4
International Corporate Tax Avoidance

We start with the introduction to international corporate tax avoidance as illicit financial flows and then discuss empirical findings in two stages. First, we discuss an estimation framework used frequently by economists and we show the results, often available for specific channels or selected countries. Second, in a series of sub-chapters we discuss the methodologies and results of the few studies that provide global estimates of profit shifting scale.

Tax avoidance by multinational companies is the most widely recognised tax ‘injustice’. The tax affairs of technology companies such as Google and Facebook, or commodity companies such as Glencore and Chevron, have sparked both popular anger and policy responses from Italy to Indonesia, and from Australia to Zambia. The related revenue losses for lower-income countries have been a particular target for tax justice activists, development advocates and researchers at international organisations.

A clear conclusion emerges from the existing research that the international tax system provides MNEs with opportunities to decrease their taxes through intra-company transfer prices, strategic management of the location of intangible assets or distortion of the corporate debt structure. The research confirms that many MNEs do often make use of these opportunities and do shift income to tax havens (Clausing, 2003; Hines & Rice, 1994; Huizinga & Laeven, 2008). However, until recently at least, the literature has been less conclusive in respect of scale of profit shifting flows and revenue implications.

This is, nonetheless, an aspect of illicit financial flows where the evidence for stronger impacts on lower-income countries is relatively compelling—and hence there is a strong case for its inclusion in the Sustainable Development Goals’ target to curtail illicit financial flows. But lobbying and arguments based on the (wrongly) presumed lawfulness of corporate tax avoidance, coupled with an insistence on interpreting ‘illicit’ as synonymous with ‘illegal’, has led to disagreement.

Such an insistence appears to overlook the fact that many avoidance schemes are found to be unlawful, without reaching the point of criminality. Are these illicit? Equating ‘illicit’ with ‘illegal’ is often taken to bring a clarity and a technical neutrality to the illicit financial flows discussion—but in practice would
introduce a systematic bias against lower-income countries. Legal findings of criminal tax evasion, or unlawful avoidance, depend on a range of factors. These include whether the underlying legislation is clear and up-to-date; whether the tax authority has both the resources and the political independence and/or support to prosecute a multinational; and whether the legal system is sufficiently well resourced and independent to try such a case well and fairly. By and large, each of these factors is less likely to be met in a low-income country as opposed to a high-income country—and so considering only proven illegal tax behaviour by multinationals will result in estimates that are systematically biased against finding illicit financial flows in lower-income countries, even assuming that multinationals’ tax behaviour does not vary between countries.

In this section we proceed on the basis of the wider definition of illicit, as set out above, including cross-border flows which are deliberately hidden. The main focus is on the evaluation of the scale of multinationals’ profit shifting (and the corresponding corporate income tax revenue losses). We use the term ‘profit shifting’ in order to abstract from the questions of legality and criminality that can be assessed only for individual transactions within a given multinational, and instead to cover the range of underlying phenomena that result in profit misalignment. We view this as in line with (i) the dictionary definition of ‘illicit’, covering socially unacceptable behaviour as well as proven illegality; and (ii) the international consensus, expressed in the G20/OECD Base Erosion and Profit Shifting (BEPS) project, that multinationals’ profit misalignment should be curtailed. This consensus is expressed most clearly in the single aim of the BEPS Action Plan: ‘The G20 finance ministers called on the OECD to develop an action plan to address BEPS issues in a co-ordinated and comprehensive manner. Specifically, this Action Plan should provide countries with domestic and international instruments that will better align rights to tax with economic activity’ (OECD, 2013a, p.11, emphasis added). Those involved in other policy processes, such as the indicator setting for the SDGs, will necessarily take their own view.

As with the other aspects of illicit financial flows, assessments of the individual channels that give rise to profit shifting largely reflect the evaluation of deviations from some expected ‘normal’ pattern of data. A specific channel by which multinationals seek to achieve profit misalignment, the mispricing of commodity trade, is assessed in a subchapter on trade mispricing below; but in the preceding subchapters we largely focus on other profit shifting channels and the overall degree of misalignment eventually achieved discussed and estimated for many countries in the studies covered in a subchapter below. The studies covered there are mostly aiming for a global coverage of
countries and obtain estimates of country-level scale of profit shifting. Still, before moving to these studies, in the following subchapter we survey the detailed profit shifting studies that have over the past years and recent decades developed into a vast body of literature.

There are three main recognised profit shifting channels: debt shifting through loans within one MNE group, location of intangible assets and intellectual property, and strategic transfer pricing. Table 4.1 sums up these three main channels of profit shifting and provides a few examples of related studies. All three are motivated mostly by the MNEs’ desire to lower their taxes by transferring their profits to countries where they pay lower taxes. In the case of debt shifting, this transfer is achieved through loans at high interest rates from one MNE unit located in a country with low taxes to a profitable affiliate in a country with high taxes. In the case of location of intangible assets, intellectual property such as brands or research and development is located artificially at an MNE’s subsidiary in a tax haven, to which high service fees are then paid by other affiliates of the MNE. In the case of strategic manipulation of transfer prices, profits are shifted by increasing or decreasing the prices of goods or services being transferred between the various foreign parts of a MNE in such a way as to minimise the tax burden faced in all the countries put together. In addition to these three main channels MNEs engage in other profit shifting strategies that might also result into illicit financial flows. As discussed in the following subchapter below, the common feature to most channels is the manipulation of prices for intra-group transactions. Since these are prices for which data are not typically available publicly, we briefly survey the key findings in this area, but focus primarily on estimates that relate to the achieved scale of profit shifting, ideally with comparable estimates for many countries.

To this end, there are three main types of data on which researchers have drawn. First, and generally preferable, are data on the reporting of individual

<table>
<thead>
<tr>
<th>The main profit shifting channels</th>
<th>Examples of relevant studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt shifting</td>
<td>Fuest, Hebous, &amp; Riedel (2011), Buettner &amp; Wamser (2013)</td>
</tr>
<tr>
<td>Location of intangible assets and intellectual property</td>
<td>Dischinger &amp; Riedel (2011), Evers, Miller, &amp; Spengel (2015)</td>
</tr>
<tr>
<td>Strategic transfer pricing</td>
<td>Clausing (2003), Davies, Martin, Parenti, &amp; Toubal (2017)</td>
</tr>
</tbody>
</table>

Source: Authors
multinationals. At present, the available datasets of this type tend to have major limitations; but the results can also be the most compelling for the partial activity they refer to, based on deviations in reported profit from the location of reported activity. Second, estimates can be based on deviations in jurisdictions’ apparent efficiency in raising corporate tax revenues, using national-level data on revenue and activity. Third, falling between the first two in terms of the aggregate level of data and analysis, estimates can be based on deviations in the reported national-level profitability of foreign direct investment (FDI) in each jurisdiction.

The following section 4.1 summarises research findings which do not generally aim to provide a global scale, but rather to establish particular patterns of multinational tax behaviour that give rise to the overall issue, i.e. individual channels of profit misalignment. This section also surveys some key research that provides partial scale estimates. The remaining sections 4.2 to 4.7 deal with what we consider the main currently available global estimates. Finally, we identify main conclusions from the existing research, and proceed to offer policy recommendations and to identify key areas that would benefit from improvements in methodology and in the availability of data. On the last question, the most obvious recommendation is for large multinationals’ reporting under the new OECD standard for country-by-country reporting to be made public—which at a stroke, and with near-zero cost, would radically change what is known about these leading global economic actors and the associated illicit financial flows.

4.1. Empirical Findings on International Corporate Tax Avoidance

4.1.1. Overview

We begin with reviewing briefly some relevant research into the phenomenon which is more closely focused than to yield directly any estimates of profit shifting scale or tax revenue loss for more than one country.

4.1.2. Data

The bulk of the analysis here has been concerned with microeconomic responses, through various channels, to tax rate differentials between
jurisdictions. Typically, authors have relied on company balance sheet data—often taken from Bureau van Dijk’s Orbis or Amadeus data bases. Orbis, has been used intensively by other profit shifting studies as recently reviewed by Dharmapala (2014). Some of the recent studies include Johannesen et al. (2017) and OECD’s Johansson et al. (2017). Still, the OECD (2015, p. 27) in its BEPS report stresses the limitations of this data for analysing profit shifting.

Although Orbis is likely the most frequently and one of the most suitable used data set in papers looking at profit shifting, the latter being a reason why we use it in this paper, Orbis has its limitations. They are discussed at some length by Cobham and Loretz (2014), Clausing (2016), and recently acknowledged by Schimanski (2017) and Garcia-Bernardo et al. (2017). One of the most relevant limitation for the reviewed area of research is that the Orbis data is biased against tax havens (and developing countries), i.e. the group of countries that we aim to study. Perhaps even more importantly, Tørslev, Wier, & Zucman (2018) show that most of some MNEs’ profits are not included in the Orbis data. Specifically, they show that only a weighted average of 17 per cent of global profits is included in Orbis.

Partly in response to these limitations of Orbis, other data have been used to examine profit shifting. For example, tax revenue data are the basis for the estimations of IMF’s Crivelli et al. (2016) and Cobham and Janský (2017a). Another alternative to Orbis are datasets that exist for a few countries with information on MNEs headquartered there. The data of the United States Bureau of Economic Analysis has been used recently by Zucman (2014), Zucman (2015), Clausing (2016) and Cobham and Janský (2017b), while Germany’s MiDi data has been employed, for example, by Weichenrieder (2009), Hebous & Johannesen (2015) and Gumpert et al. (2016). Similar foreign affiliate statistics for OECD countries is exploited by Tørslev, Wier, & Zucman (2018). Perhaps even more promising is the use of confidential corporate tax returns, as done by Dowd et al. (2017) for the United States, Bilicka (forthcoming) for the United Kingdom or Reynolds & Wier (2016) for South Africa, which brings us to a discussion of profit shifting studies in these countries.

A number of countries, including Germany, Japan, the United Kingdom and the United States, provide limited public, or more extensive private access to researchers to datasets on the activities of multinationals to which they are either home, or host economies (or both). This has given rise to studies which, while not global in scope, do provide the basis for assessments of the scale of profit-shifting. In addition, they can offer complementary evidence in respect of particular channels. We survey the key contributions here.
4.1.3. Methodology

Economists often study the sensitivity of reported income to differences in tax rates and so there are a number of studies providing evidence of profit shifting, especially on how tax rate differentials affect reported pre-tax profits and on which strategies MNEs employ to reallocate profits within the group. Since the related literature is voluminous and growing, we refer to recent review articles by Dharmapala (2014) and Beer, Mooij, & Liu (2019) and other more recent articles, such as Clausing (2016) or Dowd, Landefeld, & Moore (2017), for additional details.

Dharmapala (2014) reviews the literature on how the reported income changes with respect to tax rates differences across countries, represented by Hines Jr & Rice (1994) and Huizinga & Laeven (2008). For example, Dharmapala (2014) defends the prevailing use of statutory tax rates as more exogenous than effective tax rates (the actual tax rates faced by an affiliate), which might differ widely from the statutory ones due to deductions that in part reflect endogenous choices made by the firm, such as its decisions about the use of debt. Additionally, although Dharmapala (2014) considers the economists’ approach more rigorous, he also points to the accountants’ related research (Collins, Kemsley, & Lang, 1998; Dyreng & Markle, 2013; Klassen & Laplante, 2012).

