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Measurement of Illicit Financial Flows

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Summary

Target 16.4 of the Sustainable Development Goals framework (SDGs) includes the aim of reducing the overall level of 'illicit financial flows' (IFF), an umbrella term for a broad group of cross-border economic and financial transactions. A single indicator is so far proposed, 16.4.1, which would capture the global dollar value of measured IFF. Such an indicator would comprise of at least two elements, reflecting illegal capital IFF (those based on the theft of state assets and the proceeds of crime), and legal capital IFF (those based on tax evasion and avoidance, or regulatory abuses). This paper addresses the second element, with a primary focus on tax abusive IFF. In section 1 of this paper, we outline how such an indicator could be selected. In section 1, we address definitional questions and propose three key criteria to evaluate indicator suitability. In addition, we identify three tiers of potential indicators, reflecting estimates of the *scale* of IFF; true measures of IFF results; and, using indicators of the financial secrecy that is key to facilitating illicit flows, the IFF *risk exposure* that individual countries face (and can manage, to a degree).

Since indicator 16.4.1 concerns scale, we turn here first. Measurement is problematic because the common element across IFF types is not illegality but the use of financial secrecy to remain hidden from public and regulatory view. As a result, the literature focuses on estimates rather than direct measurement, and typically relies on identifying anomalies in public data. Since anomalies can arise for reasons other than the illicit, there is inevitably a degree of uncertainty in all

such estimations. Section 2 of this paper provides an overview of all the leading estimates, and using the criteria put forward evaluates their potential appropriateness as the basis for indicators under SDG target 16.4. In section 3, we propose and evaluate two alternative scale indicators which would provide true measures, rather than estimates, of IFF scale. In section 4, we propose and evaluate a range of indicators of IFF-enabling secrecy and of IFF risk exposure. Finally, we conclude with suggestions for further work to pilot and or otherwise test the appropriateness and feasibility of the proposed indicators.

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1 Introduction

By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime

- UN Sustainable Development Goals Target 16.4

‘Illicit financial flows’ (IFF) is an umbrella term for a broad group of cross-border economic and financial transactions. Under target 16.4 of the Sustainable Development Goals (SDGs), a single indicator is so far proposed, 16.4.1, which would capture the global dollar value of measured IFF. Such an indicator would comprise of at least two elements, reflecting illegal capital IFF (those based on the theft of state assets and the proceeds of crime), and legal capital IFF (those based on tax evasion and avoidance, or regulatory abuses). This paper addresses the second element, with a primary focus on tax abusive IFF.

In this section, we outline how such an indicator could be selected. First, we address definitional questions. Then we lay out a framework with three tiers of potential indicators, reflecting estimates of the scale of IFF; true measures of the results of IFF; and the IFF risk exposure that individual countries face (and can manage, to a degree). Finally, we propose three key criteria that will be used throughout to evaluate indicator suitability.

1.1 Definitions¹

There is no single, agreed definition of illicit financial flows (IFF). This is, in large part, due to the breadth of the term ‘illicit’. The (Oxford) dictionary definition is: “forbidden by law, rules or custom.” The first three words alone would define ‘illegal’, and this highlights an important feature of any definition: illicit financial flows are not necessarily illegal. Flows forbidden by “rules or custom” may encompass those which are socially and/or morally unacceptable, and not necessarily legally so.

To take a specific example, commercial tax evasion affecting a low-income country where the tax and authorities have limited administrative capacity is much less likely to be either uncovered or successfully challenged in a court of law, than would be the same exact behaviour in a high-income country with relatively empowered authorities. A strictly legal definition of IFF is therefore likely to result in systematically – and wrongly – understating the scale of the problem in lower-income, lower-capacity states.

For this reason, a narrow, legalistic definition of IFF should be rejected. The phenomenon with which we are concerned is one of hidden flows, where either the illicit origin of capital or the illicit nature of transactions undertaken is deliberately obscured. The most well-known classification stems from Baker (2005), an American businessman who was so shocked by the degree of profit shifting by multinationals he encountered while working in a number of sub-Saharan African countries that he subsequently wrote a book, *Capitalism’s Achilles Heel*, and established the NGO Global Financial Integrity (GFI) to challenge the abuses. In Baker’s assessment, grand corruption accounted for just a few per cent of illicit flows, and laundering of the proceeds of crime between a quarter and a third. The largest component by far was ‘commercial tax evasion’, through the manipulation of trade prices, accounting for around two thirds of the problem.

While Baker (quite reasonably) views all of the latter activity as illegal (and GFI’s definition follows from this), it is clear that much that has been labelled multinational tax avoidance by others would be included. Prof. Sol Picciotto has highlighted that there are in fact three categories to consider, rather than two: instead of looking at illegal evasion and legal avoidance, policy should identify illegal evasion; unlawful avoidance; and lawful (successful) avoidance, while recognising that there are likely to be grey areas between each.

¹ This sub-section follows closely that in our earlier background paper (Cobham & Jansky, 2017b), drawing in turn on Cobham (2014).

These three categories make up the various forms of profit *shifting*, which must be distinguished from profit *misalignment*. Misalignment is a broader term that has gained currency since 2013, when the G20 and OECD declared that the single goal of the Base Erosion and Profit Shifting Action Plan (BEPS) was to better align taxable profits with the location of multinationals' real economic activity. Profit misalignment can occur due to any of the three categories of profit shifting activity intended to reduce companies' tax liabilities, and also from a fourth category: misalignment that arises simply from the fact that OECD tax rules do not explicitly seek alignment, and therefore some divergence from full alignment would be expected even in the absence of tax-motivated shifting. In addition, differences in governments' willingness to pursue their full tax base will give rise to misalignment that does not result from attempts to procure profit shifting from elsewhere. Furthermore, there are natural differences in profitability, such as different capabilities of employees, that are independent of profit shifting, but which we are not able to isolate from profit shifting. For these reasons, the agreed aim is the reduction rather than the comprehensive eradication of misalignment.

The latter could, however, be achieved through the abandonment of OECD tax rules. These rest on the economically illogical treatment of the individual companies within a multinational group as if they were separately profit maximising. This necessitates the creation of artificial 'transfer prices' for intra-group transactions, aimed at recreating arm's length market prices in order to establish the 'true' distribution of profits across the group.

Since the economic rationale for multinationals to exist is that they can achieve higher profitability than individual companies operating at arm's length, it follows that genuine arm's length pricing would not be compatible with multinationals' continuing existence. The alternative to this illogical approach, and the enormous costs imposed for companies and tax authorities to create, check and negotiate transfer prices, is to treat taxable profit as arising where in reality it is maximised: at the unit of the multinational group itself. Such a unitary approach gives rise to the need for some basis to apportion gross profits as tax base among the jurisdictions in which the multinational carries out its economic activity. The approach typically taken is to apportion profits according to each jurisdiction's share of the multinational's global activity. Where this is in place - for example, to allocate tax base among the provinces of Canada, the cantons of Switzerland and the states of the USA; or putatively, among the countries of the EU - the formula for economic activity tends to reflect some combination of employment, sales and tangible assets. In this way, unitary taxation with formulaic apportionment can result in very close alignment of taxable profits and economic activity - and may offer an increasingly attractive alternative to current OECD rules.

The present paper is concerned in this area not with the strict legality of multinationals' tax behaviour, but with the scale of profit shifting, or of profit misalignment as proxy, because of the resulting illicit flows and the damage done.

Criminology has seen a growing zemiological critique (e.g. Hillyard & Tombs (2004) and Dorling et al. (2008)), which emphasises a range of shortcomings in the crime-led approach, among them that crime is a social construct based on value judgements and so varies across time and geography - thereby undermining it as a consistent basis of comparison; and that crime as a category excludes many serious harms (e.g. poverty or pollution). As such, working on the basis of the harm demonstrably done provides a more consistent basis. In the case of illicit flows, such an approach would clearly support the inclusion of multinational profit shifting since the revenue impacts and related harms in the grey area of 'possibly legal but untested' avoidance are indistinguishable from those which are firmly in the 'unlawful' category.

Baker also sat on the High Level Panel on Illicit Financial Flows out of Africa, which put avoidance squarely at the forefront of their scrutiny: "The various means by which IFFs take place in Africa include abusive transfer pricing, trade mispricing, misinvoicing of services and intangibles and using unequal contracts, all for purposes of tax evasion, aggressive tax avoidance and illegal export of foreign exchange." (p.24)

Table 1 provides a broader overview of the transaction types, elaborated in Cobham (2014). It is unlikely to be comprehensive because there is potential to engineer an illicit flow in any transaction,

and the range of potential illicit motivations is wide indeed; but nonetheless demonstrates the breadth of IFF phenomena. Clear clusters are captured in the column ‘IFF Type’, which shows the main illicit motivations: 1 – market/regulatory abuse, 2 - tax abuse, 3 – abuse of power, including the theft of state funds and assets, 4 – proceeds of crime. As the final two columns indicate, all four IFF types are likely to result in reductions in both state funds and institutional strength.

These in turn allow identification of the major actors in IFF:

- private actors (individuals, domestic businesses and multinational company groups committing tax and regulatory abuse, and the related professional advisers – tax, legal and accounting) – these are the leading actors in IFF types 1, 2 and 3;
- public officeholders (both elected and employed) – these are important actors in IFF types 3 and 4, and may be involved in type 1; and
- criminal groups (a term used here to indicate both those motivated primarily by the proceeds of crime, and those using crime to fund political and social agenda) – the leading actors in IFF type 4.

There is substantial overlap in the mechanisms used for IFF, regardless of motivation. The opportunity to hide, where it exists, is likely to be exploited for multiple purposes. For example then, the legal use by a multinational of highly secretive jurisdictions may both provide cover for illegal use of the same secrecy, and also inadvertently legitimize such behaviour. Identifying illicit flows in a particular mechanism will tend to be insufficient to specify the type of IFF in action.

Table 1 shows a roughly equal number of potential IFF in each of the first three categories, and rather fewer for the proceeds of crime; but this rests on an assumption made for descriptive clarity which is unlikely to hold in practice: namely, that businesses operating internationally are not used to launder the proceeds of crime. This distinction in turns highlights a more important one: namely, that IFF can take place with capital which is anywhere on a spectrum of legality. At one end are criminal proceeds and stolen public funds, with legitimate income and company profits at the other.

