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$$\frac{n!}{(n-1)!} p^{m-1} (1-p)^{n-m} = p \sum_{\ell=0}^{n-1} \frac{\ell+1}{n} \frac{(n-1)!}{(n-1-\ell)! \ell!} p^{\ell} (1-p)^{n-1-\ell}$$
$$= p \frac{n-1}{n} \sum_{\ell=0}^{n-1} \left[\frac{\ell}{n-1} + \frac{1}{n-1} \right] \frac{(n-1)!}{(n-1-\ell)! \ell!} p^{\ell} (1-p)^{n-1-\ell} = p^2 \frac{n-1}{n} +$$

$$\frac{\ell!}{(n-1)!} p^{m-1} (1-p)^{n-m} = p \sum_{\ell=0}^{n-1} \frac{\ell+1}{n} \frac{(n-1)!}{(n-1-\ell)! \ell!} p^{\ell} (1-p)^{n-1-\ell} = p \frac{n-1}{n} \sum_{\ell=0}^{n-1} \left[\frac{\ell}{n-1} + \frac{1}{n-1} \right] \frac{(n-1)!}{(n-1-\ell)! \ell!} p^{\ell} (1-p)^{n-1-\ell} = p^2 \frac{n-1}{n} +$$

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Multinational Corporations' Effective Tax Rates: Evidence from Orbis

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Abstract:

Effective tax rates (ETRs) estimated from the balance sheet data of multinational corporations (MNCs) are useful for comparing MNCs' corporate income taxation across countries. In this paper we propose a new methodological approach to estimate ETRs as reliably and as for as many countries as possible using Orbis' unconsolidated data for the 2011–2015 period. We focus on countries with at least 50 available companies, which results in a sample of 50, mostly European, countries. We estimate the ETR of a country as the ratio of corporate income tax to gross income for all affiliates of MNCs in that country, weighted by gross income. We propose four ETR estimations, including lower and upper bounds, which differ by gross income calculation. We find that ETRs substantially differ from statutory rates for some countries. For example, we show that despite similar statutory rates of 28% and 29%, MNCs in Luxembourg paid as little as 1–8% of gross income in taxes while those in Norway paid as much as 45–66%. Despite being the best available, existing data is still imperfect, and we therefore call for better data in the form of MNCs' unconsolidated, public country-by-country reporting data.

JEL: C81, F21, F23, H25, H26

Keywords: Effective tax rate, multinational corporation, foreign direct investment, profit shifting, tax haven, tax competition

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1 Introduction

Tax avoidance by multinational corporations (MNCs) contributes to inequalities both between and within countries. When MNCs shift profits to tax havens, other countries receive less profit – and lower tax revenues. In case MNCs avoid taxes in a given country, the tax burden is transferred to other taxpayers, who are then likely to view the tax system as inequitable. Recent policy proposals have recognized this risk, i.e. the low taxation of MNCs leading to the tax system being considered inequitable, to a varying extent. For example, breakthrough proposals for unitary taxation in the European Union (European Commission, 2016) or globally (Picciotto, 2017) suggest that MNCs’ profits should be apportioned according to economic activity carried out in individual countries—usually a combination of employees, wages, assets and turnover. More recently as well as more cautiously, OECD (2019b) made proposals in response to the digitization of the economy. While OECD Secretary-General Angel Gurría states that the ultimate goal is ensuring that all MNCs “pay their fair share” (OECD, 2019a, p. 1), a term which assuredly requires further discussion, there is currently no consensus regarding the amount of corporate income tax paid by MNCs in individual countries. In this paper we answer this question and provide the best available evidence for many countries worldwide.

First, we strive to identify how much MNCs pay in corporate income taxes in various countries. We answer this primary research question by estimating effective tax rates (ETRs) on the basis of MNCs’ balance sheet data. In order to provide as reliable ETR estimates as possible, we use unconsolidated data on MNCs provided by Orbis, which has the best data coverage for Europe and a good one, with at least 50 companies, for a total of 50 countries worldwide. We estimate ETR as the ratio of corporate income tax to gross income for all affiliates of MNCs in a given country, weighted by gross income. These MNCs’ ETRs show how much MNCs pay in corporate income tax as well as how large a share of their profits governments receive in the form of corporate income tax revenues. In addition to comparing estimated ETRs across countries, we also compare them with statutory (or nominal) corporate income tax rates. These ETRs are also directly relevant to some recently discussed policy proposals. For example, the second pillar of the OECD (2019b) proposal aims to ensure a minimum corporate income tax imposed on MNCs’ profits. Should this minimum tax be based on ETRs estimated using MNCs’ data, our estimates could be used to indicate which countries are currently below the minimum and to what extent they might be affected by this policy.

Existing studies have attempted to answer our primary research question primarily by relying on one of two conceptually different approaches to ETRs. One uses a model of hypothetical companies developed on the basis of existing legislation (e.g. Devereux & Griffith, 1999, 2003), which results in forward-looking ETRs. On the one hand, these forward-looking ETRs have been estimated extensively, e.g. for EU member states (Spengel et al., 2014) or G20 countries (Congressional Budget Office, 2017); they provide important policy insights and are useful in research. On the other hand, they seldom focus on MNCs and their estimates are by definition based on hypothetical modelling rather than on the observed behaviour of companies; as such, they are thus unsuitable for our purposes. The second approach uses data available for existing companies to develop backward-looking ETRs (or simply ETRs in this paper) which constitute our focus and which we discuss in detail below. Furthermore, despite our focus on estimating backward-looking ETRs, we do compare them with one set of leading estimates of forward-looking ETRs prepared by the OECD (Hanappi, 2018). While the label of ETRs has been applied to a number of concepts, we believe that the potential of backward-looking ETRs in particular has gone untapped thus far and that their use in research has been limited by their availability.

At present, no established source of such MNCs' ETRs is readily available or widely used. To the best of our knowledge, no reliable and continuously updated databases of ETRs estimated using company data are currently available. This lack of ETRs may be explained by both data- and methodology-related obstacles, as discussed below. For example, even the best available data sets suffer from poor accuracy and limited coverage. In addition, even if the data were perfect, the very existence of multiple methodological approaches designed to estimate ETRs constitutes an issue in itself; furthermore, there is thus naturally less consensus on how to estimate ETRs than e.g. on how to determine the statutory tax rate. In this paper we overcome these challenges and fill the gap by developing a new methodological approach to estimate ETRs as reliably and as for as many countries as possible. To do so, we provide newly estimated ETRs which shed new light on corporate taxation across many European and other countries. These novel findings may be of particular interest in the light of recent changes in the taxation of MNCs worldwide, ranging from the OECD's 2015 BEPS and more recent proposals to the European Council agreeing on the Anti Tax Avoidance Directive and the US passing a landmark tax reform in 2017. To discuss the effects of any reform of the taxation of MNCs, we first need to establish the status quo, starting with how much tax MNCs currently pay.

In this paper we find that the amount of taxes paid by MNCs varies considerably from country to country while also establishing substantial differences between ETRs faced by MNCs and statutory corporate income tax rates. As an extreme example, we show that despite similar statutory rates of 28% and 29%, MNCs in Luxembourg paid as little as 1–8% of gross income in taxes between 2011 and 2015 while those in Norway paid as much as 45–66% in the same period. Furthermore, although ETRs are expected to be lower than statutory rates in most cases, given the ample range of tax credits and incentives provided by governments in the form of e.g. special economic zones, tax holidays or research and development tax credits, our results are the first to reveal the actual extent of these differences. Our results also suggest that some EU countries do not tax MNCs much and that e.g. Luxembourg cannot lower its effective taxation much further since its ETRs are already close to zero. This indicates the presence of a race to the bottom with respect to ETRs.

The remainder of the paper is structured as follows. In Section 2 we discuss the characteristics of Orbis data, which, despite being imperfect in some respects, still constitute the most suitable data set for estimating ETRs, especially in Europe. In Section 3, we outline our straightforward approach to estimating ETRs using unconsolidated data. In Section 4, we present the results and discuss the differences between estimated ETRs and statutory rates. In Section 5, we briefly examine the implications of our results for policy and future research. The Appendix includes additional figures as well as the results of our robustness checks.

2 Data

We use the Orbis database to estimate ETRs across countries and over time. Orbis is a commercial product of the Bureau van Dijk company and one of the best company-level data sources available. Its coverage of companies since the mid-2000s is quite comprehensive, with information for some companies available since the 1980s. Orbis has been widely used in economic literature and contains both consolidated and unconsolidated data. Unconsolidated data may be used to estimate ETRs for individual subsidiaries and thus to estimate how much tax MNCs pay in individual countries, which is why we use them in this paper. On the other hand, while consolidated data may be used to estimate ETRs at company group level, they cannot be disaggregated by country and are therefore not used in this paper. Key variables associated with unconsolidated data used in the Orbis database are profit (labelled “P/L before Tax” in the Orbis database), tax (“Taxation”), operating profit (“Operating P/L [=EBIT] (equal

to P/L before Tax - Financial profit”), financial revenue (“Financial revenue”) and financial expenses (“Financial expenses”).

We now clarify the process of data selection using the Orbis company database (Table 1). We start with a sample of 15,684,360 companies and 60,400,740 observations, of which 866,762 companies and 3,571,361 observations are subsidiaries of MNCs which have ownership links to foreign companies. Due to their specific behaviour and distribution across countries, we exclude all financial companies by keeping the subsidiaries of Orbis type “C” (corporate) companies. By including only private limited companies and public limited companies, which reduces the number of companies by 6%, we arrive at a sample which is more comparable across countries and which allows us to establish the tax payment of the ETR of an average MNC. To reduce the effects of losses from earlier years carried forward (which often leads to positive taxation, i.e. taxes received rather than paid, in subsequent years), we drop observations with negative profits if the observation occurs in the last year of the sample (we carry out a robustness check which shows that the results are broadly similar with and without this adjustment).

Table 1. Orbis data sample

Restrictions in data	Number of companies	% of companies	Number of observations	% of observations
Initial sample	15,684,360	(100.0%)	60,400,740	(100.0%)
1. Drop domestic:	866,762	(5.5%)	3,571,361	(5.9%)
2. Drop financial:	571,058	(3.6%)	2,186,594	(3.6%)
3. Drop non-limited	529,335	(3.4%)	2,057,124	(3.4%)
5. Drop company if losses in 2010:	452,028	(2.9%)	1,673,097	(2.8%)
6. Keep 2011–15:	404,302	(2.6%)	1,247,547	(2.1%)
7. Drop last year if negative profits:	329,426	(2.1%)	1,016,675	(1.7%)
8. Drop if <3 obs:	194,662	(1.2%)	821,051	(1.4%)
9. Group by id:	194,662	(1.2%)	203,184	(0.3%)
10. Drop negative tax:	171,244	(1.1%)	177,741	(0.3%)
11. Drop negative profit:	165,024	(1.1%)	171,12	(0.3%)
12. Drop ETR>1 i.e. Final sample	163,047	(1.0%)	168,994	(0.3%)

Notes: Authors on the basis of Orbis 2011–2015.

We use the latest Orbis version available to us at the time of research. We utilize the fullest Orbis data as accessed in December 2017; in this case, the latest year with available data is

2016 (which had poor coverage) and the best five-year period is 2011 to 2015. Our study of ETRs is limited to this five-year-long period in order to allow tax credits awarded by losses to offset tax liabilities. In order to ensure data quality and robustness, we establish an inclusion criterion which states that a company must be observed a minimum of three times during the 2011–2015 period to qualify for inclusion in our sample. Finally, we also delete all companies with negative profits or taxes for the entire period, and companies with ETRs over the value of one. The advantage of these adjustments is that negative taxes or taxes higher than profits do not make good economic sense, perhaps with the exception of a merger of two companies or other forms of restructuring which we are not able to capture properly using existing data. The disadvantages are that deleting observations with negative taxes might inflate ETRs and that deleting observations with ETRs above one might deflate ETRs. These adjustments result into a final sample of 163,047 MNCs (and 168,994 observations, the difference between those numbers are companies that changed global ultimate owner during the time period sample and so they count as 2 or more observations if they pass the filters).