The Hines–Rice approach modified for panel data, in the words and notations of Dharmapala (2014), can be simplified as:

\[
\log \pi_i = \beta_1 \tau_{it} + \beta_2 \log K_i + \beta_3 \log L_i + \gamma X_i + \mu_i + \delta_t + \epsilon_{it}
\]

where \( \pi_i \) is the profit of affiliate \( i \) in year \( t \), \( \tau_{it} \) is the tax rate difference between the parent and the affiliate, \( K_i \) is capital input, \( L_i \) is labour input, \( X_i \) are additional affiliate-level controls, \( \mu_i \) is an affiliate fixed effect (which controls for the unobserved characteristics of affiliate \( i \) that do not change over time), \( \delta_t \) is a year fixed effect (which controls for unobserved common changes in the profitability of all affiliates in a given year), and \( \epsilon_{it} \) is the error term. The main coefficient of interest is \( \beta_1 \) and reflects the extent to which the multinational shifts profits into or out of affiliate \( i \). It is a marginal effect, i.e. the change in reported profits associated with a small change in the difference between the tax rates in the parent and affiliate economies, holding all else constant.

This original basic framework has been extended over the past decades in a few areas, for example, by moving from aggregate country-level analysis to...
the micro-level analysis of the behaviour of individual multinational affiliates and by relying on panel data (both already included in the version described by the equation above) or by using other indicators than fixed tangible assets and employment compensation for capital and labour inputs, respectively. Further innovations have been introduced more recently. For example, Huizinga & Laeven (2008) used the overall pattern of tax rates faced by all affiliates of the MNE rather than only the difference between the parent and the affiliate, Dharmapala & Riedel (2013) included a variable for arguably exogenous profit shocks, and Dowd, Landefeld & Moore (2017) allow for non-linear semi-elasticity with respect to the tax rates.

Some of the most convincing empirical evidence is on specific profit shifting channels with pioneering estimates for Europe by Huizinga & Laeven (2008). Some similar approaches with applications to lower-income countries have been developed by Fuest & Riedel (2012) and Johannesen, Tørslev, & Wier (forthcoming). Both indicate the importance of profit shifting for lower-income countries, but their methodological approaches do not extent to evaluate the scale of profit shifting or the associated tax revenue losses. Recently, in an unpublished draft, Nicolay, Nusser, & Pfeiffer (2016) review the literature on the effectiveness of anti-avoidance legislation and use a sample of European multinationals to test whether firms substitute between profit shifting strategies and whether this implies interdependence between different anti-avoidance regulations in place. Their empirical results, further strengthened by exploiting a reform of thin capitalization rules in France in a difference-in-difference approach, suggest that substitution between profit shifting channels takes place and that thin capitalization rules are not effective in reducing total profit shifting if no strict transfer pricing rules are present.

Riedel (2015) reviews the related literature and concludes that existing results at the lower (upper) end suggest that MNEs transfer less than 5 per cent (30 per cent or more) of their income earned at high-tax affiliates to lower-tax entities. Neither Riedel (2015) nor most other academics develop their estimates of profit shifting into estimates of revenue impacts. Together with Fuest, Spengel, Finke, Heckemeyer, & Nusser (2013) we observe that empirical studies scarcely extrapolate their estimates to profit shifting volumes. An early exception is Huizinga & Laeven (2008) with estimates of profit shifting scale and related tax revenue losses for 21 European countries (with losses largely concentrated in Germany) that has been rarely followed with respect to these country-level estimates.

There are other exceptions and, even more optimistically, their number as well as reliability seem to be increasing with time. In addition to the
mostly global estimates discussed in the sections below, there are two other exceptions—Clausing (2009) and Zucman (2014) with their estimates for the United States. The following section looks at these and other country-specific assessments, before we move to global findings.

Their as well as most other estimation methodologies can be summarised as:

\[
\text{CIT revenues lost from BEPS} = (\text{applicable tax rate}) \times (\text{a hypothetical counterfactual (without BEPS) CIT base – current CIT base}).
\]

where CIT stands for corporate income tax and, of course, one of the difficulties in estimating the scale of the profit shifting problem is the limited data that are available, as well as the difficulty associated with establishing the counterfactual levels of profit in each country absent profit shifting incentives and the applicable tax rate. Indeed, a counterfactual tax base and a relevant tax rate are needed in most of the similar estimations. The problem with a counterfactual is that firms’ true economic profit before profit shifting is not observable, but we need a reasonable estimate of it for any estimates of the revenue implications. Additionally, whether we have data on taxes paid according to financial or tax accounting is important. The problem with a tax rate is that an applicable rate is seldom known, it might be the statutory rate, an estimated effective tax rate or some other rate.

4.1.4. Results

According to survey of the recent literature by Heckemeyer & Overesch (2017), who follow the earlier meta-analysis by Mooij & Ederveen (2008) and suggest that transfer pricing and licensing are the dominant profit-shifting channels, a semi-elasticity of reported income with respect to the tax rate differential across countries amounts to 0.8. In Dharmapala’s (2014) example this entails that a 10 percentage point increase in the tax rate difference between an affiliate and its parent (e.g. because the tax rate in the affiliate’s country falls from 35 per cent to 25 per cent) would increase the pre-tax income reported by the affiliate by 8 per cent (for example, from $100,000 to $108,000). Dharmapala’s (2014) observes that the estimated magnitude of BEPS is typically much smaller than that found in earlier studies and that the
magnitude, at least as estimated by the semi-elasticity, has been decreasing over time. However, the data used usually suffer by important issues discussed, for example, by Keightley & Stupak (2015), and the methodology, for example, does not allow for non-linearity of the semi-elasticity with respect to the size of tax rates Dowd, Landefeld, & Moore (2017).

Even when ignoring the various downsides of the estimates, an important dilemma ensues, which Dharmapala (2014) describes in the following way. He considers the semi-elasticity relatively small and in contrast to a widespread policy discourse that points to descriptive statistics regarding the fraction of income reported by MNEs in tax havens as indicating that international corporate tax avoidance is large in magnitude and importance. The kind of estimates reviewed by Dharmapala (2014) capture, however, marginal effects (i.e. the change in reported profits associated with a small change in tax rates, holding all else constant), and therefore, as Miller (2014) sums up, are not necessarily inconsistent with evidence that large amounts of income have been shifted offshore. Also, Dharmapala (2014) addresses this question directly and he ponders whether the large fraction of the net book income of MNCs reported in havens might reflect ‘inframarginal’ income shifting that empirical analysis focused on semi-elasticity cannot detect or it has some other explanation. He argues that in the policy discourse it would be common to point to the reporting of 40 per cent of the MNEs’ income (which he observes on the basis of Bureau of Economic Analysis data) constituting BEPS activity, whereas he argues that it might be termed an ‘inframarginal’ phenomenon that is difficult to explain using the estimated elasticities. He argues that a semi-elasticity in the range of 0.4 to 0.8 would (if it were possible to extrapolate from small changes in the tax rate) imply that 10–20 per cent of income (rather than 40 per cent) would be shifted to havens. Furthermore, similar analyses do not take into account the finding of Kawano & Slemrod (2015) that countries tend to implement policies that both lower the corporate tax rate and broaden the corporate tax base, and this might bias the estimates of semi-elasticity, as they show using the replications of Clausing (2007) and Devereux (2007).

This heterogeneous group of recent estimates includes further research than we have space for in this review, since our priority is the estimated impact of international corporate tax avoidance on government tax revenues. Therefore, in the remainder we focus on recent research that generates specific estimates in terms of revenue loss in dollars, tax or percentages of GDP.
4.1.5. United States

Two of the exceptions are Clausing (2009) and Zucman (2014) with their estimates for the United States. Zucman (2014) on page 130 assumes that profits reported in tax havens are taxed negligibly in tax havens and mostly untaxed in the headquarters’ or owners’ countries and estimates:

\[
\text{CIT revenues lost from BEPS} = \text{Share of profits reported in tax havens} \times \text{corporate tax base}
\]

On the basis of this formula and available data, he concludes that profit-shifting to low-tax jurisdictions reduces the tax bill of US-owned companies by about 20 per cent. In another estimate on page 131, Zucman (2014) assumes that AETRs decrease due to BEPS, mostly (the other effects can be taken into account and the BEPS is responsible for the rest) and estimates:

\[
\text{CIT revenues lost from BEPS} = \text{AETR historical decrease (due to BEPS)} \times \text{corporate tax base}
\]

He observes that the effective tax rate paid by US-owned firms has been reduced by a third, from 30 to 20 per cent, between 1998 and 2013. Using the formula he argues that these companies would have, all else equal, paid $200 billion in additional taxes in 2013 if it had stayed constant.

Clausing (2009) estimates the tax responsiveness or semi-elasticity of gross profits reported by United States MNE entities in foreign countries to effective tax rate differentials between foreign affiliates and their United States parent, based on Bureau of Economic Analysis survey data on foreign activities of United States MNEs aggregated at the country level. She then uses this result to calculate, in five steps, how much government revenue would differ in the United States without profit shifting and arrives at USD 60 billion lost from profit shifting from United States MNEs in 2004, which represents 35 per cent of United States federal corporate income tax collections. Subsequently, Clausing’s (2011) best estimate of the revenue loss associated with the income shifting of multinational firms in 2008 is approximately $90 billion, or about 30 per cent of U.S. government corporate tax revenues. More recently, Clausing (2016) uses the BEA data to estimate the US government revenue losses implied by BEPS and extends, speculatively, as she says, these estimates to the world and that is why we include it below together with other global estimates, in the following subchapter.
Guvenen, Mataloni Jr, Rassier, & Ruhl (2017) identify the scale of profit shifting as being responsible for a part of mismeasurement in official statistics for US GDP and productivity. They estimate that from 2008 to 2014, domestic business-sector value added in the United States, on average, is understated by slightly more than 2 per cent or about $280 billion per year. A large part of these earnings should be reattributed from the Netherlands ($73 billion in 2012), Bermuda ($32 billion), Ireland ($29 billion), and Luxembourg ($24 billion). The profit shifting adjustments are large in particular in industries that are intensive in research and development and are most likely to produce intangible assets that are easy to move across borders.

A number of other studies also focus on the United States. Keightley & Stupak (2015) review the data relevant for BEPS estimates. United States Joint Committee on Taxation (2014) calibrate the level of current profit shifting at about 20 per cent of the corporate tax base in 2013 and OECD (2015) derive that the effect on corporate taxes would be larger than the 20 per cent (or USD 70 billion), because tax collections are not proportional to the tax base due to tax credits. Its staff members, Dowd et al. (2017), estimate that reported profits in Bermuda, the Cayman Islands, Ireland, Luxembourg, the Netherlands, and Switzerland would decline by more than $100 billion in 2010 had these countries had statutory tax rates of 29 per cent and average tax rates of 17 per cent. Importantly, they observe that the effect on profits reported in a foreign subsidiary of a 1 percentage point increase in the net of tax rate (that is, a tax decrease in a foreign country) depends crucially on whether the country has a low rate or a high rate. Under the quadratic specification, a change in the tax rate from 5 per cent to 4 per cent results in a 4.7 per cent increase in profits, while a change from 30 per cent to 29 per cent results in a 0.7 per cent increase in profits (in contrast with a 1.4 per cent increase when the traditional linear specification is used).

4.1.6. Europe

In a related area of research, governments around the world are concerned with a tax gap as the difference between the true amount of tax legally due and what taxpayers actually pay. A recent report by FISCALIS Tax Gap Project Group (2018) reviews much of the important corporate income tax gap literature and argues that it is too early to identify a consensus methodology, which could be applied across countries. It also argues that providing an overview of methods, as the report as well as this chapter does, is a first
step to an emergence of such consensus methodology. It stresses that the
focus should be on the trend of the results rather than on the absolute values.
It observes that as of June 2017 about ten EU member states have taken steps
of already estimate a CIT gap: three member states (Ireland, France and
United Kingdom) did not reply to their questionnaire, six member states use
or intend to use bottom-up methods (Belgium, Bulgaria, Denmark, Italy,
Finland and Sweden), either based on risk-based audits or on random audits
and three member states use top-down methods (Italy, Romania and Slovakia)
with national accounting methods as a basis for the calculation. While the
Netherlands uses a bottom-up approach on its programme for small and
medium enterprises, four member states (Czech Republic, Portugal, Latvia
and Lithuania) have indicated that they are planning to undertake CIT gap
estimates in the future. Overall, only three countries publish their results
(Denmark, Italy and Slovakia).