A second spectrum exists in relation not to the capital but rather the transaction itself. At one end there are clearly illegal transactions, such as bribery of public officials by commercial interests; at the other end, transactions which are likely to be legal (at least in the sense of not having been challenged successfully in a court of law) but may well be illicit; in this category would be, for example, some of the more aggressive transfer pricing behaviour of multinational companies.

Figure 1 provides a rough plotting of the four IFF types identified, on a quadrant diagram showing the spectra of transaction licitness and capital legality. The historical emphasis of both research and policy has been on those IFF types that are furthest, in general, to the northeast quadrant (i.e. where both the capital origin and the transaction are in question); and least attention to those in southeast (i.e. those where the capital origin is less likely to be in question than the manipulations involved in the transaction).

Most attention, in other words, has been paid to the clusters relating to abuse of power, and more recently to the proceeds of crime – at least in relation to efforts against ‘terrorism financing’ subsequent to the World Trade Center attacks of September 2001. The areas of market abuse and tax abuse have been relatively neglected in terms of policy focus, with the result that the dominant discourse has largely excluded the role of private sector actors in driving illicit flows – at least until the financial crisis affecting many countries that began in 2008.

Table 1: A typology of illicit financial flows and immediate impacts

Flow	Manipulation	Illicit motivation	IFF type	Impact on state funds	Impact on state effectiveness
Exports	Over-pricing	Exploit subsidy regime	2	↓	↓
		(Re)patriate undeclared capital	1	↓	↓
	Under-pricing	Shift undeclared (licit) income/profit	2	↓	↓
		Shift criminal proceeds out	4	↓	↓
		Evade capital controls (including on profit repatriation)	1		↓
Imports	Under-pricing	Evade tariffs	2	↓	↓
		(Re)patriate undeclared capital	1	?	↓
		Shift undeclared (licit) income/profit	2	↓	↓
	Over-pricing	Shift criminal proceeds out	4	?	↓
		Evade capital controls (including on profit repatriation)	1	↓	↓
		Shift undeclared (licit) income/profit	2	↓	↓
Inward investment	Under-pricing	Shift undeclared (licit) income/profit	2	↓	↓
		Shift criminal proceeds out	4	?	↓
		Evade capital controls (including on profit repatriation)	1	↓	↓
		(Re)patriate undeclared capital	1	?	↓
	Over-pricing	Hide market dominance	1		↓
		Hide political involvement	3		↓
		Evade capital controls (including on profit repatriation)	1		↓
Outward investment	Under-pricing	Evade capital controls (including on profit repatriation)	1		↓
	Over-pricing	Shift undeclared (licit) income/profit	2	?	↓
		Shift criminal proceeds out	4	↓	↓
		Hide political involvement	3		↓
Public lending	(If no expectation of repayment, or if under-priced)	Public asset theft (illegitimate allocation of state funds)	3	↓	
		Public asset theft (illegitimate creation of state liabilities)	3	↓	
Public borrowing	(If state illegitimate, or if over-priced)	Public asset theft (illegitimate creation of state liabilities)	3	↓	
Related party lending	Under-priced	Shift undeclared (licit) income/profit	2	↓	
Related party borrowing	Over-priced	Shift undeclared (licit) income/profit	2	↓	
Public asset sales	Under-pricing	Public asset theft	3	↓	
	Anonymity	Hide market dominance	1		↓
	Anonymity	Hide political involvement	3		↓
Public contracts	Over-pricing	Public asset theft	3	↓	
	Anonymity	Hide market dominance	1		↓
	Anonymity	Hide political involvement	3		↓
	Anonymity	Corrupt payments	3	↓	↓

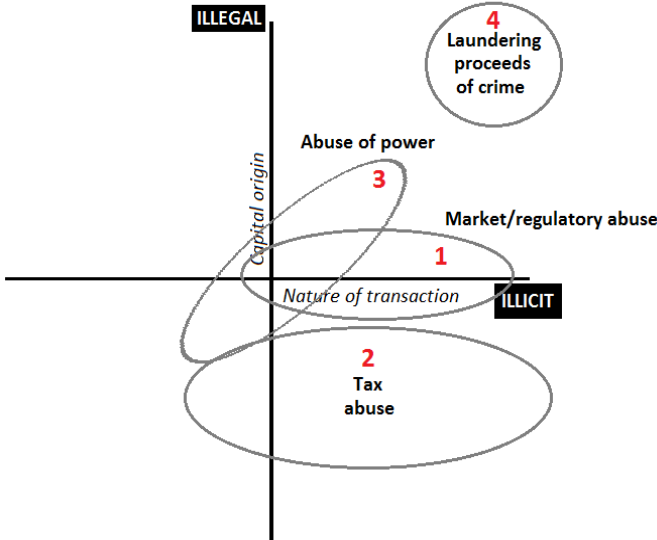
Source: Cobham (2014). 'IFF type' is defined as follows: 1 – market/regulatory abuse, 2 - tax abuse, 3 – abuse of power, including theft of state funds, 4 – proceeds of crime.

Table 2: A simpler outline of illicit financial flows

Legal category	Origin of assets	Behaviour type	Result when transferred abroad
Legal	Legally generated profits, capital gains and income	Tax compliance	Licit: Legally generated, fully tax compliant and legally transferred assets abroad
		Lawful tax avoidance	Illicit? Lawfully tax avoiding assets abroad
Unlawful		Unlawful tax avoidance	Illicit: Legally generated, but unlawfully tax avoiding assets abroad
		Market/regulatory abuse	Illicit: Circumvention of regulations via hidden (offshore) ownership for unlawfully earned profit at home/abroad
Criminal		Illicitly transferred, and/or transferred for illicit purposes	Illicit: Legally generated but violating regulations for cross-border transactions such as evading currency controls, or transferred to fund illegal activities (including terrorism)
		Tax evasion	Illicit: Legally generated, but criminally tax evading assets abroad
		Proceeds of corruption	<i>Bribery; Grand corruption; Illicit enrichment; Embezzlement</i>
	Proceeds of theft/related crime	<i>Theft; Extortion; Kidnapping; Fraud; Bankruptcy</i>	Illicit: Theft-related illegal assets transferred abroad
	Proceeds of illegal markets	<i>Drug trafficking; Counterfeiting; Firearms trafficking; Trafficking in persons; Smuggling of migrants; Wildlife trafficking</i>	Illicit: Illegal assets (from illegal economic activities)

Source: authors' elaboration, building on earlier outline by UNODC, from which text in italics is drawn.

Figure 1: Main IFF types by nature of capital and transaction



Source: Cobham (2014).

It is worth reiterating that in all cases in the typology, the behaviours in question are in some sense reprehensible. They rely on being hidden because there would be substantial negative ramifications to their becoming publicly visible. These ramifications might be legal or social – that is, they may reflect violations of law or of ‘rules and custom’ – and in each case are sufficiently powerful to justify any costs of hiding. As such, it is inevitable that estimates of these deliberately hidden phenomena exhibit a degree of uncertainty. Moreover, since different IFF types use the same channels, estimates of particular channels will inevitably combine some IFF types to some degree; and since different IFF types use multiple channels, ‘clean’ estimates of individual IFF types may be difficult to obtain.

For the purposes of simple indicators as the SDG target requires, the distinctions in table 1 may be over-elaborate. A simpler alternative is provided in table 2, which clarifies illicit assets as the key outcome of each illicit flow – and distinguishes types of tax avoidance following Picciotto’s proposal. Since each illicit asset type is associated with harms ranging from the underlying loss of public assets, promotion of criminal activities and tax losses, this simpler approach may be less helpful for specific policy responses. It does however offer a broader framing which may prove helpful in allowing simpler, harm-relevant indicators to be constructed.

1.2 Classification of indicators

In the current paper, we focus on legal capital IFF (illegal capital IFF being addressed primarily by UNODC). We identify three types of possible indicators.

Scale of illicit financial flows: Existing estimates

The SDG target currently contains a space for a single IFF indicator only, on scale:

16.4.1: Total value of inward and outward illicit financial flows (in current United States dollars).

An indicator 16.4.2 relates to illicit arms trade, so at present only the total, global scale of IFF will be captured – assuming appropriate measurement, or satisfactory estimation, is indeed possible. Depending on the measure/s selected, it may be possible to decompose into (a) national/jurisdiction-level contributions; and/or (b) contributions by IFF type and/or by IFF channel. The policy value of such an indicator would be greatly enhanced by the possibility of such decomposition.

Results of illicit financial flows: New, direct measures

The last decade has seen dramatic changes in international financial transparency, and these have given rise to new data that has only now becoming available and is yet to be fully exploited. We set out how this data will allow the construction of direct, ‘true’ measures of multinationals’ profit shifting, and of the scale of undeclared offshore assets.

Exposure to secrecy

Since the common characteristic of IFF is that they are largely hidden, indicators of financial secrecy can reveal the potential for IFF. Variables capturing elements of secrecy such as the availability of anonymous ownership vehicles, and the absence of international cooperation and information exchange, can therefore offer a potentially powerful proxy for scale. In addition, such measures have the important attractions that they can be more directly measured, and may give rise to more specific policy implications.

Given a range of financial secrecy measures at jurisdiction level, it is possible to combine these with bilateral data on the scale not of IFF but of recorded stocks and flows of trade, banking, direct and portfolio investment. These combined measures, appropriately scaled, can be taken as granular indicators of the relative risk of IFFs faced by a given country (and potentially at the global level).

1.3 Criteria for the selection of indicators

In order to evaluate the indicators that will be put forward in the following sections, we propose three criteria. Within the present exercise these will be assessed according to our own, largely subjective view – but future work may also allow objective indicators to be constructed for each.

Quality

The key feature of the IFF indicators is that it be robust – that is, that it both and be and be seen to be a credible indicator of the specific phenomenon with which target 16.4 is concerned.

Coverage

Second, the indicator must be available, or potentially able to be constructed, in a consistent basis across time – and ideally, as noted, at the level of jurisdictions (and for as many as possible) and IFF types or channels.

Feasibility

Finally, the process of collecting the data and estimating the indicator must be straightforwardly feasible – not some utopian challenge, but conceivable within the time and resource limitations facing national and UN statistical staff.