Overall, our results are based on the following final sample: the data sample includes 50 countries with available data for a minimum of 50 companies (out of a total of 90 countries with at least one company in Orbis; we also present results for all these countries in tables below for the sake of completeness). While the sample includes all EU member states, it unfortunately does not include the US due to its poor coverage in the Orbis database (only one company included).

We use Orbis since it constitutes the most suitable source for a cross-country analysis of MNCs' unconsolidated data. We selected it based on a detailed study of Orbis and alternative data sources. Although Orbis is one of the best available data sources, it does suffer from a number of shortcomings. We discuss in the methodology section below how we deal with one such limitation associated with the low level of detail relevant to financial profits data available in Orbis (in contrast to Orbis, some country-specific data sources such as Dafne for Germany provide more detailed information and overcome similar limitations). Additional limitations of Orbis are discussed by Cobham and Loretz (2014), Kalemli-Ozcan, Sorensen, Villegas-Sanchez, Volosovych, & Yesiltas (2015), Schimanski (2017), Garcia-Bernardo et al. (2017), Garcia-Bernardo & Takes (2018), Bajgar et al. (2018), Garcia-Bernardo, Janský, & Tørsløv (2019b) and Clausing (2020). For example, its coverage of individual companies is not universal and differs from country to country—it is, for example, biased against tax havens and developing countries. Even for included companies, the amount of available information differs

and is frequently limited. Tørsløv, Wier, & Zucman (2020) show that only a weighted average of 17% of global (consolidated) profits is included in the unconsolidated accounts. Furthermore, the Orbis database is unable to sufficiently account for the specific characteristics of various tax systems—e.g. deferred taxes are of relatively low quality, although we do address this issue in part by using a five-year period. Similarly, the Orbis database does not account for specifics of individual corporate income tax systems (e.g. up to six sevenths of the corporate tax paid in Malta can be claimed as refunds to shareholders). In view of these Orbis limitations, any results based on this database, including ours, are limited; as such, they should not be used as the only evidence base for policymakers' decisions.

In addition to Orbis company data, we use several other data sources. In the results section we compare ETRs with headline statutory corporate income tax rates, which generally constitute the most frequently applied or the highest applicable statutory rates. These statutory rates are sourced primarily from a corporate income tax database published by KPMG (2018), supplemented by additional sources when needed (Janský & Palanský, 2019). We also compare our backward-looking ETRs with forward-looking ETRs from OECD available for 2017 (Hanappi, 2018) in three interest and inflation rate scenarios: low, high and country-specific.

3 Methodology

In this paper we develop a new methodological approach to estimate four versions of MNCs' ETRs. All four versions are based on the same logic: for each MNC affiliate, we divide its corporate income tax by its gross income to arrive at its ETR. We then calculate a gross income-weighted mean of the ETRs of all affiliates located in one country. In this way we arrive at a country-level ETR for all affiliates of all MNCs in one country. In effect, this is a gross income-weighted mean of ETRs of MNCs' affiliates located in one country.

ETR estimation is complicated by the fact that information on gross income is not unambiguously available in the data. For ETR estimation purposes, gross income would ideally comprise corporate income taxes, operating profits, and only some financial profits. Such financial profits would ideally include interest (as well as other income such as royalties) but not equity. This is due to the fact that while interest is generally taxable – and should thus be included in gross income, equity is not – and should therefore be excluded from gross income. If available data distinguished between interest and equity, we could estimate “true ETR” values by excluding equity from its denominator. In reality, no such distinction is available for most companies. Orbis provides only three relevant indicators with good availability: financial

revenue, financial expenses and financial profit (financial profit is financial revenue minus financial expenses). Each of the three variables lumps together both interest and equity (a separate variable does exist for interest paid, but we do not use it since there is no variable for interest received). To address this inherent limitation of Orbis data, we calculate four separate versions of ETR estimates: two point estimates as well as lower and upper bound estimates.

While each of our two point estimates makes good economic sense, neither likely produces a true ETR value owing to its construction. To calculate ETR1 we include both financial revenue and financial expenses in the denominator, thereby also including equity income which should ideally be excluded since it is likely not taxable. By contrast, to calculate ETR2 we exclude both financial revenue and financial expenses from the denominator of, thus excluding not only equity income, but also interest income, which is likely taxable and should be included. The two main ETR estimates are calculated using unconsolidated company data for each country i and year t as follows:

$$ETR1_{it} = \frac{\sum \text{Corporate income tax}_{it}}{\sum (\text{Corporate income tax} + \text{operating profit} + \text{financial profit})_{it}}$$

$$ETR2_{it} = \frac{\sum \text{Corporate income tax}_{it}}{\sum (\text{Corporate income tax} + \text{operating profit})_{it}}$$

where the sum of corporate income taxes constitutes unconsolidated taxes accounted for in the balance sheets of MNC affiliates located in country i and the sum of gross incomes constitutes a sum of these taxes and the remaining unconsolidated gross income accounted for in the balance sheets of MNC affiliates located in country i . Gross income in ETR1 includes corporate income taxes, operating profit along with financial revenue and financial expenses, i.e. the sum of interest income (taxable in country i) and equity income (generally not taxable in country i). On the other hand, gross income in ETR2 only includes operating profit in addition to the taxes. Since both point estimates constitute logical approaches to the presented data challenge, we present both sets of results as the two best estimates of true ETR values. Since the interest and equity income variables may attain both positive and negative values, ETR1 may be either lower or higher than ETR2 (indeed, ETR1 is lower than ETR2 for 28 of the 50 countries, see Table 2 below). As a result, neither ETR1 nor ETR2 can function as either a lower or an upper bound for the true ETR value and additional estimates are thus needed.

We propose two additional estimates to delineate the lower and upper bounds of true ETR values. We first estimate the lower bound, i.e. ETR3, by adding financial revenue to corporate

income tax and operating profit—which constitutes the denominator of ETR2. Since financial revenue is always positive, the denominator is the highest of the four ETR versions, therefore producing the lowest ETR (as low or lower than the true ETR). Second, we estimate the upper bound, i.e. ETR4, by subtracting financial expenses from corporate income tax and operating profit—which constitutes the denominator of ETR2. Since financial expenses are always positive, the denominator is thus the lowest of the four ETR versions, therefore producing the highest ETR (as high or higher than the true ETR). Similarly to the point estimates, these supplementary bound estimates can be calculated as follows:

$$ETR3_{it} = \frac{\sum \text{Corporate income tax}_{it}}{\sum (\text{Corporate income tax} + \text{operating profit} + \text{financial revenue})_{it}}$$

$$ETR4_{it} = \frac{\sum \text{Corporate income tax}_{it}}{\sum (\text{Corporate income tax} + \text{operating profit} - \text{financial expenses})_{it}}$$

Overall, having considered alternative approaches to address the above mentioned data limitation, we opt for the inclusion of four ETR versions in the absence of one true ETR value estimate. Since ETR1 and ETR2 are both candidates for the most suitable point estimate of the true ETR, and since no overriding argument in favour of one or the other exists, we include both. We include ETR3 and ETR4 because they serve as lower and upper bounds, thus indicating the range, however wide, where the true ETR is to be expected with confidence. Although we value the simplicity of one ETR version, in the face of the complexity of available data we include four complementary versions, presented alongside each other in the results below. In addition to using mean values in our headline estimates, we provide results following the same methodology, but applying medians instead of means (different indicators of distribution may be provided as well, though we do not present these due to limited space). Using median values ensures that the results are less affected by large companies. For most countries the median values are higher than means (which is consistent with recent research by Reynolds & Wier, 2018, who show that in particular large companies engage in profit shifting). While for our paper we present mean values as headline estimates, as is common in existing literature, median-based estimates may be useful for other research questions in the future.

We aim to utilize as much data as possible for estimating each of the four ETR versions. In doing so, we use all data available for the estimation for each of the four versions, i.e. we use a different data sample for each version due to differences in the availability of individual variables. In general, operating profit data are available for more companies than financial profit data; furthermore, financial profits are not divided into financial expenses and revenue for some

companies in some countries. Of the 50 countries, there are two extreme examples. Estonia has over 600 companies with data available for ETR1 and ETR2 but only one company with data suitable for ETR3 and ETR4 while Singapore has 642 companies with data available for ETR1 but no companies for any of the other ETR versions. In some countries, ETR4 estimates may thus not be the highest values of the four ETRs. This is a consequence of differences in utilized data samples rather than the outcome of inconsistencies in the design of the four ETRs. Alternatively, in contrast with using as much data as possible, and consequently utilizing different data samples for each of the four ETRs, it is possible to establish a single data sample with available data for all four ETR versions. While this alternative produces four empirically consistent ETR versions, each is based on a lower number of companies (e.g. in the case of Estonia all four versions are based on a single company) and it thus fails to exploit all of the available data. In the interests of providing a truly comprehensive approach, we implement this alternative as one of the robustness checks and present the results in the Appendix.

ETRs estimated using unconsolidated data enable us to study the extent to which ETRs differ across countries and from their statutory rates. To compare these, we use one headline statutory rate for each country, which, of course, provides us with only an imperfect comparison, especially in case a given country implements a variety of rates either across various parts of the country (e.g. states in the United States) or for different types of companies (e.g. Germany). In the case of Germany, research interest has recently surged, in part in response to this paper's preliminary results used in a policy report (Janský, 2019) which sheds further light on why the estimated ETR range is rather wide (see e.g. in German literature, Bräutigam, Ludwig, & Spengel, 2019, and Huber & Maiterth 2019). Germany is, of course, only one relatively well studied example, another is South Korea's progressive tax schedule (OECD, 2018b). Indeed, many other countries exhibit specific corporate income tax complexities which co-determine the value of ETRs and generally make them lower than statutory rates. One of the reasons leading to this disparity includes tax avoidance; for example, Joshi (2019) uses ETR and the difference between ETR and statutory tax rates as a proxy for tax avoidance (Dyrenge et al., 2008, Hanlon & Heitzman, 2010). More generally, when compared with statutory rates, ETRs might indicate the effect of tax deductions – including tax holidays and other *ad hoc* arrangements such as tax exemptions and tax rulings – as well as other tax provisions which codetermine tax paid by companies and how ETRs differ across countries. For example, if an MNC affiliate receives a tax holiday or a tax ruling in a given country, we expect its ETR to be lower than the headline statutory rate. Some of these tax deductions and other regulations are