We discuss this concept only briefly and focus on results for Germany, as
an example of a big EU member state with a range of relevant research. The
efforts of the EU’s Tax Gap Project Group resulted in a report by European
Commission (2016b) that discusses the concept of tax gaps generally and
focuses on VAT gap estimations across a number of EU states. Some tax gap
estimates include international corporate tax avoidance and are thus rele-
vant here (Bloomquist, Hamilton, & Pope, 2014). According to European
Commission (2016b), only Germany seems to carry out and publish estimates
of corporate income tax gaps, namely using a top-down approach by Bach
(2013) and a bottom-up one by Finke (2014). There is also a lively discussion
in the United Kingdom—in somewhat contrasting contributions, Murphy
(2012) and Oxford University Centre for Business Taxation (2012) discuss the
corporate tax gap by UK corporations.

In an unpublished draft, Finke (2014) used propensity-score matching to
account for missing counterfactual of MNEs’ profit before profit shifting. Her
results suggest that MNEs in Germany on average pay 600,000 EUR (about
27 per cent) less profit taxes than a German domestic standalone, taken as the
counterfactual. When extrapolated to the full sample, this implies a revenue
loss of about 8.6 bn Euro. She finds that the effect exists only for MNE with at
least one subsidiary in a low-tax jurisdiction, and that a 2008 reform substan-
tially reduced the difference in tax payments between MNEs and domestic
control group.

In another important German-focused study, Weichenrieder (2009) uses
the MiDi database of the Deutsche Bundesbank on German inbound and
outbound FDI to find an empirical correlation between the home country tax
rate of a parent and the net of tax profitability of its German affiliate, consistent with profit shifting behaviour. Using the same data as well as another German data set on services, Hebous & Johannesen (2015) document that the service trade of tax havens partly reflects genuine specialization in service industries and partly profit shifting, and argue that the loss of government revenue resulting from this type of corporate tax behaviour is likely to be modest.

Looking more broadly, Murphy (2012) provides annual estimates of 150 and 850 billion euros for total EU tax avoidance and evasion, respectively (the latter being based mostly on the shadow economy estimates of Schneider, Buehn, & Montenegro (2010).

Recently, European Commission’s Alvarez-Martinez et al. (2018) used a computable general equilibrium model, designed specifically for corporate taxation and multinationals, to estimate the size and macroeconomic effects of base erosion and profit shifting. Their central estimate of corporate tax losses for the EU amounts to €36 billion annually or 7.7 per cent of total corporate tax revenues. As they acknowledge, their central estimate hides a large range of estimates reflecting the range of tax rates elasticities available in the empirical economic literature. For instance, the net losses in tax revenues for the EU may range between €9.7 and €71.6 billion depending on the elasticities of tax shifting used in the calibration of the model. The USA and Japan also appear to lose tax revenues respectively of €101 and €24 billion per year or 10.7 per cent of corporate tax revenues in both cases. The authors argue that these estimates are consistent with gaps in bilateral multinationals’ activities reported by creditor and debtor countries using official statistics for the EU. Furthermore, their results suggest that by increasing the cost of capital, eliminating profit shifting would slightly reduce investment and GDP and raise corporate tax revenues thanks to enhanced domestic production, which could in turn reduce other taxes and increase welfare. Unfortunately, they are able to estimate these results only for 28 EU member states and the United States and Japan.

4.2. Estimates for the World, and Low- and Middle-income Countries in Particular

To estimate global illicit financial flows, data with global coverage is clearly preferable. In practice, however, there exists at present no public data source on the economic activities of multinationals which does not suffer from grave and systematic weaknesses in coverage. In terms of methodology, the results
could in most cases be strengthened by allowing for the tax and/or secrecy behaviour of counter-party jurisdictions; and by modelling profit-shifting as a response to actual tax rates paid, rather than statutory rates or other often misleading proxies. However, these are also areas in which data is typically lacking and, especially in the case of lower income countries, useful information emerges more often from case studies such as Economic Commission for Africa (2018b). Ultimately, in terms of global coverage of countries and with specific estimates of scale of profit shifting, the best currently available estimates are those summarised in Table 4.2 and studied in more detail in subchapters below.

Table 4.2 sums up the following research contributions to estimating the scale of profit shifting for many countries: IMF’s Crivelli et al. (2016) and a follow-up study by Cobham & Janský (2018), UNCTAD (2015) and a follow-up study by Janský & Palanský (forthcoming), OECD (2015b), Clausing (2016), Cobham & Janský (2019), IMF (2014), and, very recently, Tørsløv, Wier, & Zucman (2018). We focus on these studies because most of them have been influential in the policy debate, all include an answer to what is the scale of profit shifting and how much tax revenue governments lose, in most cases providing estimates for many countries worldwide. We list these studies in an approximate order of perceived credibility and relevance of their estimates (and the most recent preliminary study as the last one). We discuss them in detail below.

IMF’s Crivelli et al. (2016) estimate losses due to profit shifting related to tax havens by looking at a counterfactual if the tax havens’ tax rates were not lower than in other countries. UNCTAD (2015) estimate tax revenue losses due to tax avoidance schemes that exploit a direct investment relationship on the basis of lower reported rate of return for investment from offshore hubs (tax havens). OECD (2015b) combines estimates of revenue losses due to both profit shifting related to tax rate differentials (differences in tax rates across countries) and differences in average effective tax rates for large affiliates of MNEs and domestic companies. Both Clausing (2016) and Cobham & Janský (2019) use data focused on US-headquartered multinationals only. While Clausing (2016) estimates profit shifting scale from derived semi-elasticities, Cobham & Janský (2019) quantify the extent of misalignment between reported profits and indicators of economic activity.

IMF (2014) for the world, and EPRS (2015) with a slightly different methodology for European countries, estimate corporate income tax revenues related to differences in countries’ corporate income tax efficiency ratio (using gross and net operating surplus, respectively) relative to the average ratio in
the other countries. One of the studies itself, OECD (2015b), argues that given the many uncertainties associated with global estimates of the scale and economic impacts of BEPS, no single empirical estimate can be definitive, but they add that such estimates are generally of more value for policymakers than extrapolating from more narrow studies involving a limited number of companies or countries. On a similar note, EPRS (2015) observe that most economists concede that estimating aggregate tax revenue losses due to tax avoidance and evasion remains elusive. Still, it is not an objective of this paper to provide their full evaluation and quite likely in due time (most of the studies were only relatively recently published) these studies are bound to receive their share of criticism, if only because some of the earlier studies’ problems preserve: a number of strong assumptions, a lack of direct implications for policy and a lack of counterfactual.

Both Clausing (2016) and Cobham & Janský (2019) use data focused on US-headquartered multinationals only. While Clausing (2016) estimates profit shifting scale from derived semi-elasticities, Cobham & Janský (2019) quantify the extent of misalignment between reported profits and indicators of economic activity. IMF (2014) for the world, and EPRS (2015) with a slightly different methodology for European countries, estimate corporate income tax revenues related to differences in countries’ corporate income tax efficiency ratio (using gross and net operating surplus, respectively) relative to the average ratio in the other countries. As we explain in detail below, this methodology’s results, similarly to Cobham & Janský (2019), provide a comparatively wide scope for other interpretations than international corporate tax avoidance. Most recently, Tørsløv, Wier, & Zucman (2018) provide perhaps the most persuasive evidence of the global scale of profit shifting, drawing on national accounts and other data.

We focus here and on estimates of scale of this corporate tax avoidance with a worldwide coverage. Table 4.2 below provides an overview of seven such studies and we discuss them in some detail below. Each sub-chapter provides an overview of the data, methodology and results of each of seven leading approaches to the estimation of global profit shifting by multinational companies.

The difficulty of assessing realistic counterfactuals (i.e. what the tax base would be in the absence of profit shifting) is a particular problem. The studies usually aim to estimate how the actual amount of corporate tax paid differs from the counterfactual of a world without (any) international corporate tax avoidance. Assessing even the actual tax paid is not straightforward due to data limitations and as shown, for example, in a review of research in
Table 4.2. Summary of estimates of global profit shifting and associated tax revenue losses

<table>
<thead>
<tr>
<th>Reference</th>
<th>Annual corporate income tax revenue loss estimates</th>
<th>International corporate tax avoidance estimated</th>
<th>More details on methodology</th>
<th>Published in an academic journal</th>
<th>Country-level estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMF’s Crivelli et al. (2016), Cobham &amp; Janský (2018)</td>
<td>Long-run approximate estimates are $400 billion for OECD countries (1 per cent of their GDP) and $200 billion for lower-income countries (1.3 per cent) of their GDP.</td>
<td>BEPS related to tax havens.</td>
<td>BEPS related to tax havens by looking at a counterfactual if the tax havens’ tax rates were not lower than for other countries.</td>
<td>Yes</td>
<td>Yes (by a later study of Cobham &amp; Janský (2018))</td>
</tr>
<tr>
<td>UNCTAD (2015), Janský &amp; Palanský (forthcoming)</td>
<td>Around 8 per cent of CIT, USD 200 billion in 2012 globally and USD 90 billion for lower-income countries.</td>
<td>BEPS through tax avoidance schemes that exploit a direct investment relationship.</td>
<td>Tax revenue losses due to tax avoidance schemes that exploit a direct investment relationship on the basis of lower reported rate of return for investment from offshore hubs.</td>
<td>No</td>
<td>Yes (by a later study of Janský &amp; Palanský (forthcoming))</td>
</tr>
<tr>
<td>OECD (2015b), Johansson et al. (2017)</td>
<td>USD 100–240 billion, or anywhere from 4–10 per cent of global corporate income tax (CIT) revenues in 2014. It ranges from 7.5 to 14 per cent of lower-income countries’ CIT revenue.</td>
<td>BEPS due to tax rate differentials and differences in average effective tax rates for large affiliates due to mismatches between tax systems and tax preferences.</td>
<td>BEPS related to tax rate differentials and differences in average effective tax rates for large affiliates of MNEs and domestic companies.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Clausing (2016)</td>
<td>Between $77 billion and $111 billion in corporate tax revenue losses of US government due to profit shifting by 2012. Revenue loses total $279 billion for a group of selected countries, 20 per cent of their total corporate tax revenues.</td>
<td>Profit shifting due to tax rate differentials.</td>
<td>Profit shifting scale from derived semi-elasticities</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Source</td>
<td>Estimate</td>
<td>Methodology</td>
<td>Tax Havens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobham &amp; Janský (2019)</td>
<td>As much as a quarter of the global profits of US multinationals may be shifted to locations other than where the underlying real activity takes place. This estimate amounts to some $660 billion in 2012, or almost 1 per cent of world GDP.</td>
<td>Misalignment between the location of US multinationals’ economic activity versus the location of their profits.</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMF (2014)</td>
<td>5% of CIT in OECD and almost 13 per cent in non-OECD countries in 2012.</td>
<td>Corporate income tax efficiency, the spillover effects of profit shifting.</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torslov, Wier, &amp; Zucman (2018)</td>
<td>They find that 40 per cent of multinationals’ profits are artificially shifted to tax havens, i.e. more than 600 billion USD in 2015. They also estimate global corporate tax revenue loss around 200 billion USD per year (around 10 per cent of global corporate tax revenue).</td>
<td>Profit shifting to tax havens. They argue that relative to compensation of employees, firms in tax havens are abnormally profitable. They then show, using foreign affiliate statistics, that all of the abnormal profitability in tax havens can be explained by foreign subsidiaries operating in tax havens. They assume that all profitability in tax havens above profitability of local firms reflects inward profit-shifting.</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors on the basis of the cited literature
The second part is, as any counterfactual, intrinsically hard to estimate. The main approach is to estimate it indirectly by estimating the extent of international corporate tax avoidance and adding the implied revenue to the tax paid now. An alternative would be to assume that the counterfactual would be consistent with a full or partial alignment of economic activity with reported incomes generated by this activity across countries (Cobham & Janský, 2017d; Cobham & Loretz, 2014). A further step would be to produce a dynamic estimate, recognising that higher effectiveness of the current tax regime would produce potentially large incentives for reorganisation of business.