The remainder of the paper is structured as follows. Section 2 provides an overview and evaluation of the leading IFF estimates. In section 3, we propose and evaluate two alternative scale indicators which would provide true measures, rather than estimates, of IFF scale. Section 4 provides the equivalent analysis for a range of indicators of IFF-enabling secrecy and of IFF risk exposure. The paper concludes with a summary of findings and suggestions for further work to strengthen the evidence base before final decisions on the SDG indicators are taken.

2 Overview of scale indicators

Illicit financial flows have tremendous power to cause damage to states, economies and societies. The extent of that damage depends ultimately on the scale of IFF themselves. The following section surveys current attempts to estimate the scale of these deliberately hidden phenomena. We provide an overview of existing methodologies, their pros and cons, as well as outlining core ingredients or considerations for improved methodologies.

In this section we discuss four groups of estimates:

- capital account-based,
- trade-based,
- offshore wealth,
- corporate tax avoidance.

In later sections we introduce financial secrecy and financial secrecy scale (or exposure to financial secrecy). Table 3 provides a quick overview of their suitability for indicators.

Table 3: Suitability of the groups of estimates for indicators (preliminary evaluation)

Scale indicator	Quality	Coverage	Feasibility	Overall
Capital account	Not sufficient	Not sufficient	Yes	No
Trade	Sufficient	Not sufficient	Yes	No
Offshore wealth	Sufficient	Not sufficient	No	Yes
Corporate tax avoidance	Sufficient	Sufficient	Yes	Yes

Source: Authors

2.1 Capital account-based estimates

Almost all approaches to IFF estimation are based on exploiting anomalies in data that may arise from the process of hiding, while most prominent IFF approaches focus on anomalies in the capital account (unrecorded capital movements) and in the current account (via mispriced trade).

For capital account anomalies, the two most commonly used methods are the World Bank Residual Method (WBR) and the Hot Money ‘Narrow’ Method (HMN). The World Bank residual model subtracts the total of funds actually used by a country from the total of funds entering that country and, if there are more funds coming in than funds being used, the resulting shortfall is considered to be illicit flows. The hot money model considers all errors in a country’s external accounts as illicit flows. Both these methods rely on anomalies in the Balance of Payment (BoP) identity:

$$A + B + C + D + E + F + G + H = 0$$

Where:

A: current account balance

B: net equity flows (including net FDI and FPI)

C: other short-term capital of other sectors

D: FPI involving other bonds

E: change in deposit-moneybanks’ foreign assets

F: change in reserves of the central bank

G: net errors and omissions (NEO)

H: change in external debt

The World Bank residual method (WBR) captures the difference between recorded inflows and recorded uses, which is given by the (negative) sum of the current account balance, net equity flows, change in reserves of the central bank and change in external debt. By the BoP identity:

$$-(A + B + F + H) = C + D + E + G$$

Of the components on the right-hand side, however, C+D+E are licit: composed of other short-term capital of other sectors, FPI involving other bonds, and the change in deposit-money banks' foreign assets. As such, the WBR method is likely to exhibit a substantial upwards bias as an estimator of IFF. Similarly, Fontana (2010) summarizes the World Bank residual method by the following equation: Illicit flows = (increase in foreign debt + increase in FDI) – (financing of the current account deficit + additions to the country's reserves).

The main alternative, the Hot Money 'Narrow' method (HMN), is given by the remaining right-hand side component, G: net errors and omissions. G is simply the balancing residual constructed to maintain the BoP identity, and so serves as an indicator of error – and possibly of illicitness – in the overall capital account. Again, Fontana (2010) summarizes the Hot Money model by the following equation: Illicit flow = all funds coming in (credit) – all funds going out (debt).

The longest-standing series of estimates, although published for African countries only, are those of Ndikumana & Boyce (e.g. 2008). These authors also contrast sources and uses of foreign exchange in the capital account, but adjust for exchange rate fluctuations on the value of external debt, for debt writeoffs and for under-reported remittances (the latter on the basis of discrepancies between IFAD estimates and BoP data). However, likely the most well-known estimates are those produced by Global Financial Integrity, have shifted from using the WBR method (e.g. Kar, Cartwright-Smith, & Hollingshead, 2010) to the HMN (e.g. Kar & Freitas, 2011 and, more recently, Spanjers & Salomon, 2017)). Since they combine these capital account estimates with trade estimates, we discuss them only reviewing the latter as well.

2.2 Trade-based estimates

The other group of models is based on trade data and estimates trade mispricing, often capturing the quantity of illicit flows by contrasting what a country claims it imported from (or exported to) the rest of the world with what the rest of the world states it exported to (or imported from) that given country. This research usually uses international trade data to study trade mispricing, which occurs when transactions between both related and unrelated parties are mispriced to avoid taxes or achieve similar objectives (in contrast to a more narrowly defined transfer mispricing that describes only transactions between related parties within a multinational corporation). Trade mispricing enables shifting profits out of countries either through import over-invoicing or export under-invoicing. Academic studies have used trade data, ideally at transaction level (Clausing, 2003; De Boyrie, Pak, & Zdanowicz, 2005; de Boyrie, Pak, & Zdanowicz, 2005; Pak, 2007; Zdanowicz, 2009), and they broadly support the view that tax indeed motivates trade pricing decisions. These types of methods have been also often applied by non-governmental organisations, Tax Justice Network (2007), Hogg et al. (2009), or Hogg et al. (2010).

Both Global Financial Integrity and Boyce & Ndikumana also include a trade-related IFF component as the second part of their flow estimates. While this may include some transfer mispricing by multinationals for the purpose of profit-shifting, trade misinvoicing is a more crude approach to tax reduction than those challenged in the OECD Base Erosion and Profit Shifting action plan, the major international attempt to curtail the problem. Instead, these anomalies are more likely to reveal unrelated party transactions that aim to shift part of one party's income into a different jurisdiction. In both approaches, the authors use national trade data to establish anomalies in the declared values of total exports and imports, on the basis that these reveal illicit shifts of value. On one view, these estimates are rather conservative. They pick up only one form of trade misinvoicing, which occurs via re-invoicing. The data does not pick up, for example, trade transactions where the misinvoicing is incorporated in the same invoice exchanged between exporter and importer. In addition their data does not pick up misinvoicing of services and intangibles.

Within the same broad approach type are more detailed trade studies, such as those carried out by Pak & Zdanowicz (2002) (and various other) and United Nations Economic Commission for Africa & African Union (2015), and these may suggest a need for some caution. Greater confidence is possible in estimates such as the latter which are based on more granular data – at detailed commodity level at least, and ideally at transaction level. The difficulties in obtaining consistent, high-quality data of this type mean that the leading global estimates at present rely instead on national-level data – and serious criticisms, including of the GFI approach, have been raised (Hong & Pak, 2017; Johannesen & Pirttilä, 2016; Nitsch, 2016). An important difference in approach between Boyce & Ndikumana and GFI is that the former net off their estimates of illicit inflows, to obtain a more conservative (and also more volatile) series, while GFI argue that because there is no such thing as ‘net crime’; it makes sense to consider gross outflows.

Two important critiques of similar methodological approaches emerged and both are worried that recent estimates, especially by the GFI, overestimate how much developing countries lose due to illicit financial flows. Hong & Pak (2016) focus on the partner-country trade data comparison method and argue that the assumption of no misinvoicing in partner countries cannot be supported and raise doubts about the reliability of the method. They also introduce an alternative method to estimate trade misinvoicing which does not rely on the trade statistics of partner countries. Similarly, Nitsch (2016) critiques the GFI’s empirical methodology, focusing in particular on deficiencies in the use of mirror trade statistics to quantify the extent of capital outflows due to trade misinvoicing. He identifies what he believes to be arbitrary assumptions, mixed methodologies and skewed sampling to argue that their estimates have no substantive meaning. Overall, the earlier studies succeeded in highlighting the importance of tax havens and illicit financial flows and bringing these issues to wider attention, but there are difficulties with these estimates and some of the individual methods were criticised by Fuest & Riedel (2012) or Hines (2010). We briefly discuss three groups of problems that most of the pioneering research in this area shares: assumptions, interpretation and policy. Most of the methods necessarily rely on strong assumptions about the sizes of flows, assets or tax rates estimates. Many of the estimates do not allow a straightforward interpretation, because usually there is no counterfactual available. Furthermore, most of the estimates do not shed more light on specific policy measures - the results seldom provide more guidance for policy other than a general recommendation to reduce illicit financial flows or recover the assets held offshore.

There is an increasing number of research papers that use detailed trade data, together with it, more credible methodologies. Their disadvantage is that they are limited in geographical coverage, usually focusing on one country only (naturally being the source of the unique data). We first briefly discuss two papers using French data. Vicard (2015) uses detailed firm level export and import data by origin, destination and product to estimate revenue impact of profit shifting through transfer pricing. He shows that the price wedge between arm’s length and related party transactions varies systematically with the corporate tax rate differential between France and its trading partner. He estimates that this profit shifting decreased French corporate tax base by 8 billion USD in 2008 and the related missing tax revenues amount to 10% of the corporate tax paid by multinational groups located in France that trade with a related party. He estimates the so called semi-elasticity of corporate profits to tax differentials at 0.5 (a 10 percentage point increase in tax differential would increase the pre-tax income reported by the affiliate by 5%). This is based on transfer pricing in goods trade only and is thus relatively high by the other estimates on balance sheet data, which he challenges. Using similar data Davies, Martin, Parenti, & Toubal (2017) arrive at a somewhat lower estimate, most of which is driven by the exports of 450 firms to ten tax havens. For the United States, Flaaen (2017) uses transaction-level data to find profit-shifting behaviour by US MNEs via the strategic transfer pricing of intra-firm trade. For Denmark, Cristea and Nguyen (2016) use firm-level panel dataset of Danish exports to find evidence of profit shifting by MNEs through transfer pricing. For the United Kingdom, Liu, Schmidt-Eisenlohr, & Guo (2017) use detailed data on export transactions and corporate tax returns of UK MNEs and conclude that firms manipulate their transfer prices to shift profits to lower-taxed destinations. In a first such study using very detailed data, Wier (2017) uses South African data to provide evidence of trade mispricing, first such for a developing country. It is a question, when such research could be carried out at comparable cross-country basis with substantial worldwide coverage, but it is obviously not yet.