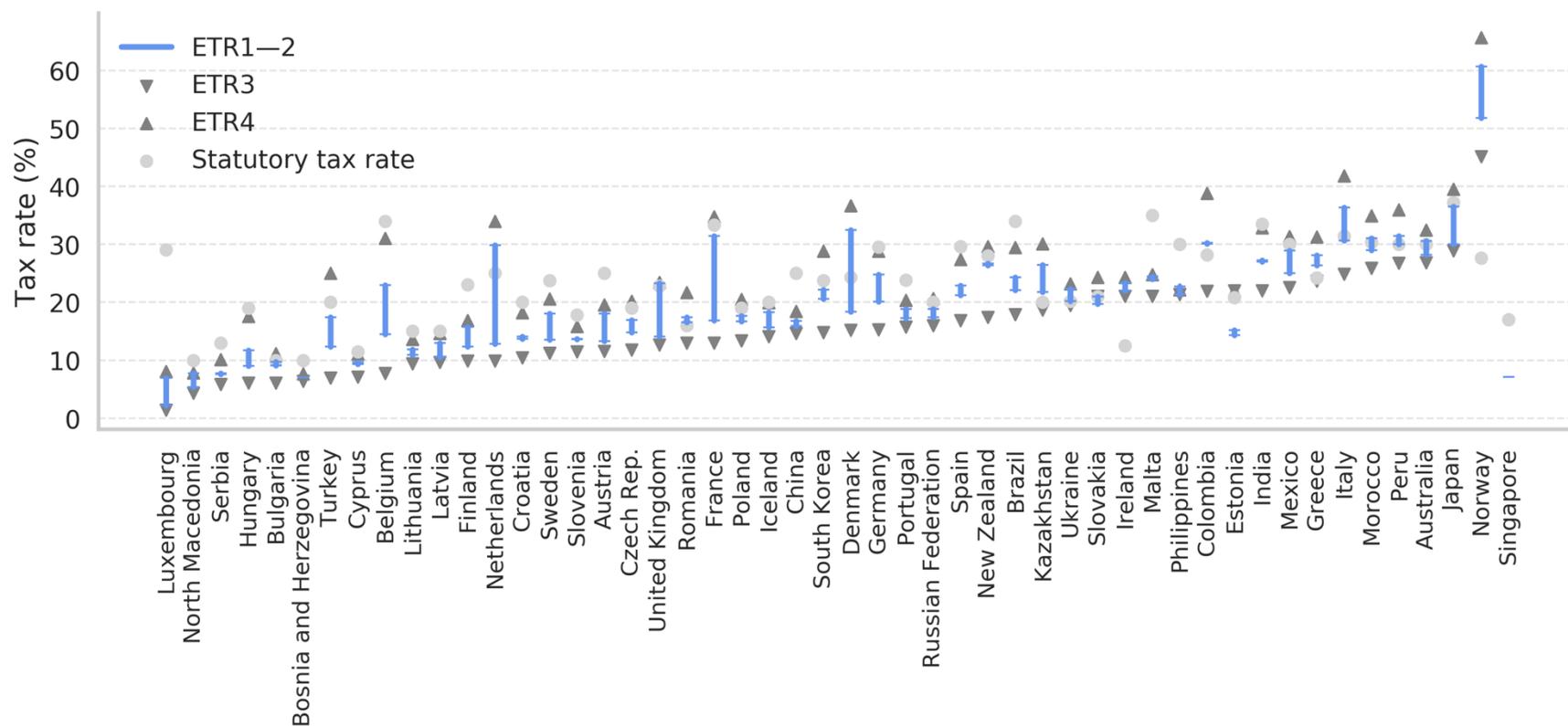
captured both by backward-looking ETRs, which form the focus of this paper, and by forward-looking ETRs (e.g. Devereux & Griffith, 1999) recently estimated by the OECD (Hanappi, 2018), which we briefly compare our estimates to below.

The question of how much taxes – and where – MNCs’ affiliates pay is best answered by examining ETRs estimated using unconsolidated data. Alternatively, to the extent that the worldwide taxation of MNCs headquartered in a given country is of interest, ETRs using consolidated MNC data may be estimated as a weighted average of company-level ETRs of companies headquartered in that country, as recently carried out by Garcia-Bernardo, Janský, & Tørsløv (2019a). Ultimately, we consider both consolidated and unconsolidated data useful for estimating ETRs, though opting for one or the other is best governed by the purpose at hand. One natural consideration is data availability, which is generally better for consolidated rather than for unconsolidated Orbis data. Indeed, as we discuss above, unconsolidated data availability in terms of both coverage and quality limits the estimation of unconsolidated ETRs. Still, if one is interested in the overall effects of the corporate income tax systems of individual countries, these ETRs facilitate an unparalleled view of MNCs’ taxation.

4 Results

We present the results of MNCs’ ETRs for individual countries calculated using Orbis data as gross income-weighted means for a five-year period between 2011 and 2015. First, we show the main results in Figure 1, which displays the four ETR versions described in the preceding methodology section along with the applicable statutory rates (means for the 2011–2015 period). Figure 1 shows 50 countries with data on at least 50 companies, including all 27 EU member states as of February 2020 that are also shown on a map in Figure 2. In addition to providing the same results as Figure 1, Table 2 includes estimates for all 90 countries with at least one company included in the data (with countries with fewer than 50 companies marked with an asterisk *) as well as the number of companies used to calculate each ETR version. This is provided for the sake of completeness and transparency, though results for countries with a limited number of companies should be treated with a higher degree of caution than the sample of 50 countries. Furthermore, in addition to means in Figure 1, we include estimates for medians in Table 2, which are more consistent across ETR1 to ETR4, but we use means in our headline estimates as is common in the existing literature. We now present some of the most interesting findings, mostly using the two extreme ETR values (i.e. ETR3 and ETR4) to describe the results.

Figure 1. Effective tax rates



Notes: Corporate income statutory tax rates (CIT), means and medians of ETRs in four estimations (ETR1–ETR4, defined in text) for 2011–2015, sorted by ETR3. Countries with fewer than 50 companies per sample are not included in this figure.

We find that MNCs do not pay much tax on their profits in some countries. In three of the 50 countries included in Figure 1 (Luxembourg, North Macedonia, and Bosnia and Herzegovina) we observe that all ETR values are lower than 10%. While our approach does not enable us to say whether this is what MNCs should be paying, some of these values are low both absolutely and in contrast to statutory rates (in the case of Luxembourg) as well as in comparison to other countries (Bosnia and Herzegovina and North Macedonia). A case in point is Luxembourg with a lower bound (ETR3) of 1% and an upper bound (ETR4) of 8%, but a statutory rate of 29%. Some evidence indicates that tax rulings have played a role in Luxembourg's low ETR (European Commission (2018a, 2018b)).

Differences in ETRs were observed between individual countries. Out of the 50 countries and across the four ETR versions displayed in Figure 1, MNCs may expect to pay between 0% and 10% in 5 countries, 10–20% in 20 countries, 20–30% in 20 countries, and over 30% in 5 countries (and as little as 1% or as much as 65% in the most extreme cases) of their profit in taxes (numbers of countries are approximate due to the four versions of ETRs). Figure 1 confirms that Bosnia and Herzegovina, North Macedonia, and Luxembourg have the lowest ETR (with all four ETR versions below 10%) of the 50 displayed countries while Norway has the highest ETR (ETR3: 45%; ETR4: 66%). Most other countries with high ETRs are generally non-European countries such as Japan, Peru, Australia, or Morocco. In the EU, in addition to Luxembourg, countries with the lowest ETRs include Cyprus (7–11%) and Bulgaria (6–11%). While other EU member states have relatively low lower bounds, their upper bounds tend to be higher, e.g. in the case of Hungary (6–18%), Belgium (8–31%) and the Netherlands (10–34%). EU countries with the highest ETR include Italy (25–42%) and Greece (24–31%). The ETRs of the remaining 20 EU countries range between 10% and approximately 30%, including those of the biggest EU economies such as France (13–35%) and Germany (15–29%). The United Kingdom (13–24%) falls into the same range, though it is no longer an EU member state.

As expected, ETRs are lower than statutory rates in most countries. ETRs 1, 2, 3 and 4 are lower than statutory rates in 40, 39, 46 and 23 out of the 50 countries. This is natural in view of tax holidays and other tax provisions, which lead to ETRs being lower than statutory rates. Lower ETR bounds, i.e. ETR3, are higher than statutory rates only in Norway, Ireland and Estonia. We observe the only substantial difference in the case of Norway, where the four ETR versions are 51%, 59%, 44% and 65%, whereas the statutory rate of 28% is far lower. This is likely due to special tax provisions applicable to the Norwegian petroleum sector, which is subject to a marginal tax rate of up to 78% (The Norwegian Tax Administration, 2018). Ireland, with ETR

values of 23%, 22%, 21% and 24% and a statutory rate of 12.5%, presents a more intriguing case; however, given the data limitations, these results are consistent with existing literature. Our data does not account for the case of the Apple company (Tørsløv et al., 2020) and the Irish public audit body has recently found ETRs of similar magnitude (Comptroller and Auditor General, 2017, in particular pp 294, 298 and 299). The audit body also counters the evidence of low taxation in Ireland presented by e.g. Stewart (2014) by arguing that the Bureau of Economic Analysis data used for this approach includes financial data from MNCs' operations everywhere, not just in Ireland, and, as such does not necessarily constitute a reflection of MNCs' operating activities in Ireland or corporation tax paid in Ireland (Comptroller and Auditor General, 2017, p 294). Our use of Orbis-based ETRs for Ireland and other countries is further supported by the fact that they are positively, albeit of course not perfectly, correlated with backward-looking ETRs based on other data sources including country-by-country reporting data for US-headquartered MNCs (Garcia-Bernardo et al., 2019a)

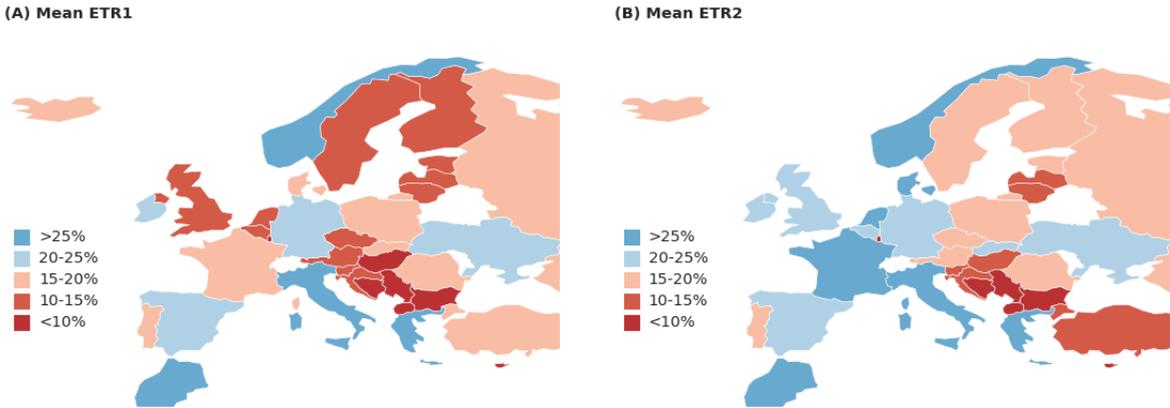
Furthermore, we observe sizeable differences between individual countries with respect to how much lower ETRs are than statutory rates. On the one hand, countries such as Ukraine, Bulgaria, and Slovakia exhibit ETRs comparable to their statutory rates. In the case of these countries, the statutory rate provides approximate information on corporate income tax which MNCs can expect to pay. On the other hand, substantial differences between the two rates are found in a range of other countries. While Luxembourg once again constitutes a case in point, statutory rates do not provide a great deal of information on the tax burden MNCs face in many other countries.

ETRs and statutory rates are positively related, though less so in the case of EU countries (Figure A1). At country level, the correlation between the four ETR versions and statutory rates is 0.59, 0.64, 0.52, and 0.66 (estimates for our sample of 50 countries which includes some non-EU countries while facilitating a comparison between EU countries and the rest of the world; estimates for a sample of 90 countries are similar, but not shown). However, in the case of EU countries, the correlation is only similar for ETR2 and ETR4, with ETR1 and ETR3 values being at approximately one half: 0.35, 0.61, 0.24 and 0.61. While statutory rates may thus be viewed as informative with respect to worldwide ETRs, they tend to be less informative in the case of EU countries and this is likely due to similar cases such as the above discussed case of Luxembourg. Similarly, forward-looking ETRs are positively correlated with our ETRs, with correlations ranging between 0.42 and 0.64 in the main sample, and between 0.24 and 0.61 in the EU sample (Figure A1). Forward-looking ETRs are also included for comparison (with

mostly higher values than our backward-looking ETRs) in Figure A2 in the Appendix and Table 2.