It is naturally, therefore, quite difficult to quantify what the corporate tax base would be in the absence of profit shifting. Some studies, however, seem not to consider this as an objective. This is discussed by Finke (2014), in terms of research on treatment effects. She argues that, indeed, the main problem in measuring the volume of tax avoidance through profit shifting is that the true profit before profit shifting is itself not observable as a reference point.

While the studies surveyed may struggle to capture the current scale of international corporate tax avoidance, they are less suited to be informative about the future prospects, especially in the view of ongoing policy changes. They also mostly focus only on corporate income tax (rather than capital gains and withholding or other tax) and leave out other tax revenues and other potentially dynamic effects of international corporate tax avoidance.

Furthermore, most of the studies use statutory rather than effective tax rates and they should employ the latter at least as a robustness check. On the one hand, average effective tax rates (AETRs) seem generally more suitable for these estimates than nominal tax rates since AETRs reflect better than the statutory rates the actual tax paid on average, which is what is usually relevant for the estimates. AETRs can differ substantially from nominal tax rates. On the other hand, there is less consensus on how to estimate AETRs and less information on AETRs across years and countries. Furthermore, differences in AETRs may be due to reasons such as R&D tax credits, i.e. other than international corporate tax avoidance, and thus might be partly misleading. Overall, good practice might be to report results using both nominal tax rates and AETRs as done by Crivelli et al. (2016) or Cobham & Janský (2018).

These estimates are only indicative or illustrative estimates, largely because currently available data do not enable estimates of substantially higher quality. Some of the estimates suffer unnecessarily from methodology weaknesses or from interpretations that are unclear or overambitious, but the field as a
whole adds substantial value—both in terms of the specific results and by advancing understanding of these phenomena. Their research approaches can be refined in the future, by adjusting the methodologies as well as applying newer data and methodologies. Notwithstanding data and methodology limitations, they are in part expert estimates in the sense that they reflect the authors’ informed perspective on how large the scale might be; and we therefore interpret the estimates loosely as meaning that they are all more or less in the range that these experts expect them to be.

We would likely be too optimistic to claim that there seems to be agreement on the order of scale of profit shifting and related tax revenue losses in absolute numbers. There is certainly disagreement on whether these particular numbers should be considered small or big. Dharmapala (2014) addresses, but does not fully settle this question, and provides some possible explanations as well as suggestions for future research. Hines (2014) discusses various estimates, and explains why some of may overstate the potential tax revenue to be had by eradicating BEPS. In a similar way to Dharmapala (2014), Hines (2014) discusses the relatively low values of semi-elasticities and argues that estimates of even 2 or 4 per cent may overstate the potential revenue, and would make an extremely modest contribution to the government finances of most countries. However, Hines (2014) focuses on OECD countries and as in Hines (2010) relies on a narrow and somewhat arbitrary definition of ‘tax havens’ to consider likely losses,. More importantly, Hines’ (2014) empirical puzzle is why there is not more tax avoidance than appears to be the case—raising the possibility that better analysis, aligned with those priors, might indeed find avoidance to be larger. In contrast, Forstater (2015) expresses scepticism about what she sees as a popular narrative that a large ‘pot of gold’ exists to fund development efforts, which could be released by cracking down on the questionable tax practices of multinational enterprises. Lobbyists for multinational companies have made a similar argument within the UN process on SDG 16.4, and have encouraged lower-income countries to focus on alternative revenue sources.

Standing back from policy debates, the research literature can be viewed in different ways. On the one hand, it seems inevitable that attempts to estimate what is deliberately hidden will produce imperfect results—and there is certainly no perfect analysis yet. On the other hand, none of the estimates discussed suggest that the revenues at risk are not substantial in absolute terms. This is especially the case for lower-income countries, where corporate tax revenues are relatively large and overall tax revenues relatively small (Prichard, Cobham, & Goodall, 2014)), and where estimated losses tend systematically
to account for a larger share of current tax revenues. Differences across countries should continue to be the subject of further research.

Overall, conclusions about the scale of any IFFs—including those related to multinational profit shifting—must be drawn on the basis of a range of methodologies and data that are all, necessarily, flawed. Nonetheless, the range of data and applied methodologies in respect of profit shifting give rise to a broadly higher degree of confidence in the findings in this area.

There are three areas of particular convergence. First, in terms of the contours of the problem, the findings indicate that only a small number of jurisdictions are consistently the recipients of disproportionate volumes of profit related to economic activity elsewhere. Second, the scale of shifted profits and revenue losses are widely distributed across other jurisdictions, with the highest values in high-income countries but the most intense losses—in relation to GDP and especially to tax revenues - in lower-income countries. Third, the overall scale of multinationals’ profit shifting may reach the level of being a material distortion to global economic accounts; and the world-wide revenue losses are likely to lie in a range between $100 billion and $650 billion annually.

4.3. IMF’s Crivelli et al. (2016)

4.3.1. Overview

IMF researchers Crivelli et al. (2016) focus on estimating BEPS in developing countries. The preliminary version of these estimates was first published as a part of IMF (2014) in another appendix (III, rather than appendix IV which is discussed below as IMF (2014)). Crivelli et al. (2016) estimate cross-border fiscal externalities of two types. Base spillover is the impact of one country’s tax policy on the tax bases of other countries through either shifting of real activities or only reported profits. Strategic rate spillover is the impact on a country’s policy choices of tax changes abroad, or the so called tax competition in its broadest sense. In terms of base spillovers, Crivelli et al. (2016) estimate worldwide losses of corporate tax base erosion and profit shifting related to tax havens at approximately 600 billion US dollars. While Crivelli et al. (2016) do not present country-level results, Cobham & Janský (2019) re-estimate their results and present the estimates for all the countries for which data are available.
4.3.2. Data

Crivelli et al. (2016) use data on corporate income tax (CIT) revenues and statutory tax rates from the private dataset of the IMF’s Fiscal Affairs Department. They argue that using such country-level data is a major limitation, but they at that time saw no other way to explore these issues for a large set of developing countries.

The recent creation of the ICTD–WIDER Government Revenue Database (GRD), which combines data from several major international databases and a new compilation from IMF Article IV and country staff reports, provides a potential alternative. A further data issue relates to the definition and treatment of ‘tax havens’, upon which the main results rest. Cobham & Janský (2019) provide robustness checks with ICTD-WIDER revenue data, alternative tax haven lists and effective tax rates instead of statutory tax rates.

4.3.3. Methodology

They estimate an equation with base spillovers as the dependent variable with an average of corporate tax rates by tax havens (as selected by Gravelle (2013)) as one of the independent variables. As the authors Crivelli et al (2016) note, those avoidance effects operating through tax havens can in principle be assessed by simply ‘turning off’ the effects on tax bases operating through that channel, calculating the implied changes in tax bases, and multiplying by the applicable CIT rate.

Crivelli et al. (2016) estimate the long term revenue (in per cent of GDP) lost by country \( i \) in period \( t \) as a consequence of profit shifting through tax havens as:

\[
\text{Long run revenue cost of BEPS}_i = \tau_i \hat{\phi}(\tau_i - W^h \tau_{-i}) / (1 - \lambda)
\]

where \( \tau_i \) is the domestic corporate income tax rate, \( \hat{\phi} \) is the estimated coefficient on the tax term (imposing the restriction of equality of coefficients on own and spillover effects, separately for OECD and non-OECD groups), \( W^h \tau_{-i} \) denotes the haven-weighted average tax rate (this is the short run effect) and \( \lambda \) is the estimated coefficient on the lagged corporate income tax base (again imposing the restriction), used to transform it from a short run to a long run estimate. According to Crivelli et al (2016), the estimated loss can be thought of as answering the question of how much revenue would a
country gain if opportunities for profit shifting were to be eliminated by raising the average rate in tax havens to the level of its own.

The basic logic behind their estimates of the revenue cost of BEPS could also be written in the following way:

\[
\text{The revenue cost of BEPS (in percent of GDP)} = \text{The applicable CIT rate} \times \text{The change in corporate tax bases implied by an increase in tax havens’ tax rates}
\]

Interestingly, this estimate seems to be independent of corporate income tax revenue of a given country in a given year—it depends only on corporate income tax rate for relative estimates (in per cent of GDP) or on GDP as well (in case we are interested in dollar values). The implied change in corporate tax bases depends for each country and year on the value of corporate income tax rate relative to the haven-weighted average. This relative value is also what is likely to drive the value of the estimates over time. One of other critical comments on this earlier version of the research was presented in International Bureau of Fiscal Documentation (IBFD)’s (2015) analysis of possible effects of the Irish tax system on developing economies (pages 67–72).

### 4.3.4. Results

Crivelli et al. (2016) present their illustrative revenue loss calculations only in a graph that distinguishes between OECD and non-OECD members. OECD members have estimated annual losses of around 1 per cent GDP or around 400 billion USD. Non-OECD countries have higher estimated losses relative to GDP at 1.3 per cent, but lower in terms of dollars at around 200 billion USD. They argue that this is a significant amount, especially relative to their lower levels of overall tax revenue.

Cobham & Janský (2019) provide country-level estimates, as well as robustness checks with some different data sources and methodological choices. Their headline estimate of revenue losses of around US$500 billion globally is slightly lower than nearly US$650 billion in Crivelli et al. (2016), with the majority of the reduction in the total estimate relating to OECD countries. They find an even greater differential in the intensity of losses suffered by lower-income countries. In terms of tax revenue losses, their headline estimates show that Sub-Saharan Africa, Latin America and the Caribbean, and South Asia, and lower middle-income and, above all, low-income countries suffer relatively intense losses.
4.3.5. Conclusions

Crivelli et al (2016) is perhaps the most credible peer-reviewed analysis of profit shifting for multiple countries. Cobham & Janský (2019) check the robustness of their results and extend their analysis to shed light on country heterogeneity.

4.4. UNCTAD (2015)

4.4.1. Overview

UNCTAD (2015) in its World Investment Report estimate tax revenue losses related to inward investment stocks as directly linked to offshore hubs with the focus on developing countries. They aim to develop and estimate a foreign direct investment-driven approach to measuring the scale and economic impact of BEPS. Their methodology puts the spotlight on the role of offshore investment hubs (tax havens and special-purpose entities in other countries) as major global investment players and enables the estimation of the magnitude. UNCTAD (2015) estimates that some 30 per cent of cross-border corporate investment stocks have been routed through offshore hubs before reaching their destination as productive assets. Their preferred estimate of annual revenue losses for developing countries, a focus of their study, is 90 billion USD; extending the estimates globally results into 8 per cent of CIT and USD 200 billion in 2012.

Janský & Palanský (forthcoming) re-estimate their methodology, extend it in a number of ways and present for the first time the related country-level estimates.

4.4.2. Data

The methodology relies on country-level foreign direct investment data. They use data on FDI stocks on a bilateral level from the IMF's Coordinated Direct Investment Survey (CDIS), which contains data for around 100 countries between the years 2009 and 2012. For stocks of direct inward investment, they use the inward direct investment positions from the same data source. In a small number of cases, they use UNCTAD's unilateral FDI database for its better coverage of countries.
4.4.3. Methodology

UNCTAD’s (2015) estimation approach, first of all, establishes the fiscal contribution of multinational enterprises and especially the corporate tax paid by their foreign affiliates, which creates the baseline from which corporate tax is avoided. They estimate that around 3 per cent of total tax revenues in developing countries is derived from MNEs’ corporate income tax. Then, they identify 42 jurisdictions as sources of investment as either tax havens or special-purpose entities and show that over time, corporate investment flows from these offshore hubs to developing countries increased to a 2010–2012 average of 26 per cent. For the United States, using the Bureau of Economic Analysis data, they show that foreign affiliates of US MNEs based in this group of countries are paying comparatively small amounts of taxes (2 and 3 per cent as a share of pre-tax net income) compared with affiliates based in other locations (17 per cent).