2.2.1 Combining capital-account and trade approaches

Having reviewed capital account and trade approaches, it is also possible to combine these two types of models, capital-account and trade, and create a composite measure. Most notably, the research by Global Financial Integrity (GFI) uses the World Bank residual and hot money models and further makes adjustments for trade misinvoicing. Their hot money-based model estimates that the developing world lost USD 859 billion in illicit outflows in 2010 (significantly more than the USD 129 billion in aid by OECD countries in 2010). Their estimates, Kar & Freitas (2012), suggest that bribery, kickbacks, and the proceeds of corruption continued to be the primary driver of illicit financial flows from the Middle East and North Africa, while trade mispricing was the primary driver of illicit financial flows in the other regions. On the basis of this kind of estimates, Hollingshead (2010) uses national corporate income tax rates to estimate the tax revenue loss from trade mispricing in poor countries between USD 98 billion and USD 106 billion annually over the years 2002 to 2006.

In the most recent 2017 GFI analysis of illicit financial flows to and from developing countries between 2005 and 2014, Spanjers & Salomon (2017) estimate the illicit financial flows (or outflows) from developing countries in 2014 at between \$620 billion and \$970 billion. In this report they publish such a range for the first time and they also put equal emphasis on inflows and estimate them in 2014 at between \$1.4 and \$2.5 trillion. In this most recent report, they still combine capital-account and trade approaches to estimating illicit financial flows. In their lower bound estimates of outflows, trade misinvoicing is responsible for two thirds of the total, while what they call unrecorded balance of payments flows (using net errors and omissions as a proxy for these) accounts for the remaining third. They estimate that Sub-Saharan Africa suffers most in terms of illicit outflows. Their trade misinvoicing estimates are based on the assumption that whatever exports or imports are reported by advanced economies, but not equally reported by developing countries, are illicit financial flows (either under-invoicing or over-invoicing). They use IMF's Direction of Trade Statistics, preferably and when data available at bilateral level (around half countries in Europe and Western Hemisphere) and otherwise at aggregate level (two thirds of all countries including a vast majority of countries in Sub-Saharan Africa and most countries in Asia and other regions). Their upper bound estimates are scaled up on the basis of assuming that traders misinvoice with other developing countries at the same rate they misinvoice with advanced economies. They do further adjustments to their trade misinvoicing estimates using data from Honk Kong, Switzerland, South Africa and Zambia.

The advantages of using the estimates of illicit financial flows by Global Financial Integrity or of a similar type are obvious from their relative media and policy success – they provide clear figures that many people can relate to, and that the media as well as researchers and policy makers can reference. The drawbacks might be less obvious, but seem more numerous and important. These estimates indicate the extent of the flows rather than the policy efforts. The models rely on official statistics that are generally of poor quality, especially in poor countries, and that do not take into account flows resulting from illicit activities, such as smuggling or black market activity, because proceeds from such activities are not captured in national accounts. Also, no single model measures the totality of illicit flows and there are no consistent models for measuring all the types of flows including corruption money, criminal money and tax evasion. Due to data publication time lags, the Global Financial Integrity has a nearly two-year delay in publication of its estimates. Additionally, they provide results for individual poor countries, but not for their rich country counterparts; these results could possibly be arranged with Global Financial Integrity or re-estimated.

While illicit inflows could be considered to counteract detrimental effects of illicit outflows by increasing available capital resources, this position is questionable (see UNECA (2012) and AUC-UNECA (2015) for a more detailed discussion) because the damage of IFF to governance may be more important than the net resource effect. The benefits to the economy of illicit financial inflows to the economy may well be less than those of licit inflows, since the illicit inflows may themselves be going to fund the illicit economy (e.g. repatriation of profits by transnational organized criminal organizations may be used to fund expansion of activities in the country in question; the flows could also represent financing of terrorism); or be circumventing regulation or taxation designed to ensure fair competition. For our purposes in this paper, illicit financial inflows seem just as likely as illicit outflows to be distributed as or more unequally than funds in the licit economy, and so our primary

interest is in estimates that do not 'net out' illicit financial inflows. In empirical comparison, Cobham & Gibson (2016) show (in Figure 5) a comparison for estimates of total African IFF, between GFI methodology with WBR and HMN – Kar & Cartwright-Smith (2010), and Kar & Freitas (2011), respectively – and the Ndikumana & Boyce approach. Note that differences between the series frequently exceed the total value of the lowest estimate. Ndikumana & Boyce demonstrates greater volatility, as would be expected given in particular their use of net rather than gross trade mispricing. At the aggregate level, GFI's updated (HMN) methodology tends to produce the more conservative estimates. These differences provide an important illustration of the sensitivity of estimates to assumptions. Note, too, that these are shown at the aggregate level; disaggregated, there are examples of quite different country patterns over time.

There are two main reasons to consider additional approaches. First, anomaly-based estimates inevitably attract criticism over the possibility that they may confuse 'innocent' anomalies including data errors and mismatches due to timing and rounding errors with evidence of illicitness, and the sensitivity to some of the assumptions made – see for example the various views expressed in five chapters of the World Bank's illicit flows volume (Reuter, 2012: chapters by Eden; Fuest & Riedel; Leite; Murphy; and Nitsch). As such, while the range of estimates have established the scale of the issue in terms of the broad order of magnitude, the degree of confidence in the estimates may be less suited to specific policy analysis at the level of countries and IFF types. The second concern relates to the bluntness of the leading estimates. While it is useful to compare the component attributable to trade with that attributable to the capital account, and to separate out some individual and corporate tax abuses, greater specificity of the channels of IFF would be valuable to support policy prioritisation. Underlying these issues is the simple fact that flows that are hidden by design do not lend themselves to measurement.

2.3 Offshore wealth estimates

How much wealth is held offshore and how much of it is illicit is another research question leading to estimates of scale of illicit financial flows. Ndikumana and Boyce have generally focused more on the stock of capital held outside African countries, than on the annual outflows. Similarly, Henry (2012) produces global estimates with a largely common methodology, scaling up from outflows to estimates stocks of capital held offshore. The alternative approach here is to use data on international asset and liability positions in order to establish anomalies in the position of particular jurisdictions. Zucman (2013) follows this line of approach, focusing on a group of pre-determined 'tax haven' jurisdictions and the potential undeclared wealth held there. Henry's estimate, reflecting a wider set of asset types and without the limitation on jurisdictions holding assets, is unsurprisingly much larger: in the range of \$21 trillion to \$32 trillion, compared to around \$8 trillion for Zucman. It is possible to estimate the income streams that may accrue on offshore assets. Both Henry (2012) and Zucman (2013) estimate an offshore income stream of around \$190 billion annually (Henry assumes a much more cautious rate of his return, on his much higher estimated stock). When country-level estimates are available, this may provide an alternative source of hidden income data to include in national distribution analysis. However, the additional extrapolations (from outflows to stocks, and then to potential income streams) inevitably add a higher degree of uncertainty. Similarly, the new global analysis of Alstadsaeter, Johannesen, & Zucman (2017b) follows Zucman (2013) in resting on an extrapolation from Swiss data.

Before Henry (2012) and Zucman (2013), research with the ambition to provide global estimates was linked with development implications of tax havens and motivated by tax revenues not collected due to illicit activities that might be used to invest in social policy programmes in poor countries. A number of studies, mostly by non-governmental organizations and some academics, emerged around the year 2000 and provided some of the first estimates of assets held offshore and associated illicit financial flows and government tax revenue losses relevant for poor countries, using various methodologies. Oxfam (2000) estimated that poor countries suffered a yearly loss of around USD 50 billion due to tax havens, whereas Transparency International (2004) estimated that corrupt heads of states are responsible for billions of dollars in illicit financial flows out of their countries. Baker (2005) estimated, by combining various methods and conducting hundreds of interviews, that more

than USD 540 billion flows out of poor countries each year due to a combination of tax evasion, fraud in international trade, drug trafficking, and corruption. Quite a few other studies focus on what assets might be illegally already held abroad and could be recovered. Tax Justice Network (2005) estimated that the value of assets held offshore lies in the range of USD 11 - 12 trillion and suggested that the global revenue loss resulting from wealthy individuals holding their assets untaxed offshore may be as much as USD 255 billion annually. Cobham (2005), on the basis of shadow economy estimates of Schneider (2005) and Tax Justice Network (2005), derived a loss to poor countries of around USD 100 billion a year. James Henry for Oxfam (2009) estimated that at least USD 6 trillion of poor country wealth is held offshore by individuals, depriving poor countries' governments of annual tax receipts of between USD 64 and 124 billion and, in a similar way, Henry (2012) estimated that a global super-rich elite had at least USD 21 trillion hidden in tax havens by the end of 2010 and that poor countries could be losing USD 189 billion in associated tax revenue every year. These studies were mostly first of their kind and put the related topics on the policy agenda. In terms of pioneering revenue-relevant estimates, only very recent research, such as Zucman (2013) estimating the stock of wealth in tax havens, includes more credible estimates.

2.4 Corporate tax avoidance estimates

International corporate tax avoidance and profit shifting (and tax gaps and related estimates) literature is largely self-contained, drawing variously from data on multinationals' balance sheets or surveys or FDI data to identify anomalies in the distribution of the international corporate tax base. We have discussed this literature in some detail in a recent paper (Cobham & Janský, 2017a). Instead, we focus here and in the Appendix on estimates of scale of this corporate tax avoidance with a worldwide coverage. Table 4 below provides an overview of seven such studies and the individual chapters in the Appendix of this paper discuss them in some detail. The Appendix 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 material there has been prepared for a forthcoming book that will survey estimates of illicit financial flows in each area. Chapters of the book will be published online in draft form, inviting expert review, from January 2018.

Table 4 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 (2017), OECD (2015b), Clausing (2016), Cobham & Janský (2017), IMF (2014), and, very recently, Tørsløv, Wier, & Zucman (2017). 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 in the Appendix.

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 (2017) use data focused on US-headquartered multinationals only. While Clausing (2016) estimates profit shifting scale from derived semi-elasticities, Cobham & Janský (2017) 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.