In addition to the main results provided in Figure 1 and Table 2, we present the results of three robustness checks which are broadly consistent with our main results. These results are presented in the Tables A1, A2 and A3 of the Appendix. In Table A1 we do not exclude observations for companies with negative profits in the previous year. In Table A2 we use a balanced panel data set for all four ETR versions. In Table A3 we apply both of these conditions simultaneously.

Figure 2. Effective tax rates in Europe



Notes: Mean ETR1 and ETR2 values in Europe. Countries with fewer than 50 companies per sample are not included in this figure.

Table 2. Effective tax rates

Country	EU	ISO2	CIT (%)	OECD Forward-looking ETRs (%)			Mean (%)				Median (%)				Number of companies			
				Low	High	C-S	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4
Albania*	Europe	AL	12	14.5	14.3	19.8	14.4					14.4						1
Algeria*		DZ	25				25	19.3	17.6	13	23.2	21.6	19.5	24.9	37	36	38	32
Argentina*		AR	35	35.7	35.9	46.2	37.4	38.5	32.6	46.7	35.4	35.1	33.3	38.5	34	25	29	20
Australia		AU	30	31.4	31.8	42.6	30.5	28.2	26.8	32.5	29.8	28.4	26.7	30.7	1496	1489	1346	1174
Austria	EU27	AT	25	23.7	22.9	32	13.3	18.1	11.5	19.5	21.2	22.3	17.9	25	1875	1752	1904	1592
Barbados*		BB	25				1.8		1.8		1.8		1.8	1		1		
Belgium	EU27	BE	34	26	20.6	40.2	14.5	23	7.7	31.1	29.2	29.4	22.7	34.8	6465	6055	6657	5360
Bermuda*		BM	0				18.6	36.8	16.8	46.5	18.6	36.8	16.8	46.5	1	1	1	1
Bosnia and Herzegovina	Europe	BA	10				7	7.1	6.4	7.7	9.5	9.1	8.6	10.1	312	303	318	291
Brazil		BR	34	29.9	26.8	37.4	24.3	22.1	17.9	29.5	28.9	23	19.3	33.5	404	384	411	339
Bulgaria	EU27	BG	10	9.1	8.7	11.2	9.7	9.1	6	11.1	10.1	9.6	8.9	10.6	1112	1051	1152	970
Burkina Faso*		BF	16				20.2				20.2				1			
Cape Verde*		CV	25				24.2	21.9	21.4	24.8	24.2	21.9	21.4	24.8	1	1	1	1
Chile*		CL	20.5	31.8	31	42	19.8	19.9	14.3	24.1	18.5	17.3	15	23	22	19	21	18
China		CN	25	23.6	22.9	30.7	16.8	15.9	14.6	18.5	18.9	16.2	15.3	20.4	2315	2310	2358	2240
Colombia		CO	28.2				30.2	30.1	22	38.8	32.8	32.7	27.6	39.5	697	703	237	206
Croatia	EU27	HR	20	15.6	14.2	17.6	14.1	13.7	10.4	18.2	20.6	20	18.2	22.3	1696	1679	1792	1486
Cyprus	EU27	CY	11.5	11.9	11.6	13.8	9.6	9.3	7.1	11	12.3	9.5	8.3	12.7	64	62	55	54
Czechia	EU27	CZ	19	20.6	19.8	27.4	14.8	16.9	11.8	20.2	19.5	18.4	15.5	22.1	4774	4781	4984	4089
Denmark	EU27	DK	24.3	19.5	18	25.6	18.3	32.4	15.2	36.7	24.4	24.2	20	26.1	4979	4151	5064	3766
Dominica*		DM					28.2	22.4		28.2	28.2	22.4		28.2	1	1		1
Dominican Republic*		DO	28.4				5.7				5.7				1			

Ecuador*		EC	22.6				25.4	22.2	21.5	27.1	28.3	20.7	19.1	30.7	30	31	31	29
Egypt*		EG	23.5				58.1	58.1	57.6	58.4	58.1	58.1	57.6	58.4	1	1	1	1
El Salvador*		SV	30				37.7	30.2	25.3	39.7	36.9	30.5	27.3	40.5	3	3	3	2
Estonia	EU27	EE	20.8	17	15	22.1	14.3	15.2	22	22	15.1	15.9	22	22	652	647	1	1
Finland	EU27	FI	23	19	18.5	25	12.3	15.8	9.8	16.8	22.1	21.9	20.2	23.3	3061	2960	3057	2756
France	EU27	FR	33.3	33	31.7	42.9	16.8	31.4	13	34.8	28.4	28.9	25.3	31.4	14151	13211	14443	12436
Gabon*		GA					32.4	28.3	27.6	32.6	32.4	28.3	27.6	32.6	1	1	1	1
Germany	EU27	DE	29.5	27.3	25.9	36.7	20.1	24.8	15.3	28.8	27.7	26.5	22.4	30.3	8480	8031	8588	7218
Greece	EU27	GR	24.2	27.6	27	30.4	28.1	26.4	23.7	31.2	28.6	25.6	24.9	29.5	662	711	718	653
Guyana*		GY					43	55.7	55.6	55.7	43	55.7	55.6	55.7	1	1	1	1
Hong Kong*		HK	16.5	15.2	14.5	21.5	18	23.4	18	23.4	18	23.4	18	23.4	1	1	1	1
Hungary	EU27	HU	19	9.9	9.2	11.7	9	11.7	6	17.5	10	9.4	6.8	12	1693	1643	1756	1320
Iceland	Europe	IS	20	18.8	18.3	25.3	18.3	15.7	14	20	20	19.9	18	21.9	167	158	166	137
India		IN	33.5	44.1	42.1	59.9	27	27.3	22	32.9	31.2	27.6	23.9	34.1	1395	1377	1360	1195
Indonesia*		ID	25	22.4	21	28.8	2.4	29.2	0	24.5	29.2	0		4	1	1		
Ireland	EU27	IE	12.5	11.8	11.5	15	23.4	22	21.1	24.3	14.8	13.7	12.6	14.8	257	251	193	147
Italy	EU27	IT	31.4	22.1	18.3	29.9	30.6	36.3	24.8	41.8	39.9	36.8	34.5	42.7	11474	11769	12489	10415
Jamaica*		JM	28.3	23.3	22.5	31.5	28.7	29		29	28.7	29		29	1	1		1
Japan		JP	37.2	27.5	26.1	37.2	30	36.5	28.9	39.5	39.2	41.6	36.7	43.6	7044	6760	7149	6396
Kazakhstan		KZ	20				21.7	26.4	18.7	30.1	22.1	21.6	20	23.7	70	71	72	68
Kosovo*	Europe	KV					11.7	13.2	11.3	13.9	13.8	13.8	13.8	13.8	3	3	3	3
Latvia	EU27	LV	15	13.5	12.6	17.4	10.5	13	9.6	14.7	15.9	15.4	15.1	16.5	1097	1094	1134	1043
Lebanon*		LB	15				16.1	16	15.8	16.2	16.1	16	15.8	16.2	1	1	1	1
Liechtenstein*	Europe	LI	12.5	10.1	8.5	14.7	4	13.2	9.6	18.2	7.5	13.2	9.6	18.2	2	1	1	1
Lithuania	EU27	LT	15	13.3	12.4	17	10.9	11.9	9.4	13.6	15.3	14.7	13.6	16	565	559	441	432
Luxembourg	EU27	LU	29.1	24.5	23	32.8	2.2	7	1.4	8.1	13.3	20.6	6	27.9	762	542	859	420
Malta	EU27	MT	35	33.3	32.5	43.5	24.4	24	21.1	24.7	35	34.9	33.3	35	665	622	680	613
Mauritius*		MU	15	14	13.4	18.1	13.5	6.1	5.8	18.7	15.8	6.1	5.6	18.7	3	3	3	1

Mexico		MX	30	27.4	26	35	28.9	25	22.5	31.3	24.1	18.9	18.4	26.6	85	83	83	72
Moldova*	Europe	MD	12				12.1	11.8			10.7	15.7			14	11		
Monaco*	Europe	MC					33.9				33.9				1			
Montenegro*	Europe	ME	9				9	10.2	8.4	11.2	9.2	7.9	7.2	9.9	22	22	22	22
Morocco		MA	30.3				31	28.9	25.9	34.9	24.5	22.4	20.7	24.8	54	53	56	50
Netherlands	EU27	NL	25	23	21.8	30.8	12.8	29.8	9.9	34	23.6	24	19.8	25.3	2457	2015	2262	1607
New Zealand		NZ	28	26.8	25.5	33.7	26.4	26.7	17.4	29.6	28.5	29.1	27.2	30.5	449	426	452	410
North Macedonia	Europe	MK	10				5.4	7.8	4.3	7.9	7.7	7.4	6.6	8.5	264	256	272	240
Norway	Europe	NO	27.6	23.1	22.7	31.9	51.8	60.6	45.2	65.7	27.7	27.5	23.9	29.6	5016	4340	5153	4018
Pakistan*		PK	34.4				34.1	30.3	29.7	33.7	31.4	30.3	29.7	31.9	25	25	23	24
Paraguay*		PY	10				26.7	16.9	16.6	27.3	26.1	16.9	16.6	26.9	2	2	2	2
Peru		PE	30	28.1	27.4	35.4	31.5	30	26.8	35.9	30.4	25.8	23.8	32.4	55	49	51	48
Philippines		PH	30				22.7	21.4	21.4	22.1	30	27.9	27.8	29.6	568	581	582	572
Poland	EU27	PL	19	17.6	16.8	21.8	16.7	17.6	13.4	20.5	20.3	19.6	18.3	22.2	4976	4959	4880	4515
Portugal	EU27	PT	23.8	27.5	26.5	33.4	18.8	17.3	15.8	20.4	25.5	23.1	22.7	25.8	3321	3413	3454	3247
Romania	EU27	RO	16	14.5	13.6	18.8	17.4	16.6	13	21.7	17.2	16.1	13.3	20.4	3279	3349	3545	2625
Russia		RU	20	18.8	18.2	27	17.4	18.8	16	20.6	18.4	17.9	17	19.1	9402	8975	9299	8661
Serbia	Europe	RS	13				7.8	7.6	5.9	10.1	10.9	9.9	7.7	13.4	882	874	918	756
Singapore		SG	17	16.2	15.3	20.3	7.1				12.3				642			
Slovakia	EU27	SK	21	21.8	20.8	28.2	19.7	20.9	21	24.3	22.9	21.5	21.3	23.4	3134	3164	3207	2969
Slovenia	EU27	SI	17.8	17.9	17.4	22.7	13.7	13.6	11.5	15.8	17.3	16.4	14.8	18.6	1110	1092	1086	990
South Africa*		ZA	30.6	27.1	26.4	36.4	16				16				1			
South Korea		KR	23.8	22	20.8	28.3	20.6	22.2	14.8	28.8	10.9	10.3	8.7	13.2	13723	13287	13823	12116
Spain	EU27	ES	29.6	24.8	24.6	32	21.2	22.9	16.9	27.4	28.1	26.1	23.6	29.9	8585	8239	8781	7722
Sri Lanka*		LK	28				30.6	33.3	28.4	35.6	11.2	17.5	7.5	14.4	18	17	19	12
Sweden	EU27	SE	23.7	19.8	18.9	25.7	13.5	18.1	11.2	20.6	20.6	20.5	18.4	22.6	7222	6639	6953	6080
Switzerland*	Europe	CH	18	19.5	18.6	25.2	15	5.9	5.2	8.4	21.7	15	14.5	23.9	41	31	33	29
Taiwan*		TW	17				18.3	16.9	14.5	22.2	18.9	22	15.6	27.9	2	2	2	2