UNCTAD (2015) then estimates, using regression analysis, that an additional 10 per cent share of inward investment stock originating from offshore investment hubs is associated with a decrease in the rate of return of 1–1.5 percentage point. UNCTAD (2015) estimates the tax revenue losses through assumptions on the profitability gap (how much foreign direct investment income is missing due to investments from offshore investment hubs; the amount of corporate profits shifted from developing economies is about $450 billion) and on the average corporate tax rate (a weighted average effective tax rate across developing countries at 20 per cent).

UNCTAD’s (2015) estimation approach can be summarized and simplified as follows (with their headline numbers for developing countries in brackets):

\[
\text{CIT revenues lost from profit shifting for developing countries =}
\text{average offshore hub exposure of total inward FDI stock (46%) ×}
\text{responsiveness of reported rate of return to offshore investment (11.5%) ×}
\text{reported FDI stock (USD 5000 billion) × transforming the after –}
\text{tax values to pre – tax values (1.25) ×}
\text{weighted average effective tax rate (20%) = USD 91 billion}
\]

Their estimates of the relationship between reported rate of return and offshore investment seem rigorous, but it is not clear that what they estimate is actually profit shifting. To be clear, we are not disputing that an additional 10 per cent share of inward investment stock originating from offshore
investment hubs is associated with a decrease in the rate of return of 1–1.5 per centage point and the role of offshore hubs does seem to be distinct, but we do not see what the likely channels of profit shifting associated with the lower returns might be and this research lacks detail and persuasiveness in this respect. Potentially, due to its methodology, UNCTAD’s (2015) approach might be estimating avoidance of capital gains and withholding tax or tax treaty shopping rather than corporate income tax avoidance, but in that case the estimates for developing countries seem large and should not be derived from the amount of corporate income tax revenue. Relatedly, UNCTAD (2015) does acknowledge on page 201 that its estimates do not include the full effects of international corporate tax avoidance; their profit shifting and tax revenue estimates are mostly confined to those associated with tax avoidance schemes that exploit a direct investment relationship through equity or debt. For example, trade mispricing does not require a direct investment link, since MNEs can shift profits between any two affiliates based in jurisdictions with different tax rates.

4.4.4. Results

UNCTAD’s (2015) estimates for developing countries amount to annual tax revenue losses of some $90 billion (which is almost half of the tax actually paid; with sensitivity analysis’ results ranging from $70 to $120 billion). The impact on developed countries is relatively smaller; UNCTAD (2015) estimates it in the order of $100 billion.

Country-level results with extended methodology are provided by Janský & Palanský (forthcoming). They find that on average OECD countries lose least and middle-income countries most corporate tax revenue relative to the size of their economies (and to their corporate tax revenues and tax revenues).

4.4.5. Conclusions

This approach to a particular channel of profit shifting is innovative and valuable. While the use of aggregate FDI data in the UNCTAD’s (2015) approach enables it to cover many diverse countries, it might be further defined by combining it with more granular FDI data such as those from Orbis, BEA and other similar sources.
4.5. OECD (2015b)

4.5.1. Overview

OECD (2015b) finds that tax planning is widespread among MNEs and entails tax revenue losses. They estimate revenue losses from BEPS conservatively at USD 100–240 billion annually, or anywhere from 4 to 10 per cent of global corporate income tax (CIT) revenues. Given developing countries’ greater reliance on CIT revenues as a percentage of tax revenue, they derive that the impact of BEPS on these countries is particularly significant. The underlying paper has been recently revised as a working paper—Johansson, Skeie, Sorbe, & Menon (2017)—but there do not seem to be fundamental differences with the initial version discussed here as OECD (2015b).

4.5.2. Data

The analysis is based on 1.2 million records between 2000 and 2010, so the data is relatively outdated. The data come from the firm-level Bureau van Dijk's Orbis database, which is considered to provide the best available cross-country firm-level information, but does have significant limitations in representativeness for some countries and is based upon financial accounts rather than tax returns. Importantly, their coverage of countries is not global, with the OECD's final sample covering 46 countries: all OECD and G20 countries, Colombia, Latvia, Malaysia and Singapore. More recent analyses using this data looked at a much higher number of countries although the coverage of firms is still far from unbiased and global (Cobham & Loretz, 2014; Garcia-Bernardo, Fichtner, Heemskerk, & Takes, 2017; Johannesen et al., 2017).

4.5.3. Methodology

In OECD’s (2015b) methodology the revenue loss arises from two effects. The first one is profit shifting due to tax rate differentials, the second one differences in average effective tax rates for large affiliates due to mismatches between tax systems and tax preferences. They are documented in their following two findings. First, their analysis estimates the average semi-elasticity of reported profits to tax rate differentials between unconsolidated affiliates’
statutory headline tax rates and their MNE group average tax rate (taking the unweighted average of the other affiliates’ statutory tax rate) at about −1.0. Second, the effective tax rate (ETR) of large MNE entities (with more than 250 employees) is estimated to be lower on average by 4 to 8.5 percentage points compared to similarly-situated domestic-only affiliates as a result of profit shifting, mismatches between tax systems and relative use of domestic tax preferences (based on 2.0 million records; this differential is even higher among very large firms and MNEs with patents). The combination of the two effects results into the overall revenue loss estimate. The estimates are based on a number of crucial assumptions and various sources (mostly Orbis) detailed in their Annex 3.A1.

Due to the data limitations in representativeness and coverage in a number of countries, OECD (2015b) produces only a global estimate based on global parameters, so no country-level estimates are available and should be a subject of future research.

4.5.4. Results

First, profit shifting due to tax rate differentials is estimated as (and we include OECD’s (2015b) estimates in brackets):

\[
\text{CIT revenues lost from profit shifting due to tax rate differentials} = \text{A worldwide responsiveness of profit to asset ratio to tax rate differentials} \times \text{average asset profit ratio derived from the average profit to asset ratio} \times \text{average tax rate differential} \times \text{MNEs’ average share of total profits} \times \text{estimated global CIT revenue USD trillion} = \text{USD 99 billion}
\]

Second, differences in average effective tax rates for large affiliates due to mismatches between tax systems and tax preferences are estimated as (we again include OECD’s (2015b) estimates in brackets):

\[
\text{CIT revenue lost from MNE mismatches between tax systems and preferential tax treatment} = \text{Average ETR difference between large MNE entities and comparable domestic entities} \times \text{MNEs’ share of total profits} \times \text{Share of large MNEs} \times \text{estimated global CIT revenues USD trillion} \times \text{upward adjustment of actual corporate tax collections after tax credits} = \text{USD 50 billion}
\]
### Table 4.3. OECD (2015b) estimates of the revenue loss due to BEPS

<table>
<thead>
<tr>
<th></th>
<th>Profit shifting due to tax rate differentials</th>
<th>Mismatches between tax systems and tax preferences</th>
<th>Total</th>
<th>Total minus two standard errors</th>
<th>Total plus two standard errors</th>
<th>Total plus two standard errors (see notes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of global CIT revenue</td>
<td>4.21 per cent</td>
<td>2.19 per cent</td>
<td>6.41 per cent</td>
<td>3.80 per cent</td>
<td>9.01 per cent</td>
<td>10.46%</td>
</tr>
<tr>
<td>USD billion</td>
<td>96.92</td>
<td>50.45</td>
<td>147.37</td>
<td>87.40</td>
<td>207.34</td>
<td>240.52</td>
</tr>
</tbody>
</table>

*Notes:* The final column assumes that firms not in the sample have 50 per cent higher tax planning intensity.

*Source:* OECD (2015) and author on the basis of OECD (2015b)
The sums in these equations as well as numbers in Table 4.3 below are ours, recomputed on the basis of details from OECD (2015b). OECD (2015b) adjusts upward actual corporate tax collections after tax credits by 23 per cent to more accurately reflect the taxable income base affected by profit shifting for the fiscal estimate. The often-reported range from 4 per cent to 10 per cent of CIT revenues takes into account a 95 per cent confidence interval around the tax sensitivity estimates and the upper bound assumes that firms outside the sample have a 50 per cent higher tax planning intensity than firms in the sample. Table 4.3 shows the resulting estimates after these adjustments in terms of share of global CIT revenue as well as in billion dollars.

Currently, country-level results can only be derived by applying the global estimates to country-level data as done by EPRS (2016). EPRS (2016) extrapolated the OECD’s estimates of a 4–10 per cent increase in corporation tax receipts using Eurostat data. Specifically, they consider corporate income tax revenue for all 28 EU members of 335.3 billion euro in 2013 and this results in an estimated gain of between 13.4 and 33.5 billion euro per annum of corporate tax that could be, in the words of EPRS (2016), recovered from cost-effective regulation.

4.5.5. Conclusions

The estimates by OECD (2015b) have been some of the most influential estimates of profit shifting scale in the policy debate, but are yet to undergo a peer-review process or, perhaps more importantly, to be published with the country-level results. The weaknesses of the Orbis data—especially to examine profit shifting sensitivity, due to the under-representation of both lower-income countries and secrecy jurisdictions—are increasingly well known. Perhaps unsurprisingly, then, in its work to fulfil BEPS Action 11 which requires ongoing monitoring of the scale of the problem, the OECD has set aside this approach and is now working on a quite different analysis using country-by-country reporting data (see the data discussion in section 6.1).

4.6. Profit Shifting of US Multinationals Worldwide (Clausing, 2016)

4.6.1. Overview

Clausing (2016) estimates the effect of profit shifting for the United States as well as other countries using the Bureau of Economic Analysis (BEA) survey
data on US multinationals during 1983 to 2012. She finds that profit shifting is likely costing the US government between $77 billion and $111 billion in corporate tax revenue by 2012, and these revenue losses have increased substantially in recent years. She extends the methodology with additional assumptions to other countries and she finds that profit shifting is likely a large problem in countries without low tax rates. Her estimates of revenue losses total $279 billion for high-tax countries, around 20 per cent of their total corporate tax revenues.

4.6.2. Data

Clausing (2016) uses the annual survey of all US multinational groups carried out by the Bureau of Economic Analysis (BEA). In addition to data on gross profits (which are net income with foreign income tax payments added), she uses data direct investment earnings, also from the BEA, as a. This series excludes all income from equity investments—and thus avoids some double-counting, but also some income that might be indicative of profit shifting.

For her extension to the world, she further uses the Forbes Global 2000 data of the world’s largest corporations, which indicate the location of corporate headquarters and the overall level of worldwide profits for the world’s biggest corporations.

4.6.3. Methodology

Clausing (2016) uses the BEA survey data to estimate semi-elasticity (her average estimate is −2.92), which then help her to calculate what profits would be in the countries of operation of US affiliates absent differences in tax rates between foreign countries and the United States. She then attributes a fraction of the lower foreign profits (of low tax countries) to the United States tax base—38.7 per cent as the share of intrafirm transactions that occur between affiliates abroad and the parent firm in the United States, relative to all intrafirm transactions undertaken by affiliates abroad (with both the parent and affiliates in other foreign countries). She then multiplies the difference between these simulated profits and the current profits by her assumed US tax rate (the mostly 35 per cent lowered by 5 percentage points, presumably, to allow for some degree of tax base narrowing, to make it more realistic). Finally, she scales the estimate up, under the assumption that foreign
multinational firms also engage in income shifting out of the United States, by the ratio of the sales of affiliates of foreign-based multinational firms in the United States (a proxy for the ability of foreign multinational firms to shift income away from the United States) to the sales of affiliates of U.S. based multinational firms abroad (a proxy for the ability of U.S. multinational firms to shift income away from the United States).