Table 4. Summary of estimates of global profit shifting and associated tax revenue losses

Reference	Annual corporate income tax revenue loss estimates	International corporate tax avoidance estimated	More details on methodology	Published in an academic journal	Country-level estimates
IMF's Crivelli et al. (2016), Cobham & Janský (2018)	Long-run approximate estimates are \$400 billion for OECD countries (1% of their GDP) and \$200 billion for lower-income countries (1.3%) of their GDP.	BEPS related to tax havens.	BEPS related to tax havens by looking at a counterfactual if the tax havens' tax rates were not lower than for other countries.	Yes	Yes (by a later study of Cobham & Janský (2018))
UNCTAD (2015), Janský & Palanský (2017)	Around 8% of CIT, USD 200 billion in 2012 globally and USD 90 billion for lower-income countries.	BEPS through tax avoidance schemes that exploit a direct investment relationship.	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.	No	Yes (by a later study of Janský & Palanský (2017))
OECD (2015b), Johansson et al. (2017)	USD 100-240 billion, or anywhere from 4-10% of global corporate income tax (CIT) revenues in 2014. It ranges from 7.5 to 14% of lower-income countries' CIT revenue.	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.	BEPS related to tax rate differentials and differences in average effective tax rates for large affiliates of MNEs and domestic companies.	No	No
Clausing (2016)	Between \$77 billion and \$111 billion in corporate tax revenue losses of US government due to profit shifting by 2012. Revenue losses total \$279 billion for a group of selected countries, 20 percent of their total corporate tax revenues.	Profit shifting due to tax rate differentials.	Profit shifting scale from derived semi-elasticities	Yes	Yes

Table 4, continued

Reference	Annual corporate income tax revenue loss estimates	International corporate tax avoidance estimated	More details on methodology	Published in an academic journal	Country-level estimates
Cobham & Janský (2017)	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.	Misalignment between the location of US multinationals' economic activity versus the location of their profits.	They quantify the extent of misalignment between reported profits and indicators of economic activity.	Yes	Yes
IMF (2014)	5% of CIT in OECD and almost 13% in non-OECD countries in 2012.	Corporate income tax efficiency, the spillover effects of profit shifting.	Corporate income tax revenues related to differences in countries' corporate income tax efficiency ratio (using gross operating surplus) relative to the average ratio in the other countries.	No	Yes
Tørsløv, Wier, & Zucman (2017)	They conclude that 45% of multinationals' profits are artificially shifted to tax havens, i.e. more than 600 billion euro in 2015. They estimate global corporate tax revenue loss to be around 200 billion euro per year (around 12% of global corporate tax revenue). Under preferred apportionment rule, the European Union is the main loser (loses around 20% of its revenue).	Profit shifting to tax havens	They argue that relative to a number of employees, firms in tax havens are abnormally profitable. They assume that all profitability in tax havens above world average reflects inward profit-shifting. They allocate the artificially shifted profits based on which countries import from (and pay interest to) tax havens (at least for the EU).	No	Yes

Source: Authors on the basis of the cited literature

3 Proposal of preferred indicators

Rather than inevitably imprecise estimates of the scale of illicit flows, our two preferred indicators (or indicator components) address instead the measurable consequences. Both rely on newly available data series which follow the international adoption of policy measures first put forward as a package during 2003-05, when the then newly established Tax Justice Network set out the policy platform now known as the ABC of tax transparency:

- Automatic, multilateral exchange of tax information between jurisdictions;
- Beneficial ownership transparency (public registers of the owners of companies, trusts and foundations); and
- Country-by-country reporting to the public by multinational companies.

These proposals were initially derided by OECD and other policy experts. By 2013 however, they had come to form the basis of the global policy agenda. First, the G20 and G8 groups of countries directed the OECD to develop a new multilateral standard for automatic information exchange. This Common Reporting Standard (CRS) came into effect in September 2017. Despite a range of issues to address, most notably the fully multilateral inclusion of lower-income countries, this reflects remarkable progress. More gradual has been the emergence of public beneficial ownership as an international transparency ambition, with early adopters include the UK and EU.

Finally, the G20 and G8 also mandated the OECD to develop a standard for country-by-country reporting by multinationals. This standard, now in force for large multinationals, closely resembles the original Tax Justice Network proposal for an international accounting standard (see Cobham, Gray, & Murphy, Richard, 2017). The pursuit of country-by-country reporting also reflects a longer discourse on appropriate levels of financial and non-financial disclosure by multinational companies, which has deep roots in the UN system through the G77's initiation of the Commission on Transnational Corporations (1974-1992).

The standard requires reporting of multinationals' economic activity, profits and tax paid, annually and on a country-by-country basis. At present the data is provided only to tax authorities, rather than being made public; although publication is the subject of legislative processes in a number of major economies including the EU. In addition, as part of the BEPS process, Action 11 requires the OECD to report annually on progress against the single goal of reducing the misalignment between multinationals' profits and the location of their real economic activity. This requires the OECD to collate partially aggregated country-by-country reporting data from cooperating tax authorities, in order to publish jurisdiction-level summary statistics on the extent and nature of profit misalignment.

Together, the A and C of the ABC of tax transparency provide a step change in available data on illicit financial flows – or rather, their immediate consequences. The following sub-sections address, respectively:

1. the volume of multinational companies' profit that has been shifted to achieve tax-favourable misalignment with real activity; and
2. the volume of offshore assets that are not declared to home country authorities.

A final sub-section discusses the implications of combining the two components.

3.1 Profit shifting: SDG 16.4.1a

For illicit financial flows related to multinationals' avoidance of corporate income tax, we propose an indicator of misaligned profits, based on OECD country-by-country reporting data. A clear advantage of this approach is that the data should provide a precise measure, for all multinationals above the reporting threshold, of the misalignment of profit away from the locations of real economic activity. Issues of estimation can therefore be set aside completely.

As discussed in section 1, the exact nature of profit misalignment means that this measure will necessarily include a degree of non-illicit activity. Recall that profit *shifting* is made up of lawful and

unlawful avoidance, along with criminal evasion. Profit *misalignment* is a broader term, including these three elements but also misalignment that may arise simply from the fact that OECD tax rules do not explicitly seek alignment. Since some divergence from full alignment might therefore be expected even in the absence of tax-motivated shifting, the value of the indicator consistent with IFF elimination need not be zero.

Given international agreement on the need to curtail both illicit flows and the misalignment of profits and real activity, and recognition that misalignment is associated with unnecessary harms to sustainable development, we propose the following indicator with the intention of achieving substantial reduction, rather than necessarily the absolute eradication of misalignment.

The misaligned profit indicator is defined as the value of profits reported by multinationals in countries, for which there is no proportionate economic activity of MNEs. It is defined for each jurisdiction and it can be summed across some or all countries. For each jurisdiction we define the misaligned profit as:

$$\chi_i = \omega_i \Pi - \pi_i \quad \dots(1)$$

where:

ω_i is the share of all multinationals' economic activity in jurisdiction i ;

Π is the global, gross profits of all multinationals; and

π_i is the share of all multinationals' gross profits declared in jurisdiction i .

We propose to capture economic activity as the simple average of single indicators of production (the share of full-time equivalent employees in a jurisdiction, t_i) and consumption (final sales within each jurisdiction, γ_i). We define, for all i :

$$\omega_i = \frac{1}{2}(t_i + \gamma_i)$$

We also use the label Ω for the global total of multinationals' economic activity, and define:

$$\Omega = \sum_{i=1}^n \omega_i; \text{ and}$$

$$\Pi = \sum_{i=1}^n \pi_i$$

It follows that the global sum of misaligned profits, X , is equal to zero:

$$X = \sum_{i=1}^n \chi_i = 0$$

We propose that the profit misalignment indicator for use in SDG target 16.4 is the global sum of *positively misaligned* profits – that is, the total excess profits declared in jurisdictions with a greater share of profits than would be aligned with their share of economic activity. Equivalently, this can be calculated as half the sum of the absolute values of misaligned profit:

$$SDG_{16.4.1a} = \frac{1}{2} \sum_{i=1}^n |\chi_i| \quad \dots(2)$$

Note that the SDG indicator is expressed as the sum of inward and outward IFF, so the sum of absolute profit misalignment could be used; this seems inelegant at best. Note also that the underlying country-level misalignment measures provide monitoring and accountability for individual states seeking to reduce the (negative) misalignment suffered – for example, to demonstrate to citizens and domestic businesses that multinationals are being fairly taxed; and for states that benefit from profit-shifting at the expense of others, an accountability mechanism to demonstrate their own commitment to global progress.

The *quality* of the data required is high. Although not currently required to be audited and consolidated to global accounts, the basis in reporting by individual multinationals to their home tax authorities sets the likely standard well above any current alternative – from the limited, publicly available company balance sheet data, to elements of national accounts data or bilateral aggregates. Misreporting faces potentially criminal consequences.

In terms of *coverage*, the capturing of multinationals above the threshold is expected to be complete – and therefore global in terms of their operations. One potential issue relates to the channel through which the data might enter the UN system. Most straightforward in practical terms at least would be to work with the OECD, as it gathers partially aggregated data from tax authorities. Some states provide headquarters to only one or a few multinationals passing the threshold, and until public reporting is agreed, the question of confidentiality may affect what data can be shared via the OECD. Alternatively, a delegated UN body such as UNCTAD could – in tandem with the OECD or quite separately – obtain additional data direct from member states’ tax authorities, with the guarantee of protecting confidentiality of individual reporting multinationals. Given cooperation of OECD and/or member states, either approach is broadly *feasible*.

3.2 Undeclared offshore assets: SDG 16.4.1b

As with the proposed profit-shifting indicator, so too in the area of undeclared offshore wealth there is a new possibility due to the recent adoption at global level of a key tax justice proposal. In this case, it relates to the ‘A’ of the Tax Justice Network’s ABC of tax transparency: automatic exchange of tax information. This measure requires jurisdictions that are signatories to the OECD Common Reporting Standard to provide bilaterally to other jurisdictions, detailed reporting on financial assets of the other’s citizens – for example, for Switzerland to report to Germany the Swiss bank holdings of German citizens.

This policy measure is intended above all to address offshore tax evasion by individuals. The category of undeclared assets, however – and hence the proposed indicator – should include the results of the great majority of illicit flows as set out in Table 2 above. With only certain exceptions, maintaining the success of the illicit flow will require continuing not to declare ownership of the results offshore assets to the home authorities.

More than 100 of the leading financial centres are committed to exchange financial information under the CRS, starting either in September 2017 or September 2018, and annually thereafter. Unfortunately, the OECD has allowed jurisdictions to breach the originally understood commitment to exchange automatically with all other CRS signatories, leading Switzerland and others to restrict their detailed reporting to only economically and politically powerful states. But as with 16.4.1a, the proposal here does not require full access to the detailed data.