Thailand*		TH	22.6	21.6	20.8	27.3	18	16.9	15.1	23.2	19.8	20.2	19.8	20.2	13	13	9	13
Trinidad and Tobago*		TT	25				26.4	25.9	25.8	27.2	27.8	26.7	25.4	29.7	2	2	2	2
Tunisia*		TN	28				14.3	7.4	7.3	14.9	14.4	7.4	7.2	14.9	2	2	2	2
Turkey		TR	20	20.2	19.6	24.2	17.4	12.3	6.9	25	20	15.3	8.2	29.1	372	374	390	198
Ukraine	Europe	UA	20.2				22.3	20.2	19.5	23.2	21.2	20.7	20.5	21.5	1955	1965	1992	1921
United Arab Emirates*		AE	55				96	94.7	94.7	96.1	96	94.7	94.7	96.1	1	1	1	1
United Kingdom	Europe	GB	22.8	19	18.7	25.4	14.1	23.3	12.6	23.5	22.2	22.5	20.1	23.7	11762	10746	9936	7033
United States*		US	40	37.5	36.5	49.4	9.3	8.9	8.9	10.2	9.3	8.9	8.9	10.2	1	1	1	1
Uruguay*		UY	25				4.7	5	4.7	4.9	19.2	18.6	16	21.1	35	38	41	29
Uzbekistan*		UZ					15.2	23.7	9.6		15.2	23.7	9.6		1	1	1	

Notes: Corporate income statutory tax rates (CIT), means and medians of ETRs in four estimations (ETR1–ETR4, defined in text) for 2011–2015. OECD forward-looking ETRs (dataset CTS_ETR) for three scenarios: high inflation and interest rates (OECD-high), low inflation and interest rates (OECD-low) and country-specific inflation and interest rates (OECD-c). EU27 indicates whether a country was in the EU in February 2020 while Europe indicates non-EU countries geographically located mostly in Europe (i.e. this designation excludes Russia and Turkey). Countries marked with an asterisk () have fewer than 50 companies per sample.*

5 Conclusions

Effective tax rates estimated from multinational companies' balance sheet data are of particular interest in the light of recent changes in the taxation of MNCs worldwide. For example, while the OECD has been pursuing its BEPS Action Plan – designed to close the current system's loopholes (Devereux & Vella, 2014) – since 2015, the European Council agreed the Anti Tax Avoidance Directive one year later, with a move towards a more fundamental reform within the EU being considered in the long-term (e.g. Fuest, Hemmelgarn, & Ramb, 2007, Devereux & Loretz, 2008, Cobham, Jones, Janský, & Temouri, 2017). More recently, the US passed a landmark tax reform in late 2017 with effect from 2018 (Clausing, 2020). To discuss the effects of any reform of the taxation of MNCs, we first need to establish the current state of play, starting with how much tax MNCs currently pay. The distinct lack of an established and widely used source of such ETRs for MNCs has therefore prompted us to locate this missing link.

To estimate ETRs of MNCs in individual countries over a period of time, we use the best available company-level data for many countries, mostly in Europe. While the Orbis database does constitute the best available source, which thus enables us to study how much ETRs differ across countries or from country-specific statutory rates, it suffers from a number of inherent shortcomings, including the fact that its balance sheet data are based on financial accounting rather than on tax accounting. Better data are needed in order to achieve more informed policy decisions and obtain more reliable ETR estimates, e.g. in the form of public, subsidiary-level country-by-country reporting data, i.e. in contrast with aggregate data from tax authorities on the biggest MNCs, scheduled for publication by the OECD in 2020 (OECD, 2018). Results obtained using such data would be more suitable for follow-up research than those achieved using Orbis, e.g. when examining differences in ETRs between individual MNCs and across various fields.

The estimates of MNCs' ETRs allow us to establish differences in observed ETRs across countries. In many countries MNCs do not pay much tax. As expected, ETRs are lower than statutory rates in many countries, but countries differ significantly with respect to how much. ETRs and statutory rates are positively related, though less so in the case of EU countries. Presented evidence suggests to some extent a race to the bottom in ETRs: some EU countries do not tax MNCs much and that these EU countries cannot lower their rates further since they are already close to the bottom. Furthermore, as some of these very same EU member states are using their rights to block some of the tax reforms discussed at EU level, the EU could abandon

the requirement for unanimity in tax matters and the European Commission should consider using Article 116 of the Treaty on Functioning of the European Union to propose legislation in this respect. Furthermore, the EU as well as countries elsewhere should consider the adoption of a proposal, either the current OECD proposition or other plan, designed to introduce minimum effective corporate tax rates to stop the current race to the bottom and end unhealthy tax competition practices.

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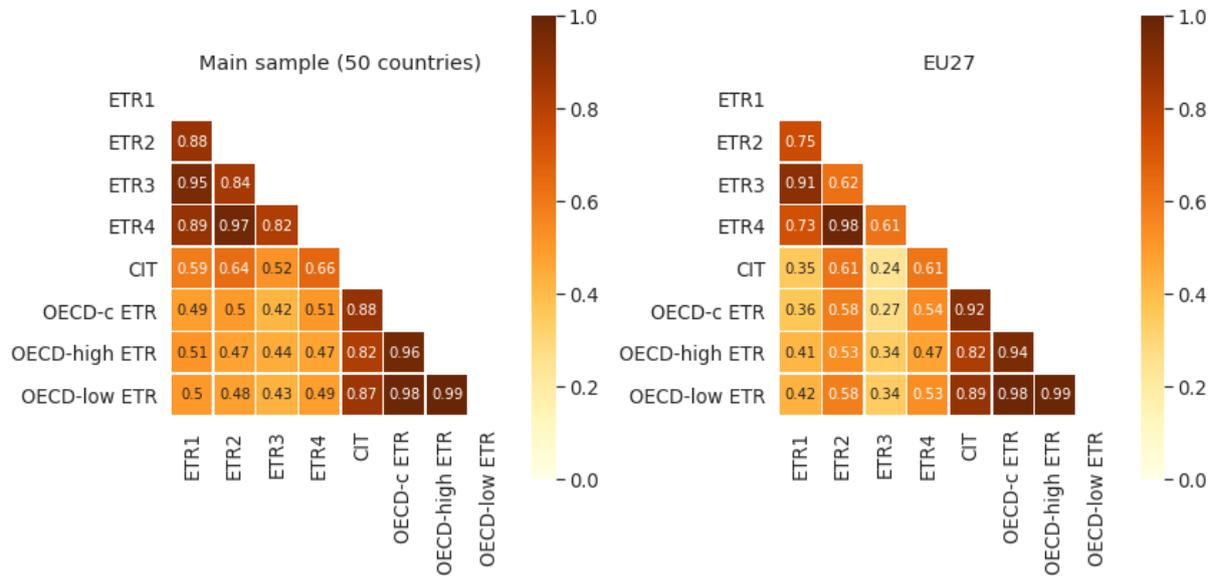
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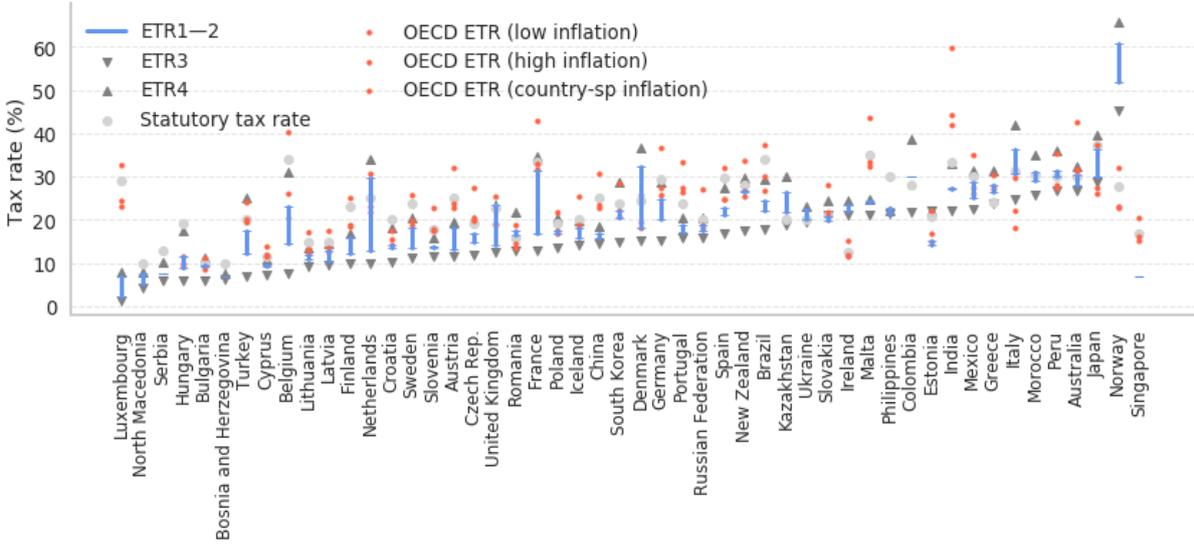
Appendix

Figure A1. Correlation between effective tax rates



Notes: Corporate income statutory tax rates (CIT), means and medians of ETRs in four estimations (ETR1–ETR4, defined in text) for 2011–2015. OECD forward-looking ETRs (dataset CTS_ETR) for three scenarios: high inflation and interest rates (OECD-high), low inflation and interest rates (OECD-low) and country-specific inflation and interest rates (OECD-c).

Figure A2. Effective tax rates, including additional data sources



Notes: Corporate income statutory tax rates (CIT), means and medians of ETRs in four estimations (ETR1–ETR4, defined in text) for 2011–2015. OECD forward-looking ETRs (dataset CTS_ETR) for three scenarios: high inflation and interest rates (OECD-high), low inflation and interest rates (OECD-low) and country-specific inflation and interest rates (OECD-c).

Table A1. Effective tax rates, robustness check (not removing observation when a company had negative profits in the previous year)

Country name	EU	ISO2	CIT (%)	OECD forward-looking ETRs (%)			Mean (%)				Median (%)				Number of companies			
				Low	High	C	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4
Albania*	Europe	AL	12	14.5	14.3	19.8	14.4				14.4				1			
Algeria*		DZ	25				25	19.3	17.6	13	23.2	21.6	20.1	25.3	38	37	41	33
Argentina*		AR	35	35.7	35.9	46.2	37.4	37.9	32.3	46.6	35.4	35.1	33.4	38.5	34	26	30	20
Australia		AU	30	31.4	31.8	42.6	30.7	28.1	26.7	32.8	29.9	28.6	26.8	30.9	1556	1569	1419	1209
Austria	EU27	AT	25	23.7	22.9	32	12.8	17.3	10.7	19.1	21.2	22.3	17.7	25	1909	1788	1976	1603
Barbados*		BB	25				1.8		1.8		1.8		1.8	1			1	
Belgium	EU27	BE	34	26	20.6	40.2	14.5	22.9	7.7	31.2	29.3	29.4	22.4	35	6574	6259	6979	5396
Bermuda*		BM	0				18.6	36.8	16.8	46.5	18.6	36.8	16.8	46.5	1	1	1	1
Bosnia and Herzegovina	Europe	BA	10				7.1	7.2	6.5	7.7	9.5	9.4	8.6	10.1	314	314	335	295
Brazil		BR	34	29.9	26.8	37.4	23.7	21.3	18.1	28.4	29.1	22.6	18.6	33.6	420	409	451	346
Bulgaria	EU27	BG	10	9.1	8.7	11.2	9.8	9.1	6	11.2	10.2	9.7	8.9	10.7	1130	1085	1211	984
Burkina Faso*		BF	16				20.2				20.2			1				
Cape Verde*		CV	25				24.2	21.9	21.4	24.8	24.2	21.9	21.4	24.8	1	1	1	1
Chile*		CL	20.5	31.8	31	42	19.8	19.9	14.3	24.1	18.5	17.3	15	23	22	19	21	18
China		CN	25	23.6	22.9	30.7	16.9	16	14.7	18.5	19.3	16.3	15.3	20.7	2439	2492	2553	2348
Colombia		CO	28.2				29.5	29.2	20.8	37.8	33.5	33.3	27.6	40.2	703	712	264	216
Croatia	EU27	HR	20	15.6	14.2	17.6	14.6	14.5	11.1	18	20.8	20	18.4	22.5	1662	1665	1802	1459
Cyprus	EU27	CY	11.5	11.9	11.6	13.8	9.8	9.4	7.2	11.2	12.3	9.5	8.5	12.6	71	73	62	59
Czechia	EU27	CZ	19	20.6	19.8	27.4	14.8	16.9	11.8	20.2	19.6	18.5	15.5	22.2	4823	4894	5185	4109
Denmark	EU27	DK	24.3	19.5	18	25.6	18	31.9	14.7	36.1	24.5	24.2	19.9	26.2	5012	4228	5251	3771
Dominica*		DM					28.2	22.4		28.2	28.2	22.4		28.2	1	1		1
Dominican Republic*		DO	28.4				5.7				5.7			1				
Ecuador*		EC	22.6				25.5	22.6	21.9	27.2	29.4	21	20	33.2	32	36	36	31
Egypt*		EG	23.5				58.1	58.1	57.6	58.4	58.1	58.1	57.6	58.4	1	1	1	1
El Salvador*		SV	30				37.7	30.2	25.3	39.7	36.9	30.5	27.3	40.5	3	3	3	2