The revenues lost from profit shifting can be specified as:

\[
\text{US CIT revenues lost from profit shifting} = (\text{US statutory tax rate (mostly 35\%) } - 5\%) \times (\text{profits in the absence of tax rate differences between the US and foreign countries } - \text{current profits})
\]

Clausing (2016) then extends her estimates for US MNEs to most of the global economy (but not the whole world) that she considers only indicative of approximate magnitudes. She uses the Forbes Global 2000 data of the world’s largest corporations, which indicate the location of corporate headquarters and the overall level of worldwide profits for the world’s biggest corporations (25 countries are home to 95 per cent of the profits earned by this group of firms). She assumes that share of income of the Global 2000 firms booked in low-tax countries, defined as those with effective tax rates that are less than 15 per cent (she identifies 17 such countries), is proportionate to the share of U.S. multinational firm foreign income that is booked in low-tax countries (it is $800 for the US). She applies her earlier US-based estimate of semi-elasticity to calculate what profits would be in low-tax countries and the likely magnitude of profit shifting to low tax countries. Her estimates suggest that $545 billion for the US (of the $800 billion booked in the low-tax countries) and $1,076 billion for the group of big headquarters countries that are not low-tax countries (including the United States) would not be booked in such countries absent the tax rate difference. She then attributes this total to the tax bases of higher-tax headquarters countries based on their share of GDP for this higher-tax group of countries. To arrive at the revenue estimate, she multiplies it with a country-specific tax rate, which she assumes to be five percentage points less than their statutory rates, as in the US case.

The revenues lost from profit shifting can be specified as:

\[
\text{CIT revenues lost from BEPS} = (\text{Statutory tax rate } - 5\%) \times (\text{profits in the absence of tax rate differences between the US and foreign countries } - \text{current profits})
\]
Clausing estimates the revenue cost of income shifting behaviour for the US at $111 billion in 2012. She applies the same methodology using an alternative, more conservative BEA direct investment earnings series, which avoids some double-counting, but also some profit-shifting, and arrives at an estimate of $77 billion in 2012. She highlights seven tax haven countries (Netherlands, Ireland, Luxembourg, Bermuda, Switzerland, Singapore, and UK Islands) that account together for 50 per cent of all foreign profits and 52 per cent of all direct investment earnings.

Overall, the estimates of revenue losses total $279 billion for high-tax countries, 20 per cent of their total corporate tax revenues. For example, for the US, revenue loss of $94 billion is estimated for 2012, in between the upper and lower estimates of the author’s more detailed US-focused methodology discussed above. Clausing (2016) discusses various sources of uncertainties and, especially for the worldwide estimate admits that is an approximate estimate.

Clausing (2016) provides careful estimates, perhaps the most rigorous ones together with those of Zucman (2014) and Dowd et al. (2017), for the biggest economy in the world, the United States. The extension of her estimates for the US to the world is, as she says, only indicative of approximate magnitudes, but even that is currently valuable. Perhaps other data might be employed for this extension and be thus informative for an even wider range of countries, including lower-income ones.

Cobham & Janský (2019) show that as much as a quarter of the global profits of US multinationals may be shifted to locations other than where the underlying economic activity takes place. Their estimate amounts to some $660 billion in 2012, or almost 1 per cent of world GDP. They find that countries at all
income levels are losing out to profit shifting, compared to the taxable profits they could expect, given the current pattern of economic activity and a scenario in which the OECD BEPS aim of aligning profits with economic activity were actually to be achieved.

4.7.2. Data

Similarly to Clausing (2016), Cobham & Janský (2019) use the annual survey of all US multinational groups carried out by the BEA. Also the limitations presented by the data are similar to those by Clausing (2016). The publicly-available data are aggregated to country- and/or industry-level and are by definition for multinational groups from just a single country of headquarters, the United States.

4.7.3. Methodology

First, Cobham & Janský (2019) use a correlation estimate to measure a relative intensity of misalignment. Their second measure reflects the scale of the distortion: in effect, how much taxable profit is in the wrong place. This can be calculated as the sum of either the (positive) excess profits recorded in countries where there is not concomitant economic activity; or equivalently the sum of the (negative) missing profits from countries with economic activity. The following formula shows how they estimate the misaligned profit for a country—if the result is negative, they call it excess profit (since alignment would require its removal); if the result is positive, they call it missing profits.

\[
\text{Estimated profit} = \text{Share of economic activity} \times \text{Total global gross profit} - \text{Actual gross profit}
\]

With these indicators, they develop one possible way to operationalise what the OECD literally said when it launched its BEPS initiative in 2013 with the specific aim of reforming international corporate tax rules so that they ‘better align rights to tax with economic activity’ (OECD 2013a: 11). Cobham & Janský (2019) provide simulation results of what the profits were in case they were distributed in line with indicators of economic activity, considering
the formula proposed by European Commission (2011) for the Common Consolidated Corporate Tax Base (CCCTB) as the main scenario, which is weighted one-third tangible assets, one-third sales, and one-third split equally between compensation costs and (number of) employees (this part stays the same in the more recent proposal by European Commission (2016a)).

Ultimately, they do measure what they call misalignment of the location of profits and economic activity as approximated by the various indicators. However, with the current data and methodology, they are not able to attribute the extent of misalignment to the various reasons. Similar research is yet to decompose the scale misalignment according to various reasons including the profit shifting or a higher capital intensity of operations in some countries or industries.

4.7.4. Results

Cobham & Janský (2019) show that misalignment as recently as the mid-1990s is relatively contained—suggesting that it is only in the last two decades that BEPS has become a significant problem. The extent of deviation from perfect correlation appears small, on any measure, even if the post-crisis level and trend are above those of the pre-crisis period (around 0.2 in 2008 and around 0.03 in the subsequent years). They show the sum of excess profits, i.e. the profits estimated by the above formula for which a perfect alignment would require their transfer to another country. In other words, it shows the total value of US MNEs’ profits that would need to be declared in other jurisdictions in order for the profits to be perfectly aligned with their economic activity. Misalignment by this measure grows over the period from roughly 5–10 per cent of total gross profit in the 1990s, to around 15–25 per cent in the 2000s pre-crisis, through an artificial maximum of around 50 per cent during the sharp profit fall in 2008, and broadly in the range of 25–30 per cent since 2009. In other words, the crisis, and measures taken in the immediate years after it, does not appear to have reversed the sharp growth in misalignment since the 1990s.

Their estimates of excess tax revenue received in 2012 range from $25 bn to nearly $80 bn; the estimate of missing tax revenue is of course higher, ranging from around $80 bn to $160 bn. The difference between the two ranges—i.e. roughly $50 bn to $80 bn—is the implied revenue gain of US multinationals and their shareholders, at the expense primarily of missing-profit jurisdictions
worldwide. The revenue gains of excess-profit jurisdictions can be thought of as providing an estimate of the cost of bribing these excess-profit jurisdictions by the other jurisdictions into cooperative behaviour.

Also some other research studies the misalignment between reported profits and economic activity. There seems to be a policy consensus (OECD, 2013b) on the need to apply corporate taxation where a given value was created, with two sets of estimates provided by Cobham & Loretz (2014), who use company-level balance sheet data retrieved from the Orbis database provided by Bureau van Dijk, and Cobham & Janský (2015), who estimate the misalignment of economic activity using the US data provided by the government Bureau of Economic Analysis. Relatedly, Riedel, Zinn, & Hofmann (2015) find that the tightening of transfer pricing rules raises reported operating profits of high-tax affiliates, and vice versa for low-tax ones, and reduces the sensitivity of affiliates’ pre-tax profits to corporate tax rate changes, and they therefore suggest the effectiveness of the regulations in limiting tax-motivated profit shifting behaviour. In another similar analysis, MSCI (2015) identify 243 companies (out of 1,093 companies within their MSCI World Index constituents; health care and IT companies stood out) paying an average rate of 17.7 per cent, versus 34.0 per cent, if these companies were paying taxes in the jurisdictions where they generate revenues, i.e. equivalent to comparing the location of reported profits and sales (the total difference amounts to USD 82 billion per year).

4.7.5. Conclusions

With the same data source, but very different methodological approach, the scale estimated by Cobham & Janský (2019) is comparable to Clausing (2016).

While the methodological approach is one of the most indirect estimates from the studies reviewed here (in this respect similar to the corporate income tax efficiency estimates in the following section) and thus not to be considered precise in terms of the specific scale of profit shifting, its value might be in providing indicative guidance on cross-country heterogeneity and trends over time. The results show countries at all levels of development suffering from under-reporting of profit reported compared to the economic activity located there; and this scale of misalignment to have increased sharply from the 1990s until at least 2012, when the decision was taken to initiate the OECD Base Erosion and Profit Shifting process.
4.8. Corporate Income Tax Efficiency Estimates
(IMF (2014), EPRS (2015))

4.8.1. Overview

IMF (2014) estimated the spillover effects of profit shifting in what they call a very preliminary exercise. The calculation is based on differences in countries’ corporate income tax (CIT) efficiency ratio relative to the average ratio in the other countries and a similar methodology is applied also by EPRS (2015), covered also below. Both studies argue that they capture profit shifting, whereas what they really attempt to capture empirically is CIT efficiency. Of course, profit shifting is likely to be partially responsible for a lack of CIT efficiency, but only in part, definitely not in full, since there are a number of other factors from compliance to policy. The studies, however, do not provide any credible disentangling of profit shifting from these various factors, but the authors, nonetheless, argue that they provide approximate estimates of profit shifting.

4.8.2. Data

IMF (2014) use data for corporate income tax revenue and rate from the IMF’s Fiscal Affairs Department tax and revenue database and data for the Gross Operating Surplus (GOS) of corporations from the national accounts from the UN Statistics Division. EPRS (2015) uses data sources specific for the European Union (Eurostat and the European Commission’s publications on taxation trends in the EU). The recently created ICTD–WIDER Government Revenue Database (GRD), which combines data from several major international databases and a new compilation from IMF Article IV and country staff reports, provides a potential alternative for future research.

4.8.3. Methodology

IMF (2014)
The methodology described in the IMF (2014) staff paper’s Appendix IV (this is different than another analysis in Appendix III, which we discuss above as a later version published as Crivelli et al. (2016)). IMF (2014) define
CIT efficiency in country $i$, $E_i$, as the ratio of actual CIT revenue ($R_i$) to some reference level of CIT revenue, with the latter computed as the standard CIT rate ($\tau_i$) multiplied by a reference tax base ($G_i$):

$$E_i = \frac{R_i}{\tau_i G_i}$$

IMF (2014) use data for $R_i$ and $\tau_i$ from the IMF’s Fiscal Affairs Department tax and revenue database. Data for $G_i$, the Gross Operating Surplus (GOS) of corporations from the national accounts, is taken from the UN Statistics Division, and this benchmark is of crucial importance in their estimates. According to IMF (2014), GOS provides a proxy to what the base would be if profits were allocated on something broadly similar to a ‘source’ basis (interest income received from foreign operations or the tax base that a residence country operating a worldwide tax system would derive from foreign source income) and is close to the accounting concept of EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization). GOS is broader than the standard CIT base because of loss carry forwards and because depreciation allowances, interest and other specific provisions are not subtracted, and therefore IMF (2014) would expect the values of $E_i$ to be lower than one. The values of $E_i$ higher than one indicate a very efficient corporate income tax system and vice versa. The values can differ across countries because of differences in tax compliance or policies, such as the generosity of tax deductions for depreciation and interest, or of special tax incentives such as tax holiday and patent box or too generous tax rulings as in the case of Luxleaks (Huesecken & Overesch, 2015). IMF (2014) hypothesise that the values might also be affected by behavioural responses, such as profit shifting, which cause the actual CIT base to deviate from its reference. Importantly, however, the value of GOS itself is likely affected by any profit shifting taking place and therefore does not work well as the counterfactual value of corporate tax base without profit shifting.