Since financial institutions are required for CRS effectiveness to confirm the citizenship of accountholders, reporting of aggregate data is straightforward – that is, not the data on individual German citizens with Swiss bank accounts, but on the totality of their holdings. At the same time, to participate in the CRS requires tax authorities to organise their own data on citizens’ self-declaration in an equivalent manner. This therefore makes it reasonable to publish aggregate data on the totality of holdings in each other jurisdiction – e.g. of German citizens in Switzerland, in France, in Austria, and so on.

The undeclared offshore assets indicator is defined as the excess of the value of citizens’ assets declared by participating jurisdictions under the CRS, over the value declared by citizens themselves for tax purposes. For each jurisdiction we define the undeclared assets as:

$$\phi_i = \sum_{j=1}^n \beta_{j,i} - \alpha_i \quad \dots(3)$$

where:

α_i is the sum of assets declared by citizens of jurisdiction i as being held in jurisdictions $j = 1, \dots, n$ where $j \neq i$; and

$\beta_{j,i}$ is the sum of assets of citizens of jurisdiction i reported as being held in jurisdiction j .

We propose that the undeclared offshore assets indicator for use in SDG target 16.4 is the global sum of jurisdiction-level undeclared assets:

$$SDG_{16.4.1b} = \sum_{i=1}^n \phi_i \quad \dots(4)$$

Again, the underlying jurisdiction-level measures will allow monitoring and accountability in a number of ways. Individual states seeking to reduce the under-declaration suffered, for example, will be able to demonstrate to taxpayers that the economic elites who make disproportionate use of ‘tax havens’ are being fairly taxed; For example, the underlying data would allow France’s tax authority to show progress in closing the undeclared assets gap, thereby bolstering revenues and also confidence in the system, with wider benefits for tax morale and compliance. For states that benefit from providing financial secrecy at the expense of others, the measures offer an accountability mechanism to demonstrate their own commitment to global progress - allowing Switzerland, for example, to be held to account over the number of countries and the volume of assets for which it still refuses to provide automatic information exchange.

The *quality* of the data required is expected to be generally high. One concern is the ongoing activity to create non-reportable asset classes such as insurance ‘wrappers’ that may allow circumvention of the CRS. In this sense, automatic information exchange can be thought of as a form of capital control, and in common with all such measures will require ongoing strengthening as financial institutions and others ‘innovate’ to avoid (in this case) transparency. The standard should be expected to evolve over time for this reason, raising some issues for comparability year on year. In addition, the somewhat narrow range of financial assets currently covered makes leakage inevitable; but there is no serious alternative in terms of data quality with wider range.

In terms of *coverage*, comprehensive data would require some improvement in implementation. Some implementing jurisdictions have sought to limit the data gathered by requiring their reporting financial institutions only to collect data for the jurisdictions with which they will initially be exchanging information – ensuring that no data is available, even in the aggregate, on the assets of citizens of other jurisdictions. In addition, the current systematic exclusion of lower-income jurisdictions must be addressed – either through pressure on the OECD to implement the fully multilateral instrument that the G20 first sought, or through an alternative UN measure to require it. If deemed necessary, extrapolations based on country size and income level could be made to ensure a broadly accurate global value in the initial stages. Alternatively, existing data could be used to provide a partial but precise measure. Either would ensure the approach was *feasible* at the outset.

3.3 Combining the two components

A final issue to consider is that the proposed measure undeclared asset is not of a form consistent with the profit shifting indicator above. Since the latter is a measure of annual flow, to align the two – so that, for example, they could be added to form a single number – would require a conversion of undeclared asset (stock) into undeclared income (flow).

There are two possible approaches. One would be to assume some rate of return on the measured stock, to estimate the associated annual income flow – much as Henry (2012) and Zucman (2013) do. The fact that those two studies reach similar values for global revenues lost to tax evasion, despite a threefold difference in the asset base, speaks to the sensitivity to the assumed rates of return. The other approach would be to track the growth in total undeclared assets, year to year, as effectively the net flow of undeclared assets. A weakness here is that if CRS circumvention through asset class innovation is effective, the data are likely to show falling flows even as the stock of undeclared assets (in non-CRS classes) grows more strongly. This is, of course, also ultimately a weakness of the approach in equation (4) – and so continuing tightening of the asset class definitions will be needed to maintain effectiveness.

Since either conversion of the undeclared assets measure to a flow approach would introduce complications, we would propose to report separately on 16.4.1a and 16.4.1b, rather than seeking to combine the two – but as indicated, conversion and combination are possible if deemed strictly necessary.

In combination, the two measures respond to the main components of illicit flows as presented, most simply, in Table 2. Proposed indicators 16.4.1a captures the level of achieved profit shifting. Proposed indicator 16.4.1b captures the achieved level of creation of illicit (undeclared) assets offshore.

4 A risk-based approach

A complementary or alternative approach to seeking indicators of scale can be found in a risk-based approach. This has the potential to offer both a more granular analysis, and also to go beyond overall monitoring and accountability, to support policy prioritization at the national level. The central idea behind this approach, pioneered in the work of the African Union/Economic Commission for Africa’s High Level Panel on Illicit Flows out of Africa (2015), is this: that precisely because illicit financial flows are, by definition, hidden, the likelihood of an illicit component will be increasing in the degree of financial opacity in any given transaction.

Box: Calculating ‘Exposure’ to IFF risk

Partner Opacity	Scale	Exposure
$V_i = \frac{\sum F_{i,j} \cdot SS_j}{F_i}$	$I_i = \frac{F_i}{Y_i}$	$E_i = \frac{\sum F_{i,j} \cdot SS_j}{Y_i}$
Where:	<i>i</i> : {1, ..., I} <i>j</i> : {1, ..., J} <i>F_{i,j}</i> <i>Y_i</i> <i>SS_j</i>	Country of interest Partner country Flow between reporter <i>i</i> and partner <i>j</i> GDP of country of interest Secrecy Score of partner country. Ordinal, 0-100.

The assumption is that all else being equal, the easier is to hide something, the more likely that something will be hidden: trading with Switzerland, or accepting investment from the British Virgin Islands, exposes a country to a greater risk of IFF than trading with Denmark or accepting investment from France. This does not of course imply that all trade with Switzerland is illicit, nor that all multinationals with BVI subsidiaries are committing tax evasion. However, the greater is the transparency of the partner jurisdiction in a given bilateral transaction, then the lower, all other things being equal, will be the risk of something being hidden. Not all transactions of a less transparent nature will be illicit; but the likelihood of illicit transactions within a less transparent flow will be higher. The greater the degree of opacity, in other words, the higher the risk of IFF.

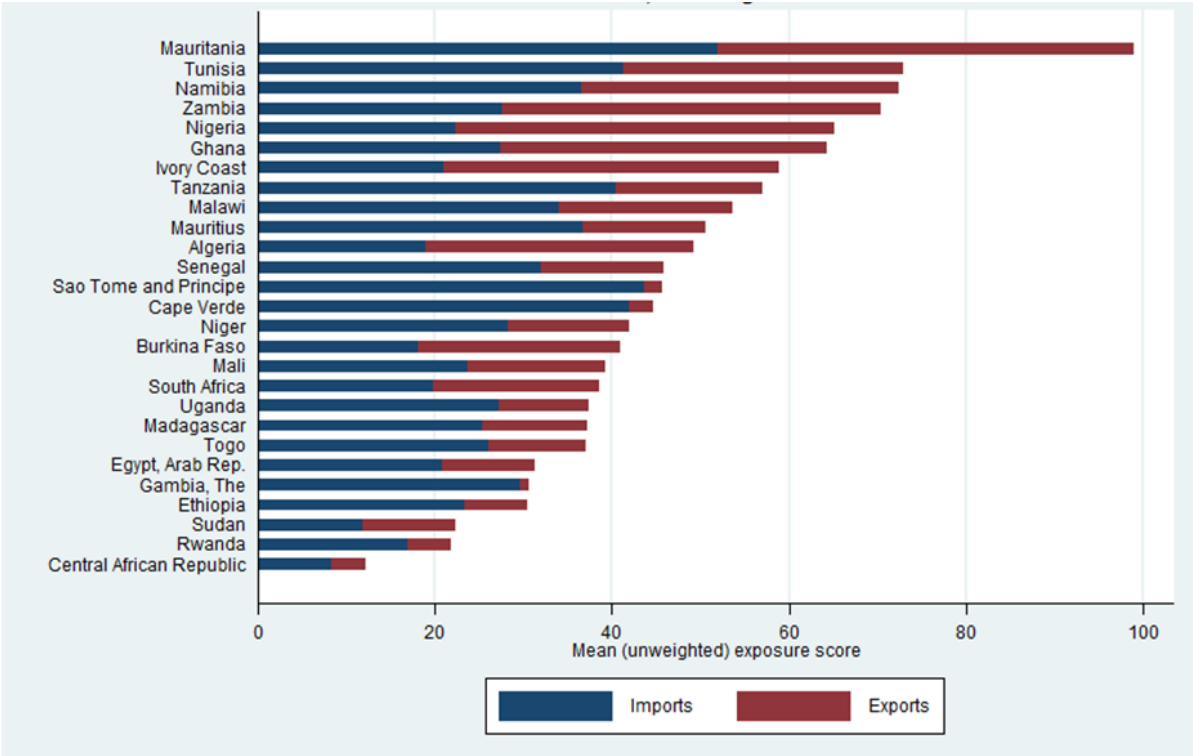
To the extent that financial opacity of partner jurisdictions can be measured, this provides the basis to assess the risk of IFF facing a given country or region, according to the pattern of partners in economic and financial cross-border activity. The first step is therefore to create a measure of average Partner Opacity in each stock or flow for which data are available on a bilateral basis. This measure reflects the extent to which countries face a risk of ‘hiddenness’ in each stock or flow.

Multiplying Partner Opacity with ‘Scale’ (the importance of a given bilateral stock or flow in relation to the GDP of the country of concern) yields values of ‘Exposure’ (see Box). If all possible partner jurisdictions were either completely transparent, or completely secretive, the Exposure values would simply be the share of GDP involved in transactions with pure secrecy jurisdictions. Exposure scores can therefore be interpreted as measures of the overall risk to an economy from financial secrecy, or equivalently as measures of IFF risk.