Estonia	EU27	EE	20.8	17	15	22.1	14.3	15.2	22	22	15.2	16.2	22	22	676	668	1	1
Finland	EU27	FI	23	19	18.5	25	12.5	15.9	9.9	17	22.3	22.2	20.5	23.5	3144	3078	3213	2829
France	EU27	FR	33.3	33	31.7	42.9	16.9	31.4	12.9	34.8	28.7	29.1	25.5	31.7	14235	13353	14805	12407
Gabon*		GA					35	27.4	26.5	33	35	27.4	26.5	33	1	1	1	1
Germany	EU27	DE	29.5	27.3	25.9	36.7	20.1	24.6	15.1	28.8	27.9	26.6	22.3	30.4	8552	8231	8886	7258
Greece	EU27	GR	24.2	27.6	27	30.4	27.7	25.5	23.1	30.5	28.8	25.8	25.3	29.8	663	734	744	653
Guyana*		GY					43	55.7	55.6	55.7	43	55.7	55.6	55.7	1	1	1	1
Hong Kong*		HK	16.5	15.2	14.5	21.5	18	23.4	18	23.4	18	23.4	18	23.4	1	1	1	1
Hungary	EU27	HU	19	9.9	9.2	11.7	9.1	11.8	6.1	17.4	10	9.5	6.9	12.2	1711	1669	1830	1312
Iceland	Europe	IS	20	18.8	18.3	25.3	18.6	15.6	14.2	19.9	20	19.9	17.8	21.9	177	167	179	144
India		IN	33.5	44.1	42.1	59.9	27.1	27	21.9	32.9	31.2	27.6	23.6	34.1	1421	1450	1459	1215
Indonesia*		ID	25	22.4	21	28.8	2.4	29.2	0		24.5	29.2	0		4	1	1	
Ireland	EU27	IE	12.5	11.8	11.5	15	23.4	22	21.1	24.4	14.9	13.8	12.6	14.8	264	257	200	150
Italy	EU27	IT	31.4	22.1	18.3	29.9	30.6	35.5	24.2	41.7	40	36.8	34.5	42.8	11252	11955	12786	10170
Jamaica*		JM	28.3	23.3	22.5	31.5	28.7	29		29	28.7	29		29	1	1		1
Japan		JP	37.2	27.5	26.1	37.2	30.1	36.7	28.9	39.8	39.3	41.6	36.8	43.7	7037	6754	7185	6356
Kazakhstan		KZ	20				21.1	25.5	17.7	30.3	22.2	22.5	20.2	24	67	69	73	64
Kosovo*	Europe	KV					11.7	12.6	11	13.9	13.8	12.7	11.8	13.8	3	4	4	3
Latvia	EU27	LV	15	13.5	12.6	17.4	10.5	13.1	9.6	14.7	16.1	15.6	15.2	16.8	1092	1103	1162	1032
Lebanon*		LB	15				16.1	16	15.8	16.2	16.1	16	15.8	16.2	1	1	1	1
Liechtenstein*	Europe	LI	12.5	10.1	8.5	14.7	4	13.2	9.6	18.2	7.5	13.2	9.6	18.2	2	1	1	1
Lithuania	EU27	LT	15	13.3	12.4	17	11.2	12	9.6	13.7	15.3	14.8	13.7	16.1	570	569	448	432
Luxembourg	EU27	LU	29.1	24.5	23	32.8	2.3	7	1.3	8.1	13	19.3	3.9	28.7	808	609	1080	428
Malta	EU27	MT	35	33.3	32.5	43.5	24.3	23.9	20.9	24.7	35	35	33.3	35	704	663	725	653
Mauritius*		MU	15	14	13.4	18.1	13.5	6.1	5.8	18.7	15.8	6.1	5.6	18.7	3	3	3	1
Mexico		MX	30	27.4	26	35	28.9	25	22.6	31.4	24.5	20.5	19.3	27.8	85	84	85	72
Moldova*	Europe	MD	12				10.2	9.1			11.1	15.7			13	13		
Monaco*	Europe	MC					33.9				33.9				1			
Montenegro*	Europe	ME	9				9	10.3	8.4	11.2	9.3	8.3	7.6	10.4	23	24	24	23
Morocco		MA	30.3				31	28.6	25.6	34.9	24.9	21.9	20	25.3	55	56	59	51

Netherlands	EU27	NL	25	23	21.8	30.8	12	29.6	9.2	33.8	23.6	23.9	19.5	25.3	2499	2062	2377	1624
New Zealand		NZ	28	26.8	25.5	33.7	26.4	26.6	17.4	29.6	28.5	29.1	27.2	30.6	462	434	469	416
North Macedonia	Europe	MK	10				5.3	7.5	4.3	7.6	7.9	7.4	6.7	8.7	270	268	289	244
Norway	Europe	NO	27.6	23.1	22.7	31.9	52.2	61.2	45.2	66.2	27.7	27.5	23.8	29.8	5100	4458	5365	4054
Pakistan*		PK	34.4				34.2	30.4	29.7	33.8	31.4	30.4	29.7	32.2	26	26	24	25
Paraguay*		PY	10				26.7	16.9	16.6	27.3	26.1	16.9	16.6	26.9	2	2	2	2
Peru		PE	30	28.1	27.4	35.4	31.9	30.3	27	36.6	30.7	26	24.5	33.2	55	49	51	48
Philippines		PH	30				22.9	20.8	20.8	22.2	30	28.1	28	29.6	576	601	602	585
Poland	EU27	PL	19	17.6	16.8	21.8	17.2	17.9	13.4	20.9	20.4	19.7	18.3	22.3	5034	5079	5027	4549
Portugal	EU27	PT	23.8	27.5	26.5	33.4	19.4	17.7	16	21	25.6	23.1	22.8	26	3303	3444	3499	3230
Romania	EU27	RO	16	14.5	13.6	18.8	17.5	16.7	12.8	22	17.4	16.3	13.1	20.7	3299	3471	3913	2616
Russia		RU	20	18.8	18.2	27	17.5	18.9	16	20.7	18.6	18	17	19.3	9756	9437	9869	8930
Serbia	Europe	RS	13				7.9	7.5	5.9	10.1	11.2	10.1	7.6	13.5	913	931	999	775
Singapore		SG	17	16.2	15.3	20.3	7.1				12.4				644			
Slovakia	EU27	SK	21	21.8	20.8	28.2	19.7	21	21.1	24.4	23.1	21.7	21.5	23.6	3144	3248	3310	2971
Slovenia	EU27	SI	17.8	17.9	17.4	22.7	14.7	13.6	11.5	15.6	17.3	16.4	14.8	18.5	1115	1106	1105	991
South Africa*		ZA	30.6	27.1	26.4	36.4	16				16				1			
South Korea		KR	23.8	22	20.8	28.3	20.4	21.9	14.7	28.5	11	10.4	8.8	13.2	13765	13364	14009	12067
Spain	EU27	ES	29.6	24.8	24.6	32	21.2	22.8	17	27.3	28.1	26.2	23.7	29.9	8636	8364	8955	7742
Sri Lanka*		LK	28				30.8	33.5	28.5	35.8	11.2	17.5	7.5	16.5	18	17	19	12
Sweden	EU27	SE	23.7	19.8	18.9	25.7	13.6	18.2	11.2	20.8	20.9	20.8	18.5	22.8	7397	6838	7216	6207
Switzerland*	Europe	CH	18	19.5	18.6	25.2	15	5.9	5.2	8.4	21.8	15	14.5	24	40	31	33	28
Syria*		SY	24.4				83.5	87.4	81.1	91.8	83.5	87.4	81.1	91.8	1	1	1	1
Taiwan*		TW	17				18.3	16.9	14.5	22.2	18.9	22	15.6	27.9	2	2	2	2
Thailand*		TH	22.6	21.6	20.8	27.3	17.9	16.8	15.1	23.3	19.8	20.2	19.8	20.2	13	13	9	13
Trinidad and Tobago*		TT	25				26.4	25.9	25.8	27.2	27.8	26.7	25.4	29.7	2	2	2	2
Tunisia*		TN	28				14.3	7.4	7.3	14.9	14.4	7.4	7.2	14.9	2	2	2	2
Turkey		TR	20	20.2	19.6	24.2	17.5	12.2	6.8	25.5	20.1	15.3	8.1	28.9	380	396	427	196
Ukraine	Europe	UA	20.2				22	20.6	19.5	22.9	21.5	21	20.7	21.7	1918	1968	1998	1882

United Arab Emirates*		AE	55				96	94.7	94.7	96.1	96	94.7	94.7	96.1	1	1	1	1
United Kingdom	Europe	GB	22.8	19	18.7	25.4	14.1	22.4	12.4	22.7	22.3	22.5	20	23.8	11875	10915	10187	7080
United States*		US	40	37.5	36.5	49.4	9.3	8.9	8.9	10.2	9.3	8.9	8.9	10.2	1	1	1	1
Uruguay*		UY	25				4.8	5	4.6	5	19.2	16.4	14.4	21.2	41	46	49	35
Uzbekistan*		UZ					15.2	23.7	9.6		15.2	23.7	9.6		1	1	1	

Notes: Corporate income statutory tax rates (CIT), means and medians of ETRs in four estimations (ETR1–ETR4, defined in text) for 2011–2015. OECD forward-looking ETRs (dataset CTS_ETR) for three scenarios: high inflation and interest rates (OECD-high), low inflation and interest rates (OECD-low) and country-specific inflation and interest rates (OECD-c). EU27 indicates whether a country was in the EU in February 2020 while Europe indicates non-EU countries geographically located mostly in Europe (i.e. this designation excludes Russia and Turkey). Countries marked with an asterisk () have fewer than 50 companies per sample.*

Table A2. Effective tax rates, robustness check (balanced sample)