With their results estimated, they find a strong negative correlation between $E_i$ and $\tau_i$, which they interpret as suggesting strong profit shifting. With this correlation they support their crucial assumption (they call it a somewhat heroic assumption) that all of the variation in cross-country CIT efficiency ratios is due to profit shifting. With this assumption in mind, IMF (2014) estimate a rough measure of the revenue loss (if negative) or gain (if positive) from profit shifting as the difference between the actual ($R_i = \tau_i G_i E_i$)
and the simulated CIT revenue \( R'_i = \tau_i G_i \bar{E} \), i.e. \( \tau_i G_i \) multiplied by \( \bar{E} \), a GOS-weighted average of countries’ CIT-efficiencies, for each country as:

\[
\Delta_i = R_i - R'_i = \tau_i G_i (E_i - \bar{E})
\]

Through multiplication by this weighted average, \( \bar{E} \), they argue that they allow for base erosion or expansion other than profit shifting, but it can also be considered an arbitrary setting of the cut-off point (possibly as an alternative to setting the simulated CIT revenue as equal to \( \tau_i G_i \) only, which would imply the value of \( \bar{E} \) as unity and make the revenue estimates substantially higher, assuming mean efficiency below 100 per cent as is the case in this sample with the value of \( \bar{E} \) being 43 per cent). It follows that they de facto use the weighted average as the benchmark for zero profit shifting and any negative or positive profit shifting follows from differences of countries’ efficiency with the sample’s weighted average. The estimated revenue impact, \( \Delta_i \), can thus only be negative if the country’s share of the world’s implicit CIT base exceeds its share of the world’s GOS, i.e. its CIT-efficiency is lower than the weighted average.

IMF (2014) is aware of a number of important shortcomings of their approach. For example, it can capture only profit shifting between countries in the sample, which does not include many countries, including those considered tax havens (and therefore the revenue impact might be underestimated if the group of countries in the sample together lose profits to third countries such as tax havens). IMF (2014) discusses the crucial assumption in some detail. They argue that to the extent that such variation reflects differences in the prevalence of incentives that are themselves a strategic response to the tax policies of others, it can be seen as capturing base erosion from international tax competition. But they realise that variations in CIT-efficiency may also reflect such unrelated features as differences in compliance and enforcement and they show that revenue impact underestimates the loss from profit shifting if a country has more exemptions or compliance problems relative to its GOS compared to the sample average (so the estimate could in theory be improved by adjusting it for differences in compliance or enforcement across countries). Bach (2013) made a similar comparison of the tax base reported in tax statistics with the corporate income derived from national accounts for Germany (the difference amounted to 90 billion euros or 3.7 per cent GDP in 2008) to observe considerable tax base erosion; neither he nor IMF (2014) have further accounting data of sufficient extent to give precise reasons for the erosion.
EPRS (2015)

EPRS (2015) in chapter 1 follows a similar methodological approach as IMF (2014), but focuses on the EU member states. We include them despite their regional focus on the EU, especially due to their relevance in following IMF (2014) and improving on their approach in some respects, such as when presenting more details including the country-level estimates. Separately, EPRS (2015) in chapter 3 further conclude that if a complete solution to the problem of base erosion and profit shifting were available and implementable across the EU, it would have an estimated positive impact of 0.2 per cent of the total tax revenues of the member states, assuming that the total tax revenues collected over the EU as a whole were 5.74 trillion euro in 2011, a comprehensive solution would add another 11.5 billion euro in revenues. They believe that this estimate underplays the amount of revenue that is recoverable through a cost-effective regulatory response.

In their main estimates and similarly to IMF (2014), the calculation is based on differences in countries’ corporate income tax efficiency (here defined as a country’s actual CIT revenue relative to a potential CIT revenue estimated by the multiplication of CIT rate and a theoretical tax base derived from operating surplus) compared to the average ratio in the sample countries. EPRS (2015) defines the CIT-efficiency as (to simplify the comparison we are using the notation from IMF (2014), rather than the one used by EPRS (2015)):

\[ E_i = \frac{R_i}{\tau_i G_i} \]

where, again, \( E_i \) is the CIT-efficiency, \( R_i \) is the actual CIT revenue, \( \tau_i \) is the CIT rate, \( G_i \) is the reference, here called theoretical, tax base. Together with IMF (2014), EPRS (2015) shares a number of drawbacks and realises that lower CIT-efficiency might be due to not only profit shifting, but also due to, for example, special tax initiatives.

Similarly to IMF (2014), EPRS (2015) estimates the revenue loss or gain from profit shifting as the difference between the actual (\( R_i = \tau_i G_i E_i \)) and the simulated (i.e. supposedly without profit shifting) CIT revenue (\( R'_i = \tau_i G_i \bar{E} \)), i.e. \( \tau_i G_i \) lowered by multiplying by \( \bar{E} \), in their case a non-weighted average of countries’ CIT-efficiencies to allow for base erosion or expansion other than profit shifting), for each country as:

\[ \Delta_i = R_i - R'_i = \tau_i G_i (E_i - \bar{E}) \]
The methodological differences with IMF (2014) are nuanced, but important. EPRS (2015) use a different sample (only EU members; Spain, Hungary and Finland are excluded due to data unavailability) and data source (Eurostat and the European Commission’s publications on taxation trends in the EU). EPRS (2015) uses a non-weighted average of sample countries’ CIT-efficiencies (the weighted average used by IMF (2014) seems more reasonable to enable larger countries to have a bigger impact on others and it is not clear why EPRS (2015) uses a non-weighted average). Importantly, EPRS (2015) use the net operating surplus (NOS) as a theoretical base rather than the gross one (GOS) used by IMF (2014). EPRS (2015) argues that the NOS is closer to the theoretical base and thus more suitable for the task at hand (with which IMF (2014) agree, but lack the data); they subtract depreciation from the GOS to create it. Furthermore, they prefer and use NOS adjusted for imputed compensation for self-employed workers (who are treated for tax purposes as being external contractors and not subject to payroll taxes or pensions).

4.8.4. Results

Both IMF (2014) and EPRS (2015) focus on estimations of tax revenue losses rather than the underlying scale of profits and our presentation of their results follow this approach (however, it is possible to derive the scale of profit shifting from their tables and graphs with some imprecision, which would be especially high for IMF (2014) because of their results being communicated mostly via graphs). In the results of IMF (2014), mean CIT efficiency is 43 per cent, while they provide country-level mean values of CIT efficiency for the period between 2001 and 2012 only in a graph (rather than a table) as Figure 2 in the Appendix of IMF (2014). For example, average CIT efficiency exceeds 100 per cent for Cyprus, is also high in Ireland and Luxembourg, and is lowest in some of the African countries.

In terms of estimated revenue losses, IMF (2014) reports an unweighted average revenue loss across all countries in the sample of 5 per cent of current CIT revenue, but almost 13 per cent in the non-OECD countries. They do not include detailed country-level estimates and so the approximate relative results can be derived from country-level mean values of CIT-efficiency in Figure 1. We derive from the graph that Egypt and other countries to the left with lower values of CIT-efficiency than 43 per cent are, according to these estimates, losers of corporate income tax profit shifting. There are also some of the world’s big economies—from Germany and Japan to India
International corporate tax avoidance

and China—some developing countries as well as some countries, such as the Netherlands, which are being viewed in other existing research as those benefiting from profit shifting (Janský & Kokeš, 2016; Weyzig, 2014). In contrast, Brazil and other countries to the right with higher values of CIT-efficiency than 43 per cent are beneficiaries of corporate income tax profit shifting.

There are also three EU member states which are often considered tax havens and have the highest values of CIT-efficiency in the sample: Cyprus, Ireland, Luxembourg. Behind these three tax havens are countries that are usually not considered as such: the Czech Republic, Tunisia, Bulgaria and Ukraine. This diverse group of countries further includes other tax havens such as Malta and Switzerland, as well as some of the biggest developed economies: United Kingdom and United States; the inclusion of the latter being surprising in the light of evidence suggesting otherwise (Cobham & Janský, 2017d).

EPRS (2015) estimates the mean CIT efficiency at around 75 per cent over the period 2009–2013. Their estimate based on NOS is comparable to 86 per cent estimated by IMF (2014) using GOS over the period 2001–2012 (and reported for a sample of 20 European countries in footnote 134 on page 62). EPRS (2015) estimate revenue losses for the EU as a result of profit shifting to be around 50–70 billion euro, which they think is a lower-end estimate and interpret it as the amount lost due to profit shifting. Moreover, if they assume that profit shifting is the only source of lower CIT-efficiency than 100 per cent, they estimate that revenue losses for the EU could amount to around 160–190 billion euro (which EPRS (2016) interpret as the amount lost due to aggressive tax planning) and they interpret this as including other tax regime issues, such as special tax arrangements, inefficiencies in tax collection and other practices. Although they compare it to an estimate of similar scale by Murphy (2012), who provides annual estimates of 150 and 850 billion euros for total EU tax avoidance and evasion, respectively (the latter being based mostly on shadow economy estimates of Schneider, Buehn, & Montenegro (2010)), they are aware that this is likely an over-estimate because there are cross-country differences in compliance and enforcement as well as strategic responses to the tax policies of other countries (what some would call international tax competition) that are not directly related to profit shifting.

The detailed results by EPRS (2015) show not only country-level estimates, but also that a weighted (weighted by NOS-derived theoretical revenue) average is substantially lower at 60 per cent (and this estimate might be more suitable for comparison with the average of 86 per cent estimated by IMF (2014) for
the EU). This is partially because three countries with highest CIT-efficiency, all above 100 per cent (Cyprus, Slovenia, Croatia), have together a weight of only 1.1 per cent, whereas five countries with highest weights (Germany, United Kingdom, France, Italy, Netherlands), altogether above two fifths of total, have all values below the unweighted average.

4.8.5. Conclusions

Corporate income tax efficiency estimates are some of the most readily available profit-shifting-related estimates for a wide range of countries with the coverage likely to increase in the future. However, it is important to keep in mind that both IMF (2014) and EPRS (2015) are based on differences in countries’ estimated corporate income tax efficiency and this provides a wide scope for other interpretations than international corporate tax avoidance, so these results should be interpreted cautiously and might be of little more than indicative value for discussions of revenue implications.


4.9.1. Overview

In a recent contribution, Tørslev, Wier, & Zucman (2018) present novel research on tax havens, including new estimates of the tax revenue losses related to profit shifting.

4.9.2. Data

Tørslev, Wier, & Zucman (2018) use balance of payments (including newly available bilateral data on service payments such as royalties and FDI interest payments), foreign affiliate statistics (FATS) and national accounts data. They use data on 81 countries covering 90 per cent of world GDP. To support the use of this data, they convincingly show that most of some MNEs’ profits are not included in the often used Orbis data (in fact they show that only a weighted average of 17 per cent of global profits is included in Orbis and for more than a quarter of MNEs there are no profits at all included in Orbis).
4.9.3. Methodology

In their main empirical analysis, Tørslov, Wier, & Zucman (2018) use two indicators to make two observations. First and most importantly, they argue (following the standard Cobb-Douglas production function) that the ratio of corporate profits to the compensation of employees in the corporate sector should be constant. A similar argument has been used by Hines & Rice (1994) and the ensuing vast body of profit shifting literature as well as by the European Commission (201a) in their proposal for the Common Consolidated Corporate Tax Base and the related analysis of misalignment between profits and economic activity by Cobham & Janský (2019). Tørslov, Wier, & Zucman (2018) then, as a novelty, use national account data (main source is OECD, Table 14a, and webpages of national statistical offices) to calculate country-level corporate profit measures (corporate gross operating surplus, less net interest paid, less depreciation).