Exposure scores have been calculated for African countries, subject to data availability, in respect of flows of trade in goods and services (figure 3); stocks of direct investment (figure 4) and stocks of portfolio investment (figure 5). Underlying data are for 2011 and sourced from UN Comtrade, IMF CDIS and IMF CPIS respectively. One immediate suggestion of figure 3 is that trade exposure tends to be higher in imports, with the exception of major commodity exporters. Indeed, as would be expected, countries with great natural resource wealth are among the most exposed in all categories. Inward direct and portfolio investment exposure dominates outward, although this in part reflects

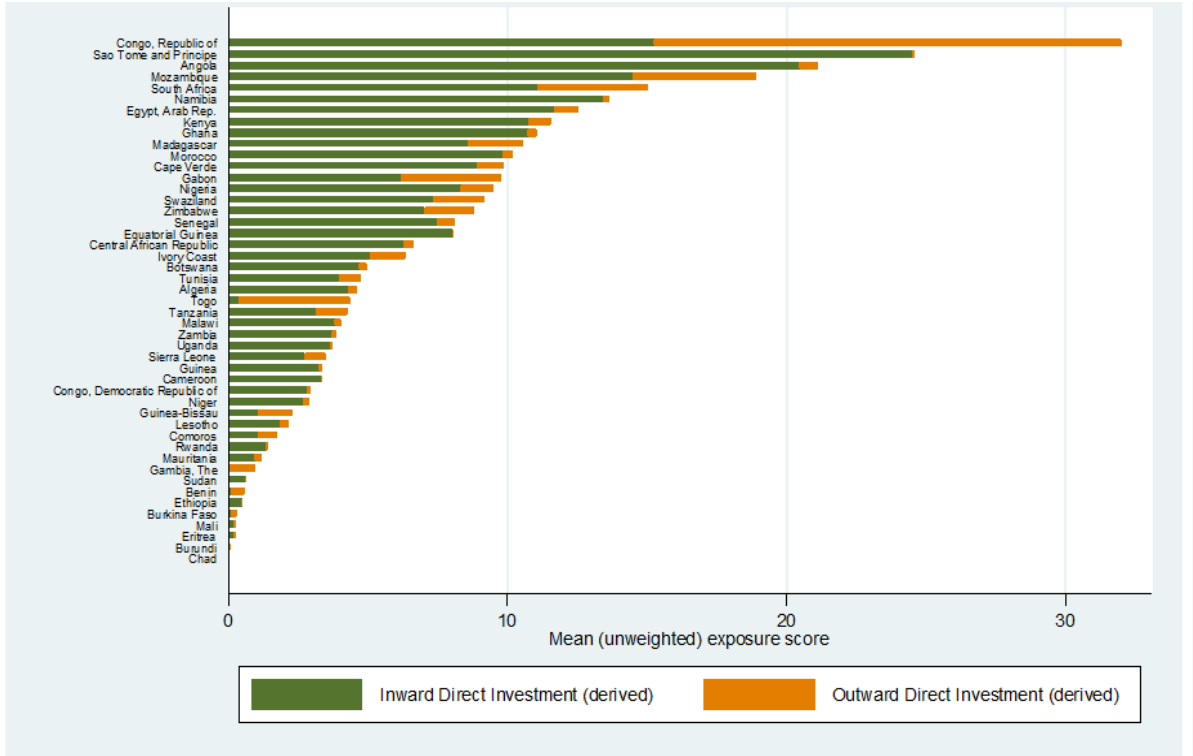
weaknesses in international reporting of outward positions. In addition, many countries are simply missing altogether. Enhanced regional data collation and reporting would offer clear advantages in terms of policymakers' ability to track and manage IFF exposure in different areas.

Figure 3: IFF risk exposure, commodity trade



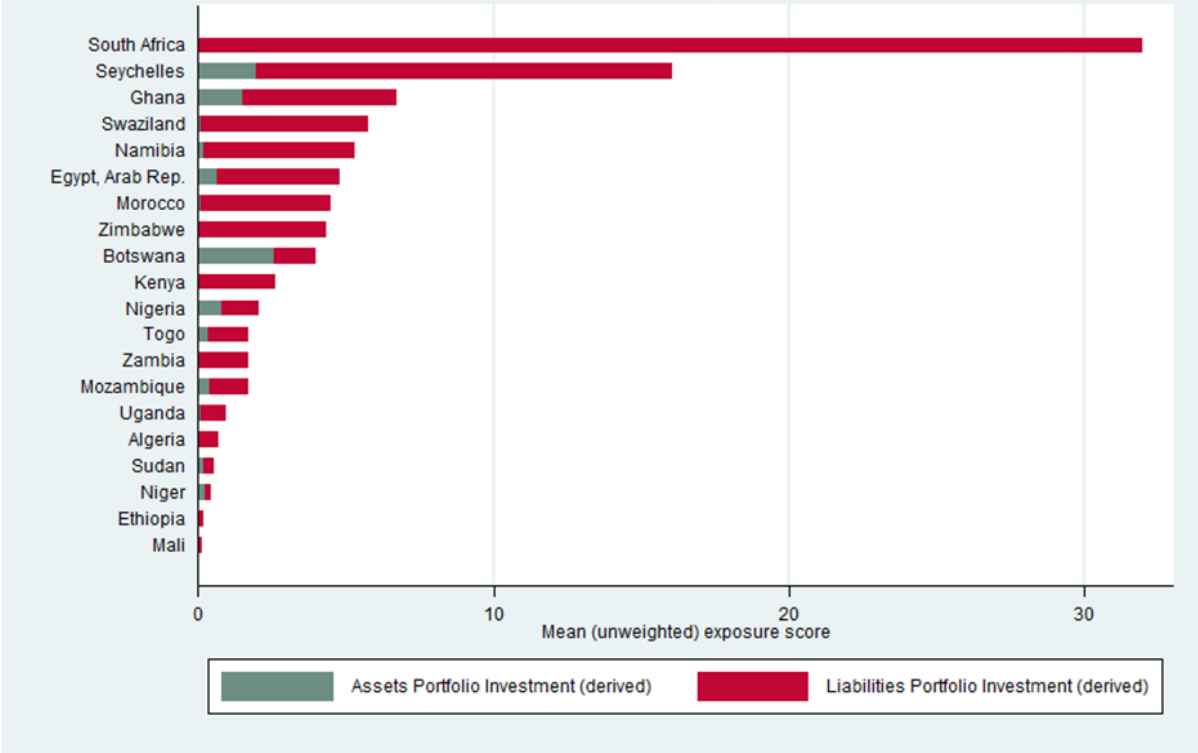
Source: Cobham (2014).

Figure 4: IFF risk exposure, direct investment



Source: Cobham (2014).

Figure 5: IFF risk exposure, portfolio investment



Source: Cobham (2014).

Note that exposure on investment stocks should not be compared directly with that in trade flows; and in addition, note from the typology that illicit flows in trade are likely to be a relatively small proportion of the total value (i.e. the mispriced element), while illicit flows in investment may be 100% of the total where ownership is hidden for illicit purposes. Policymakers are likely to have more detailed data with which to carry out this assessment, and should consider carefully the specific circumstances in their country in making decisions to prioritise particular areas.

Such vulnerability measures – or the related concept of bilateral Financial Secrecy Indices (see e.g. Janský et al., forthcoming) – provide the potential to track the exposure of countries to IFF risk on a consistent basis over time, using existing data. While not a full alternative to estimates of the scale of IFF, the consistency and granularity for policy prioritisation may offer useful complementarity.

An alternative to using the full Financial Secrecy Index would be to focus on the ABC of tax transparency, identifying more narrowly the concerns there. This would allow construction of the range of measures of each country’s exposure to jurisdictions that do not provide automatic exchange of information; those that do not publish the beneficial owners of companies, trusts and foundations; and those that do not exchange and/or publish the country-by-country reporting of their multinationals. This would also provide the basis for measures of more and less cooperative or transparent jurisdictions, on the same lines as has been proposed to form the basis of a global convention to end ‘tax haven’ secrecy (Tax Justice Network, 2017; Brown, 2017).

Further work in this area – whether included in the eventual SDG indicator/s or not – may prove most valuable for states wishing to monitor and manage downwards their exposure to IFF risk.

5 Conclusions

The area of illicit financial flows remains one in which estimates of scale are fraught with difficulty. By definition, these are estimates of deliberately hidden phenomena. By definition too, if perfect data were readily available on a given illicit flow, that flow would already be tending towards zero.

Standard approaches of estimating illicit activity on the basis of anomalies in published statistics inevitably risk confounding the illicit with genuine statistical anomalies. Better methodologies and data can deal with this to a point, and many of the surveyed approaches provide estimates of overall scale in which researchers can have a deal of confidence. But the inherent difficulties mean that even the stronger estimates may not rise to the level necessary for a global policy framework such as the SDGs.

For that reason, we propose here two measures using newly available data that allow precise measurement of particular aspects of illicit flows: first, the annual flow of profit misalignment achieved by multinational companies (proposed indicator 16.4.1a); and second, the annually recorded stock of undeclared offshore assets (proposed indicator 16.4.1b). Between them, these two arguably capture the bulk of the illicit flows types set out in the simplified Table 2, and in relation to the likely harm done. Both would require a degree of additional statistical work, possibly by or with the OECD; and each is likely to deliver significant additional benefit from the underlying data, for which the fixed costs are already sunk.

Additionally, we highlight the potential for measures of IFF risk. These could stand alongside scale indicators as components of a new indicator 16.4.1c; and would in any case be valuable to explore as possible instruments for country-level decision making.

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Appendix: Overview of profit shifting studies with global estimates

This Appendix 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 material here has been prepared for a forthcoming book that will survey estimates of illicit financial flows in each area. Chapters of the book will be published online in draft form, inviting expert review, from January 2018.

A1. IMF's Crivelli et al. (2016)

Overview

IMF's Crivelli et al. (2016) focus on estimating BEPS in developing countries. The preliminary version of IMF's Crivelli et al. (2016) estimates was first published as a part of IMF (2014) in another appendix (III) than appendix IV discussed below as IMF (2014). Crivelli et al. (2016) estimate, what they label in line with IMF (2014), 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 (2017) re-estimate their results and present the estimates for all the countries for which there are data.