Country name	EU	ISO2	CIT (%)	OECD forward-looking ETRs (%)			Mean (%)				Median (%)				Number of companies			
				Low	High	C	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4
Algeria*		DZ	25				11.6	11.9	10.9	13	22.9	21.6	19.9	24.9	32	32	32	32
Argentina*		AR	35	35.7	35.9	46.2	37.7	36.9	31.9	46.7	35.2	34.9	33.4	38.5	20	20	20	20
Australia		AU	30	31.4	31.8	42.6	30.7	28.2	27.4	32.5	29.7	27.7	26.3	30.9	1071	1071	1071	1071
Austria	EU27	AT	25	23.7	22.9	32	16	17.5	14.6	19.5	21.7	22.1	19.2	25	1585	1585	1585	1585
Belgium	EU27	BE	34	26	20.6	40.2	20.8	23	16.9	31.1	30.5	29.7	25.9	34.8	5317	5317	5317	5317
Bermuda*		BM	0				18.6	36.8	16.8	46.5	18.6	36.8	16.8	46.5	1	1	1	1
Bosnia and Herzegovina	Europe	BA	10				7	7	6.5	7.7	9.5	9	8.7	10.1	291	291	291	291
Brazil		BR	34	29.9	26.8	37.4	23.9	21.8	18.6	29.5	27.9	23	19.8	33.4	336	336	336	336
Bulgaria	EU27	BG	10	9.1	8.7	11.2	9.9	9.2	8.4	11.1	10.1	9.6	9.2	10.6	970	970	970	970
Cape Verde*		CV	25				24.2	21.9	21.4	24.8	24.2	21.9	21.4	24.8	1	1	1	1
Chile*		CL	20.5	31.8	31	42	20.2	19.9	17.1	24.1	19.2	17.2	15.4	23	18	18	18	18
China		CN	25	23.6	22.9	30.7	16.7	15.9	14.7	18.5	18.8	16.2	15.3	20.4	2231	2231	2231	2231
Colombia		CO	28.2				30.8	30	25.1	39.2	34.2	33.8	29.3	41.4	156	156	156	156
Croatia	EU27	HR	20	15.6	14.2	17.6	15.1	14.1	12.1	18.2	20.5	20	18.8	22.3	1486	1486	1486	1486
Cyprus*	EU27	CY	11.5	11.9	11.6	13.8	9	8.8	7.6	11	12	9.4	8.9	12.8	45	45	45	45
Czechia	EU27	CZ	19	20.6	19.8	27.4	16.2	17	14.2	20.2	19.4	18.5	16.3	22.1	4089	4089	4089	4089
Denmark	EU27	DK	24.3	19.5	18	25.6	22.3	32.4	20.3	36.7	24.7	24.2	22.1	26.1	3671	3671	3671	3671
Ecuador*		EC	22.6				25.3	22.1	21.4	27.1	27.6	20.7	19.1	30.7	29	29	29	29
Egypt*		EG	23.5				58.1	58.1	57.6	58.4	58.1	58.1	57.6	58.4	1	1	1	1
El Salvador*		SV	30				35.7	32	29.4	39.7	36	31.7	29	40.5	2	2	2	2
Estonia*	EU27	EE	20.8	17	15	22.1	22	22	22	22	22	22	22	22	1	1	1	1
Finland	EU27	FI	23	19	18.5	25	13.5	14.9	12.2	16.8	22.3	22	20.6	23.3	2692	2692	2692	2692
France	EU27	FR	33.3	33	31.7	42.9	25.4	30.1	22.8	34.8	28.8	28.8	26.5	31.4	12436	12436	12436	12436
Gabon*		GA					32.4	28.3	27.6	32.6	32.4	28.3	27.6	32.6	1	1	1	1
Germany	EU27	DE	29.5	27.3	25.9	36.7	21.6	23.9	18.7	28.9	28.2	26.5	24	30.3	7087	7087	7087	7087
Greece	EU27	GR	24.2	27.6	27	30.4	29	26	24.5	31.2	28.5	25.6	25.2	29.5	653	653	653	653

Guyana*		GY					43	55.7	55.6	55.7	43	55.7	55.6	55.7	1	1	1	1
Hong Kong*		HK	16.5	15.2	14.5	21.5	18	23.4	18	23.4	18	23.4	18	23.4	1	1	1	1
Hungary	EU27	HU	19	9.9	9.2	11.7	12.3	12.1	9.4	17.5	9.7	9.2	7.3	12	1312	1312	1312	1312
Iceland	Europe	IS	20	18.8	18.3	25.3	18.5	15.6	14.2	20	20	19.8	18	21.9	134	134	134	134
India		IN	33.5	44.1	42.1	59.9	27.4	27.7	23.5	32.9	31.1	28.7	25.2	34.1	1186	1186	1186	1186
Ireland	EU27	IE	12.5	11.8	11.5	15	24.1	22.5	21.8	24.6	13.9	13.6	12.6	15.1	126	126	126	126
Italy	EU27	IT	31.4	22.1	18.3	29.9	36.6	35.1	31.4	41.8	40.3	36.5	35	42.7	10414	10414	10414	10414
Japan		JP	37.2	27.5	26.1	37.2	31	36.3	29.8	39.5	39.2	41.4	37	43.6	6396	6396	6396	6396
Kazakhstan		KZ	20				25.5	25.7	22.3	30.1	22.1	21.6	20.1	23.7	68	68	68	68
Kosovo*	Europe	KV					11.7	13.2	11.3	13.9	13.8	13.8	13.8	13.8	3	3	3	3
Latvia	EU27	LV	15	13.5	12.6	17.4	10.6	13	9.7	14.7	15.9	15.4	15.1	16.5	1043	1043	1043	1043
Lebanon*		LB	15				16.1	16	15.8	16.2	16.1	16	15.8	16.2	1	1	1	1
Liechtenstein*	Europe	LI	12.5	10.1	8.5	14.7	12	13.2	9.6	18.2	12	13.2	9.6	18.2	1	1	1	1
Lithuania	EU27	LT	15	13.3	12.4	17	12.1	11.9	10.6	13.8	15.3	14.6	13.6	16	415	415	415	415
Luxembourg	EU27	LU	29.1	24.5	23	32.8	4.3	6.7	3.9	8.1	24.3	23.8	20	28.4	407	407	407	407
Malta	EU27	MT	35	33.3	32.5	43.5	24.4	23.9	21.7	24.7	34.9	35	33.8	35	606	606	606	606
Mauritius*		MU	15	14	13.4	18.1	17.6	6.1	5.9	18.7	17.6	6.1	5.9	18.7	1	1	1	1
Mexico		MX	30	27.4	26	35	29.5	25.1	23.2	31.3	24	17.3	15.8	26.6	72	72	72	72
Montenegro*	Europe	ME	9				9	10.2	8.4	11.2	9.2	7.9	7.2	9.9	22	22	22	22
Morocco*		MA	30.3				31.6	28.8	26.5	34.9	24.5	22.5	22	24.8	50	50	50	50
Netherlands	EU27	NL	25	23	21.8	30.8	26.1	30.3	23.1	34.5	24.2	24.2	22.4	25.4	1433	1433	1433	1433
New Zealand		NZ	28	26.8	25.5	33.7	24.9	26.5	22.6	29.6	28.4	29.1	27.3	30.5	410	410	410	410
North Macedonia	Europe	MK	10				5.6	7.1	5.2	7.9	7.8	7.3	6.6	8.5	240	240	240	240
Norway	Europe	NO	27.6	23.1	22.7	31.9	61.1	61.1	57.1	65.7	27.8	27.5	25.3	29.6	4016	4016	4016	4016
Pakistan*		PK	34.4				33.2	29.6	29.1	33.7	31.3	30.4	28.8	32.8	22	22	22	22
Paraguay*		PY	10				26.7	16.9	16.6	27.3	26.1	16.9	16.6	26.9	2	2	2	2
Peru*		PE	30	28.1	27.4	35.4	32.2	30	27.4	35.9	30.4	25.9	24.6	32.4	48	48	48	48
Philippines		PH	30				22.8	21.4	21.4	22.1	30	27.6	27.6	29.6	567	567	567	567
Poland	EU27	PL	19	17.6	16.8	21.8	16.2	17.1	14.1	20.3	20.3	19.6	18.3	22.3	4333	4333	4333	4333
Portugal	EU27	PT	23.8	27.5	26.5	33.4	19	17.3	16.3	20.4	25.4	23.1	22.8	25.8	3247	3247	3247	3247

Romania	EU27	RO	16	14.5	13.6	18.8	17.3	16.8	14.1	21.7	16.8	16.1	14.3	20.4	2624	2624	2624	2624
Russia		RU	20	18.8	18.2	27	17.4	18.7	16.2	20.6	18.5	18	17.3	19.2	8393	8393	8393	8393
Serbia	Europe	RS	13				7.8	7.5	6.1	10.1	10.5	9.9	8.3	13.4	756	756	756	756
Slovakia	EU27	SK	21	21.8	20.8	28.2	22.1	21.7	21.3	24.3	23	21.5	21.3	23.4	2969	2969	2969	2969
Slovenia	EU27	SI	17.8	17.9	17.4	22.7	13.6	13.5	11.9	15.8	17.2	16.3	15.1	18.6	959	959	959	959
South Korea		KR	23.8	22	20.8	28.3	19.8	21.7	16.4	28.8	10.7	10.1	8.7	13.2	12110	12110	12110	12110
Spain	EU27	ES	29.6	24.8	24.6	32	22.2	23.3	19.4	27.4	28.1	26.2	24.2	29.9	7721	7721	7721	7721
Sri Lanka*		LK	28				32.3	33.9	30.9	35.6	8.9	8.3	6.3	14.4	12	12	12	12
Sweden	EU27	SE	23.7	19.8	18.9	25.7	16.1	18.3	14.5	20.6	20.8	20.4	18.8	22.6	5762	5762	5762	5762
Switzerland*	Europe	CH	18	19.5	18.6	25.2	8.1	6.4	6.2	8.4	21.7	15.5	14.6	24	28	28	28	28
Taiwan*		TW	17				18.3	16.9	14.5	22.2	18.9	22	15.6	27.9	2	2	2	2
Thailand*		TH	22.6	21.6	20.8	27.3	18.6	16.6	15.1	23.8	19.8	20.5	19.8	21.2	9	9	9	9
Trinidad and Tobago*		TT	25				26.4	25.9	25.8	27.2	27.8	26.7	25.4	29.7	2	2	2	2
Tunisia*		TN	28				14.3	7.4	7.3	14.9	14.4	7.4	7.2	14.9	2	2	2	2
Turkey		TR	20	20.2	19.6	24.2	16.2	14.6	11.1	25	20	16.8	12.8	29.1	198	198	198	198
Ukraine	Europe	UA	20.2				22.4	19.8	19.2	23.2	21.2	20.7	20.5	21.5	1919	1919	1919	1919
United Arab Emirates*		AE	55				96	94.7	94.7	96.1	96	94.7	94.7	96.1	1	1	1	1
United Kingdom	Europe	GB	22.8	19	18.7	25.4	16.9	21	15.4	23.5	22.3	22.3	20.5	23.8	6142	6142	6142	6142
United States*		US	40	37.5	36.5	49.4	9.3	8.9	8.9	10.2	9.3	8.9	8.9	10.2	1	1	1	1
Uruguay*		UY	25				4.5	4.7	4.3	4.9	17.6	16.8	15.2	21.1	29	29	29	29

Notes: Corporate income statutory tax rates (CIT), means and medians of ETRs in four estimations (ETR1–ETR4, defined in text) for 2011–2015. OECD forward-looking ETRs (dataset CTS_ETR) for three scenarios: high inflation and interest rates (OECD-high), low inflation and interest rates (OECD-low) and country-specific inflation and interest rates (OECD-c). EU27 indicates whether a country was in the EU in February 2020 while Europe indicates non-EU countries geographically located mostly in Europe (i.e. this designation excludes Russia and Turkey). Countries marked with an asterisk (*) have fewer than 50 companies per sample.