They find that tax havens are abnormally profitable compared to the compensation of employees (up to a factor of 10). They then show, using foreign affiliate statistics, that all of the abnormal profitability in tax havens can be explained by foreign subsidiaries operating in tax havens. That is, whereas local firms have comparable profitability to the global average profitability, foreign firms operating in tax havens are substantially more profitable. For example, in Ireland, local firms earn roughly 70 cents per wage paid while foreign firms earn more than 8 dollars per wage paid. Their benchmark estimate of profit shifting is simply to set the foreign sector profitability in tax havens equal to the local sector profitability. They argue that their estimate accounts for all shifting of parent firms and subsidiaries to subsidiaries in tax havens. In contrast, their estimate does not capture profit shifting from subsidiaries to parent firms in tax havens, which, however, the authors argue, is a second order issue.

Second, the authors observe that tax havens have high trade surpluses relative to gross national income, a vast majority of which seems to be paid back to foreign parents (GNI is the often used denominator in this case, more suitable than GDP, since it is not affected so much by profit shifting, but both GNI and GDP include both corporate and non-corporate economic activity). Importantly, they assume that all ‘abnormal’ profitability of foreign affiliates in tax havens (that is, profitability above that of local firms) reflects inward profit-shifting. A similar, crucial assumption is made by the IMF (2014) staff paper’s Appendix IV and both UNCTAD (2015) and Janský & Palanský (forthcoming). In line with the previous research, they acknowledge that high
profitability could be due to other factors, but argue that the assumption can be supported with a correlation between the abnormal profitability and dividends payments and retained earnings of ultimate owners (i.e. profits are shifted to tax havens and then paid out to owners in high-tax countries). Finally, they arrive at comparable estimates of worldwide profit shifting scale through two alternative approaches: first, they assume that all net foreign income in tax havens is profit shifting and, second, they assume that excessive high risk exports (such as royalty payments) and FDI interest paid reflect profit shifting.

Tørsløv, Wier, & Zucman (2018) allocate the above-average (i.e. artificially shifted) profits based on which countries import from (and pay interest to) tax havens. They exploit the detailed Eurostat data of service trade for six EU’s tax havens (Netherlands, Ireland, Luxembourg, Malta, Cyprus and Belgium). For non-EU tax havens they rely on Eurostat and BEA data for the US and the EU and bilateral FDI data for the remaining countries. They argue that profit shifting of information and communications technology companies often goes directly from companies to consumers (such as customers paying Uber Netherlands directly or Skype customers paying Skype Luxembourg directly), which was supported by the LuxLeaks revelations. The issue with companies to consumer exports are that they are rarely reported in the importing countries (in line with the Balance of Payments 6 manual). Strikingly, they document clear discrepancies in service export and import data in the EU only for the most important tax havens (e.g. Luxembourg). They thus argue that exporting countries’ export data are more reliable than the lower imports reported by the other countries. They also show that some profits by US MNEs are missing in EU havens’ national accounts.

We set out one part of their methodology in simple algebra, in line with their labelling. \( \pi \) is profit relative to a compensation of employees defined as:

\[
\pi = \frac{Taxable\ corporate\ profits}{Compensation\ of\ employees}
\]

Within each country, \( \pi_f \) is this ratio for foreign companies (affiliates) and \( \pi_i \) for local companies. They estimate average \( \pi \) among non-haven at 36 per cent in 2015.

They assume that for a preselected group of tax havens, any \( \pi_f \) above \( \pi_i \) have been artificially shifted into these tax havens:

\[
Profits\ shifted\ into\ tax\ haveni = (\pi_f - \pi_i)^*
\]

\[
Taxable\ corporate\ profits\ of\ foreign\ companies
\]
4.9.4. Results

Tørsløv, Wier, & Zucman (2018) find that 15 per cent of global profits are made by multinationals abroad (and as little as 5 per cent in the 1980s). They define MNEs’ profits as the sum of FDI equity income receipts across all countries (with corrections for taxes paid and depreciation). They subtract income received by tax havens to avoid double counting. They find that MNEs’ profits are around 1.74 trillion USD in 2015, while global corporate profits are around 11.5 trillion USD.

They conclude that 40 per cent of multinationals’ profits are artificially shifted to tax havens, i.e. more than 600 billion USD in 2015. They also estimate global corporate tax revenue loss around 200 billion USD per year (around 10 per cent of global corporate tax revenue). This scale is broadly comparable to global estimates of other recent research contributions: IMF’s Crivelli et al. (2016) and a follow-up study by Cobham & Janský (2018), UNCTAD (2015) and a follow-up study by Janský & Palanský (forthcoming), OECD (2015b), Clausing (2016), Cobham & Janský (2019) and IMF (2014).

Under their preferred apportionment rule, the European Union is the main loser (with around 20 per cent of its revenue at risk). They argue that as the ratio of taxable corporate profits to a compensation of employees is increasing for some tax havens (e.g. Ireland), a growing amount of profits is artificially shifted to them and that low tax rates in combination with this huge tax base leads to a lot of revenue for these tax havens. The countries benefiting most are Ireland, Netherlands and Luxembourg (which impose low rates on huge tax bases), which is in line with earlier results presented by Zucman (2014) and Cobham & Janský (2019).

4.9.5. Conclusions

The results of Tørsløv, Wier, & Zucman (2018) offer a more deliberate and comprehensive assessment of the global, multinational tax base than others. Their findings suggest a pattern of profit shifting that are partly, they innovatively argue, due to the fact that European tax enforcement focuses on other high-tax countries rather than tax havens—allowing the latter to flourish. The argument is supported with information about the counterparts in OECD’s mutual agreement procedures within the EU. While the revenue loss estimates are lower than some, they sit within the range of other work.
4.10. Conclusions on International Corporate Tax Avoidance

To conclude this chapter on international corporate tax avoidance, we draw the main lessons from the extensive and still expanding academic and policy literature reviewed in detail above.

First, profit shifting of MNEs to tax havens and associated international corporate tax avoidance falls under illicit financial flows, as we argue at the beginning of the chapter as well as in the book’s introduction. These should be seen in total as illicit flows, since they rest on a combination of criminal, unlawful and socially forbidden practices. We leave the question of strict legality mostly to others, to deal with on a case by case basis. Low- and middle-income countries seem to be more intensively affected by profit shifting, with predictable results for public spending and access to health, education and so forth; and this makes even stronger the case for its inclusion in the Sustainable Development Goals’ target to curtail illicit financial flows.

In addition, the international policy consensus, expressed in the G20/OECD BEPS project, is that multinationals’ profit misalignment should be curtailed: ‘The G20 finance ministers called on the OECD to develop an action plan to address BEPS issues in a co-ordinated and comprehensive manner. Specifically, this Action Plan should provide countries with domestic and international instruments that will better align rights to tax with economic activity’ (OECD, 2013a, p.11, emphasis added).

This international consensus that profit shifting should be addressed in general is compounded by consensus in the SDG process, and most visibly in the High Level Panel on Illicit Financial Flows from Africa, and the High Level Panel of Eminent Persons on the Post-2015 Framework, that profit shifting should be addressed specifically within the SDGs. It is, moreover, clear that the intention of the global agreement on the SDGs was that this be done within SDG 16.4 on illicit financial flows, rather than SDG 17.1 on tax. We can see arguments to address profit shifting under either; but it is clear that 16.4 is what was agreed, and we see no reason to unpick this now. Profit shifting is an integral element of the wider problem of illicit financial flows, and like others should be curtailed.

Second, profit shifting is a real phenomenon. Second, profit shifting is a real phenomenon, and there is now a large body of evidence consistent with MNEs shifting profits illicitly from where economic activity occurs to tax havens. A clear conclusion emerges that the international tax system provides MNEs with opportunities to decrease their taxes through intra-company transfer prices, strategic management of the location of intangible assets or distortion of the corporate debt structure. The research confirms that
many MNEs do often make use of these opportunities and do shift income to tax havens (Clausing, 2003; Hines & Rice, 1994; Huizinga & Laeven, 2008). However, until recently, the literature had been less conclusive in respect of scale and revenue implications. The quality and coverage of estimates has improved substantially in recent years, and for coverage of countries in particular—with direct relevance to estimates of the scale and harms of illicit financial flows. A clear conclusion emerges from the existing research that the international tax system provides MNEs with opportunities to decrease their taxes through intra-company transfer prices, strategic management of the location of intangible assets or distortion of the corporate debt structure. The research confirms that many MNEs do often make use of these opportunities and do shift income to tax havens (Clausing, 2003; Hines & Rice, 1994; Huizinga & Laeven, 2008). However, until recently at least, the literature has been less conclusive in respect of scale of profit shifting flows and revenue implications.

Third, profit shifting is an important phenomenon of substantial scale—economically, statistically, as well as in terms of revenues lost. The various studies estimate that governments worldwide lose more than 100 billion USD annually. The existing research indicates that the scale of shifted profits and revenue losses are widely distributed across jurisdictions, with the highest values in high-income countries but the most intense losses in relation to GDP and especially to tax revenues, in lower-income countries. In contrast, only a small number of jurisdictions are consistently the recipients of disproportionate volumes of profit related to economic activity elsewhere. Furthermore, Guvenen, Mataloni Jr, Rassier, & Ruhl (2017) and Tørsløv, Wier, & Zucman (2018) provide estimates of profit shifting impacts on macroeconomic aggregates such as gross domestic product that are statistically important.

Fourth and perhaps more obviously, profit shifting can be curbed. Although it has over the past couple of decades grown into an important economic phenomenon, it has not always been so big. Some studies, such as Cobham & Janský (2019) and Tørsløv, Wier, & Zucman (2018), show that in the 1990s profit shifting was a much smaller concern. This historical account can thus help us understand that profit shifting is not an inherent feature of the global economy and that it can work well (or, indeed, better) without it. How to measure progress in reducing profit shifting is an important matter that has been increasingly addressed since 2013 both by academics and policy experts, so far without clear recommendations—although as we write in 2019, the ‘BEPS 2.0’ process at the OECD has committed to going beyond the arm’s length principle, and is actively considering unitary tax approaches which have the
potential to deliver both meaningful change in the international rules and also clearer measures of progress.

Fifth, in terms of methodology, three recent studies stand out as particularly useful when thinking about an indicator for the SDG. Although each of Tørsløv, Wier, & Zucman (2018), Cobham & Janský (2019) and IMF (2014) uses different methodology and reaches different results, all three of them have much in common that is desired for an indicator of the SDG target. They all rely on official statistical sources, largely national accounts data and official statistics of foreign affiliates of MNEs. Their methodological approaches are relatively straightforward, which makes them feasible and transparent. All of them rely on basic ratios of various economic variables. None of them uses regression analysis, which might be hard to implement as a part of the SDG target indicator, whereas all the other four studies rely on regressions in reaching their conclusions. Another methodological similarity is that they all make use of the comparison between what the profits or tax revenues are, and a counterfactual of what they would be in the absence of profit shifting. Also, all of them take quite literally the BEPS objective of better aligning rights to tax with economic activity, useful aligning the approaches with the policy consensus (this also helps guide our proposal in chapter 6). In sum, IMF (2014), Cobham & Janský (2019) and Tørsløv, Wier, & Zucman (2018) apply straightforward methodologies to publicly available, official, government-sponsored data. We are confident that these observations can help us design a new indicator that overcomes some remaining drawbacks these estimates have, such as data quality and selection of specific economic variables.

Sixth, there is no perfect indicator operationalised in the literature that could be used as it is and applied for the SDG target. Some of the research reviewed is promising, and we believe that a workable indicator is within reach. Perhaps the biggest challenge is the necessary consensus of national statistical offices on which specific version of a profit shifting indicator should be used for the target. We return to this question in chapter 6.