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 (2017) provide robustness checks with ICTD-WIDER revenue data, alternative tax haven lists and effective tax rates instead of statutory tax rates.

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 percent of GDP) lost by country i in period t as a consequence of profit shifting through tax havens as:

$$\text{Long run revenue cost of BEPS}_{it} = \tau_{it} \hat{\phi} (\tau_{it} - W^h \tau_{-it}) / (1 - \hat{\lambda})$$

where τ_{it} 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), $W^h \tau_{-it}$ denotes the haven-weighted average tax rate (this is the short run effect) and $\hat{\lambda}$ 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:

$$\begin{aligned} & \textit{The revenue cost of BEPS (in percent of GDP)} \\ & = \textit{The applicable CIT rate} \\ & \times \textit{The change in corporate tax bases implied by an increase in tax havens' tax rates} \end{aligned}$$

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 percent 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).

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 a 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 (2017) 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.

Conclusions

Crivelli et al (2016) is perhaps the most credible analysis of profit shifting for many countries published in an academic journal. Cobham & Janský (2017) check the robustness of their results and extend their analysis to shed light on country heterogeneity.

A2. UNCTAD (2015)

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 percent 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% of CIT and USD 200 billion in 2012.

Janský & Palanský (2017) re-estimate their methodology, extend it in a number of ways and present for the first time the related country-level estimates.

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. As a complement, in some limited cases where we do not need bilateral FDI data, they use UNCTAD's unilateral FDI database for its better coverage of countries.

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% 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%. 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% as a share of pre-tax net income) compared with affiliates based in other locations (17%).

UNCTAD (2015) then estimates, using regression analysis, that an additional 10% 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 percent).

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

CIT revenues lost from profit shifting for developing countries
= average offshore hub exposure of total inward FDI stock (46%)
× responsiveness of reported rate of return to offshore investment (11.5%)
× reported FDI stock (USD 5000 billion) × transforming the after – tax values to pre – tax values (1.25) × 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% 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 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.

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 is provided by Janský & Palanský (2017). 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 their corporate tax revenues and tax revenues).

Conclusions

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.

A3. OECD (2015b)

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% 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).

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, Tørsløv, & Wier, 2017).

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.

Results

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

CIT revenues lost from profit shifting due to tax rate differentials
= A worldwide responsiveness of profit to asset ratio to tax rate differentials (0.1)
× average asset profit ratio (16.13 derived from the average profit to asset ratio (6.2%))
× average tax rate differential (3.6%) × MNEs' average share of total profits (59%)
× estimated global CIT revenue (USD 2.3 trillion) = 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):

CIT revenue lost from MNE mismatches between tax systems and preferential tax treatment
= Average ETR difference between large MNE entities and comparable domestic entities (3.25%)
× MNEs' share of total profits (59%) × Share of large MNEs (93%)
× estimated global CIT revenues (USD 2.3 trillion)
× upward adjustment of actual corporate tax collections after tax credits (23%)
= USD 50 billion

The sums in these equations as well as numbers in Table A1 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% to more accurately reflect the taxable income base affected by profit shifting for the fiscal estimate. The often-reported range from 4% to 10% of CIT revenues takes into account a 95% confidence interval around the tax sensitivity estimates and the upper bound assumes that firms outside the sample have a 50% higher tax planning intensity than firms in the sample. Table A1 shows the resulting estimates after these adjustments in terms of share of global CIT revenue as well as in billion dollars.

Table A1. OECD (2015b) estimates of the revenue loss due to BEPS

	Profit shifting due to tax rate differentials	Mismatches between tax systems and tax preferences	Total	Total minus two standard errors	Total plus two standard errors	Total plus two standard errors (see notes)
% of global CIT revenue	4.21%	2.19%	6.41%	3.80%	9.01%	10.46%
USD billion	96.92	50.45	147.37	87.40	207.34	240.52

Source: OECD (2015) and author on the basis of OECD (2015b)

Notes: The final column assumes that firms not in the sample have 50% higher tax planning intensity

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 percent 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.

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 section 3.2 in the main text).

A4. Profit shifting of US multinationals worldwide (Clausing (2016))

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% of their total corporate tax revenues.

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.

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% 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% 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:

US CIT revenues lost from profit shifting = (US statutory tax rate (mostly 35%) – 5%) × (profits in the absence of tax rate differences between the US and foreign countries – 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% 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% (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:

CIT revenues lost from BEPS =
(Statutory tax rate – 5%) ×
(profits in the absence of tax rate differences between the US and foreign countries –
current profits).

Results

She 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 percent of all foreign profits and 52 percent of all direct investment earnings.

Overall, her estimates of revenue losses total \$279 billion for high-tax countries, 20% of their total corporate tax revenues. For example, for the US, she estimates the revenue loss at \$94 billion in 2012, in between her 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.

Conclusions

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 very valuable. Perhaps other data than those used by her might be employed for this extension and be thus informative for an even wider range of countries, including lower-income ones.

A5. Misalignment of profits and economic activity of US multinationals worldwide (Cobham & Janský (2017))

Overview

Cobham & Janský (2017) 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.

Data

Similarly to Clausing (2016), Cobham & Janský (2017) 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.

Methodology

First, Cobham & Janský (2017) 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.

Estimated profit

$$\begin{aligned} &= \text{Share of economic activity} * \text{Total global gross profit} \\ &- \text{Actual gross profit} \end{aligned}$$

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 2013: 11). Cobham & Janský (2017) 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 (2016)).

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.

Results

Cobham & Janský (2017) show that misalignment as recently as the mid-1990s is near zero – 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, 2013) 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%, versus 34.0%, 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).

Conclusions

With the same data source, but very different methodological approach, the scale estimated by Cobham & Janský (2017) is comparable to Clausing (2016).

While their 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. So, according to Cobham & Janský (2017), countries at all levels of development seem to suffer from having less profit reported in them than would correspond to the economic activity located there; and this scale of misalignment seem to be increasing over the past decade or so.

A6. Corporate income tax efficiency estimates (IMF (2014), EPRS (2015))

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 do provide very approximate estimates of profit shifting.

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.

Methodology

IMF (2014)

The methodology is 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 (τ_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 τ_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 τ_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 percent as is the case in this sample with the value of \bar{E} being 43 percent). 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, Δ_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% 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 percent 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, τ_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).

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 percent, 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 percent 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 percent of current CIT revenue, but almost 13 percent 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 percent

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 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 percent 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, 2017b).

EPRS (2015) estimates the mean CIT efficiency at around 75 percent over the period 2009-2013. Their estimate based on NOS is comparable to 86 percent 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%, 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 We approximate 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 percent (and this estimate might be more suitable for comparison with the average of 86 percent estimated by IMF (2014) for the EU). This is partially because three countries with highest CIT-efficiency, all above 100% (Cyprus, Slovenia, Croatia), have together a weight of only 1.1%, 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.

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.

A7. Tørsløv, Wier, & Zucman (2017)

Overview

In November 2017, Tørsløv, Wier, & Zucman (2017) presented novel research on tax havens, including new estimates of the tax revenue losses related to profit shifting. This ambitious research, with a variety of data sources used and a number of research questions answered, is a work in progress (and only slides and data have been published so far) and therefore this discussion is naturally also only a work in progress.

Data

Tørsløv, Wier, & Zucman (2017) use balance of payments and national accounts data, especially service trade. They focus on European countries, but ultimately arrive at global estimates. 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% of global profits is included in Orbis and for more than a quarter of MNEs there are no profits at all included in Orbis).

Methodology

In their main empirical part, Tørsløv, Wier, & Zucman (2017) 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 (2016) in their proposal for the Common Consolidated Corporate Tax Base and the related analysis of misalignment between profits and economic activity by Cobham & Janský (2017). Tørsløv, Wier, & Zucman (2017) then, as a novelty, use national account data (from OECD, Table 14a) to calculate country-level corporate profit measures (Corporate gross operating surplus, less net interest paid, less depreciation). They find that tax havens are abnormally (up to a factor of 10) profitable compared to the compensation of employees.

Second, 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 profitability in tax havens above world average reflects inward profit-shifting. Similar crucial assumption is made by the IMF (2014) staff paper's Appendix IV and both UNCTAD (2015) and Janský & Palanský (2017). Similarly to 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 profitability and foreign ownership. However, 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 (2017) 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 WTO data for the remaining countries. As WTO data has poor coverage imputations are made when necessary using FDI data. 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 is supported by the recent 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. π is profit relative to a compensation of employees defined as:

$$\pi = \frac{\text{Taxable corporate profits}}{\text{Compensation of employees}}$$

$$\phi = \frac{\text{Taxable corporate profits accruing to foreigners}}{\text{National income}}$$

High ϕ implies that profits are made in foreign-owned subsidiaries. They observe that average π among non-havens is 34%, i.e. $\bar{\pi} = 34\%$. They assume that for a preselected group of tax havens, any profits above $\bar{\pi}$ have been artificially shifted into these tax havens:

*Profits shifted into tax haven $i = (\pi_i - \bar{\pi}) * \text{Taxable corporate profits}$ if $\pi_i > \bar{\pi}$.*

Results

Tørsløv, Wier, & Zucman (2017) find that close to 20% of global profits are made by multinationals abroad (and was as little as 5 percent in the 1980s). For estimation of these profits they use not only FDI, but also portfolio equity data. They define MNEs' profits as the sum of portfolio equity and FDI equity income receipts across all countries. They subtract income received by tax havens to avoid double counting. They find that MNEs' profits are around €1.4 trillion in 2015, while global corporate profits are around €7.9 trillion.

They conclude that 45% of multinationals' profits are artificially shifted to tax havens, i.e. more than 600 billion euro in 2015. They also estimate global corporate tax revenue loss around 200 billion euro per year (around 12% of global corporate tax revenue). This scale is 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 (2017), OECD (2015b), Clausing (2016), Cobham & Janský (2017) and IMF (2014).

Under preferred apportionment rule, the European Union is the main loser (loses around 20% of its revenue). 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 (2017).

Conclusions

These results are partly, they innovatively argue, due to the fact that European tax enforcement focuses on other high-tax countries rather than tax havens and that lets tax havens flourish (they support this with information about the counterparts in OECD's mutual agreement procedures within the EU).

Of course, the detailed discussion that this research deserves is to come only when detailed description is published by the authors.