Table A3. Effective tax rates, robustness check (not removing observation when a company had negative profits in the previous year and using a balanced sample)

Country name	EU	ISO2	CIT (%)	OECD forward-looking ETRs (%)			Mean (%)				Median (%)				Number of companies			
				Low	High	C	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4	ETR1	ETR2	ETR3	ETR4
Algeria*		DZ	25				11.6	11.9	10.9	13	23.2	21.6	20.1	25.3	33	33	33	33
Argentina*		AR	35	35.7	35.9	46.2	37.7	36.2	31.5	46.6	35.2	34.9	33.4	38.5	20	20	20	20
Australia		AU	30	31.4	31.8	42.6	30.9	28.1	27.3	32.8	29.8	27.9	26.5	30.9	1099	1099	1099	1099
Austria	EU27	AT	25	23.7	22.9	32	15.6	17.1	14.2	19.1	21.7	22.1	19.3	25	1597	1597	1597	1597
Belgium	EU27	BE	34	26	20.6	40.2	20.9	23.1	16.9	31.2	30.7	29.9	26	35	5353	5353	5353	5353
Bermuda*		BM	0				18.6	36.8	16.8	46.5	18.6	36.8	16.8	46.5	1	1	1	1
Bosnia and Herzegovina	Europe	BA	10				7.1	7.1	6.5	7.7	9.5	9.1	8.7	10.1	295	295	295	295
Brazil		BR	34	29.9	26.8	37.4	23.1	21.2	18.1	28.4	27.7	22.6	19.2	33.5	343	343	343	343
Bulgaria	EU27	BG	10	9.1	8.7	11.2	9.9	9.2	8.4	11.2	10.1	9.7	9.2	10.7	984	984	984	984
Cape Verde*		CV	25				24.2	21.9	21.4	24.8	24.2	21.9	21.4	24.8	1	1	1	1
Chile*		CL	20.5	31.8	31	42	20.2	19.9	17.1	24.1	19.2	17.2	15.4	23	18	18	18	18
China		CN	25	23.6	22.9	30.7	16.8	16	14.7	18.5	19	16.2	15.3	20.8	2329	2329	2329	2329
Colombia		CO	28.2				29.9	28.9	24.2	38.2	34.7	34	29.6	42.6	165	165	165	165
Croatia	EU27	HR	20	15.6	14.2	17.6	15.8	15.1	13.6	18	20.7	20.1	19	22.5	1459	1459	1459	1459
Cyprus*	EU27	CY	11.5	11.9	11.6	13.8	9	8.8	7.6	11	12	9.5	9	12.7	48	48	48	48
Czechia	EU27	CZ	19	20.6	19.8	27.4	16.2	17	14.2	20.2	19.5	18.6	16.4	22.2	4109	4109	4109	4109
Denmark	EU27	DK	24.3	19.5	18	25.6	21.7	31.8	19.7	36.1	24.7	24.2	22.1	26.2	3671	3671	3671	3671
Ecuador*		EC	22.6				25.4	22.2	21.5	27.2	29.3	20.7	19.4	33.2	31	31	31	31
Egypt*		EG	23.5				58.1	58.1	57.6	58.4	58.1	58.1	57.6	58.4	1	1	1	1
El Salvador*		SV	30				35.7	32	29.4	39.7	36	31.7	29	40.5	2	2	2	2
Estonia*	EU27	EE	20.8	17	15	22.1	22	22	22	22	22	22	22	22	1	1	1	1
Finland	EU27	FI	23	19	18.5	25	13.7	15	12.3	17	22.5	22.2	20.9	23.5	2764	2764	2764	2764
France	EU27	FR	33.3	33	31.7	42.9	25.3	30	22.7	34.8	29.2	29	26.8	31.7	12406	12406	12406	12406
Gabon*		GA					35	27.4	26.5	33	35	27.4	26.5	33	1	1	1	1

Germany	EU27	DE	29.5	27.3	25.9	36.7	21.4	23.6	18.4	28.9	28.3	26.6	24.1	30.5	7118	7118	7118	7118
Greece	EU27	GR	24.2	27.6	27	30.4	28.3	25.3	23.7	30.5	28.7	26	25.5	29.8	653	653	653	653
Guyana*		GY					43	55.7	55.6	55.7	43	55.7	55.6	55.7	1	1	1	1
Hong Kong*		HK	16.5	15.2	14.5	21.5	18	23.4	18	23.4	18	23.4	18	23.4	1	1	1	1
Hungary	EU27	HU	19	9.9	9.2	11.7	12.2	12	9.3	17.4	9.7	9.2	7.4	12.2	1304	1304	1304	1304
Iceland	Europe	IS	20	18.8	18.3	25.3	18.5	15.4	14	19.9	20	19.4	17.9	21.9	142	142	142	142
India		IN	33.5	44.1	42.1	59.9	27.5	27.7	23.5	32.9	31.1	28.7	25.2	34.1	1208	1208	1208	1208
Ireland	EU27	IE	12.5	11.8	11.5	15	24.1	22.6	21.8	24.6	14	13.6	12.6	15	127	127	127	127
Italy	EU27	IT	31.4	22.1	18.3	29.9	37	35.2	31.8	41.7	40.3	36.7	35.1	42.8	10169	10169	10169	10169
Japan		JP	37.2	27.5	26.1	37.2	31.2	36.5	29.9	39.8	39.2	41.5	37.1	43.7	6356	6356	6356	6356
Kazakhstan		KZ	20				25.1	24.6	21.1	30.3	22.3	22	20.2	24	64	64	64	64
Kosovo*	Europe	KV					11.7	13.2	11.3	13.9	13.8	13.8	13.8	13.8	3	3	3	3
Latvia	EU27	LV	15	13.5	12.6	17.4	10.6	13	9.7	14.7	16.1	15.6	15.2	16.8	1032	1032	1032	1032
Lebanon*		LB	15				16.1	16	15.8	16.2	16.1	16	15.8	16.2	1	1	1	1
Liechtenstein*	Europe	LI	12.5	10.1	8.5	14.7	12	13.2	9.6	18.2	12	13.2	9.6	18.2	1	1	1	1
Lithuania	EU27	LT	15	13.3	12.4	17	12.4	12	10.8	13.8	15.4	14.7	13.8	16.1	414	414	414	414
Luxembourg	EU27	LU	29.1	24.5	23	32.8	4.3	6.7	3.9	8.1	25.3	24.8	20.6	29.3	415	415	415	415
Malta	EU27	MT	35	33.3	32.5	43.5	24.3	23.8	21.6	24.7	35	35	34	35	642	642	642	642
Mauritius*		MU	15	14	13.4	18.1	17.6	6.1	5.9	18.7	17.6	6.1	5.9	18.7	1	1	1	1
Mexico		MX	30	27.4	26	35	29.5	25.1	23.2	31.4	24.3	18.2	17.1	27.8	72	72	72	72
Montenegro*	Europe	ME	9				9	10.2	8.4	11.2	9.3	8.2	7.2	10.4	23	23	23	23
Morocco		MA	30.3				31.6	28.8	26.5	34.9	24.9	23	22.8	25.3	51	51	51	51
Netherlands	EU27	NL	25	23	21.8	30.8	25.2	29.1	22.2	33.3	24.3	24.1	22.4	25.4	1445	1445	1445	1445
New Zealand		NZ	28	26.8	25.5	33.7	24.8	26.4	22.5	29.6	28.4	29	27.2	30.6	416	416	416	416
North Macedonia	Europe	MK	10				5.5	6.9	5.1	7.6	7.9	7.3	6.6	8.7	244	244	244	244
Norway	Europe	NO	27.6	23.1	22.7	31.9	61.6	61.8	57.7	66.2	27.8	27.5	25.4	29.8	4050	4050	4050	4050
Pakistan*		PK	34.4				33.2	29.7	29.2	33.8	31.4	30.5	29.7	33.8	23	23	23	23
Paraguay*		PY	10				26.7	16.9	16.6	27.3	26.1	16.9	16.6	26.9	2	2	2	2
Peru*		PE	30	28.1	27.4	35.4	32.7	30.4	27.6	36.6	30.6	26.6	24.8	33.2	48	48	48	48
Philippines		PH	30				22.9	20.8	20.8	22.2	30	27.6	27.6	29.5	575	575	575	575

Poland	EU27	PL	19	17.6	16.8	21.8	16.2	17.1	14.1	20.3	20.3	19.6	18.3	22.3	4359	4359	4359	4359
Portugal	EU27	PT	23.8	27.5	26.5	33.4	19.5	17.7	16.6	21	25.6	23.2	22.9	26	3230	3230	3230	3230
Romania	EU27	RO	16	14.5	13.6	18.8	17.4	16.9	14	22	16.9	16.3	14.4	20.7	2615	2615	2615	2615
Russia		RU	20	18.8	18.2	27	17.5	18.8	16.3	20.7	18.7	18.1	17.5	19.4	8649	8649	8649	8649
Serbia	Europe	RS	13				7.8	7.5	6.1	10.1	10.7	10.1	8.4	13.5	775	775	775	775
Slovakia	EU27	SK	21	21.8	20.8	28.2	22.1	21.7	21.4	24.4	23.2	21.7	21.5	23.6	2971	2971	2971	2971
Slovenia	EU27	SI	17.8	17.9	17.4	22.7	13.6	13.3	11.8	15.6	17.2	16.3	15.1	18.6	960	960	960	960
South Korea		KR	23.8	22	20.8	28.3	19.8	21.7	16.4	28.5	10.8	10.1	8.8	13.2	12061	12061	12061	12061
Spain	EU27	ES	29.6	24.8	24.6	32	22.4	23.1	19.5	27.3	28.2	26.2	24.2	29.9	7741	7741	7741	7741
Sri Lanka*		LK	28				32.5	34.1	31.1	35.8	8.9	9.1	6.3	16.5	12	12	12	12
Sweden	EU27	SE	23.7	19.8	18.9	25.7	16.1	18.4	14.5	20.8	21.1	20.6	19	22.9	5877	5877	5877	5877
Switzerland*	Europe	CH	18	19.5	18.6	25.2	8.1	6.6	6.4	8.4	21.8	15.7	14.8	24.2	27	27	27	27
Syria*		SY	24.4				83.5	87.4	81.1	91.8	83.5	87.4	81.1	91.8	1	1	1	1
Taiwan*		TW	17				18.3	16.9	14.5	22.2	18.9	22	15.6	27.9	2	2	2	2
Thailand*		TH	22.6	21.6	20.8	27.3	18.6	16.6	15.1	23.8	19.8	20.5	19.8	21.2	9	9	9	9
Trinidad and Tobago*		TT	25				26.4	25.9	25.8	27.2	27.8	26.7	25.4	29.7	2	2	2	2
Tunisia*		TN	28				14.3	7.4	7.3	14.9	14.4	7.4	7.2	14.9	2	2	2	2
Turkey		TR	20	20.2	19.6	24.2	16.3	14.4	10.9	25.5	20	17.1	12.9	28.9	196	196	196	196
Ukraine	Europe	UA	20.2				22.1	20.1	19.5	22.9	21.5	21	20.8	21.7	1880	1880	1880	1880
United Arab Emirates*		AE	55				96	94.7	94.7	96.1	96	94.7	94.7	96.1	1	1	1	1
United Kingdom	Europe	GB	22.8	19	18.7	25.4	16.1	19.8	14.4	22.7	22.4	22.3	20.6	23.9	6152	6152	6152	6152
United States*		US	40	37.5	36.5	49.4	9.3	8.9	8.9	10.2	9.3	8.9	8.9	10.2	1	1	1	1
Uruguay*		UY	25				4.6	4.8	4.4	5	17.9	16.1	14.4	21.2	35	35	35	35

Notes: Corporate income statutory tax rates (CIT), means and medians of ETRs in four estimations (ETR1–ETR4, defined in text) for 2011–2015. OECD forward-looking ETRs (dataset CTS_ETR) for three scenarios: high inflation and interest rates (OECD-high), low inflation and interest rates (OECD-low) and country-specific inflation and interest rates (OECD-c). EU27 indicates whether a country was in the EU in February 2020 while Europe indicates non-EU countries geographically located mostly in Europe (i.e. this designation excludes Russia and Turkey). Countries marked with an asterisk (*) have fewer than 50 companies per sample.

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