

UNCTAD

Investment and Enterprise Division

**An FDI-driven approach to measuring the
scale and economic impact of BEPS**

ANNEX II

**Technical background paper accompanying the *World Investment Report 2015*,
Chapter V "International Tax and Investment Policy Coherence"**

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SECTION A: MAPPING CORPORATE INVESTMENT PATTERNS THROUGH OFCs/CONDUITS AND MEASURING THE SIZE OF THE PHENOMENON

1. Objective and scope of the analysis

The objective of the analysis is to estimate the share of international corporate investment stock routed through *offshore financial centres (OFCs) and conduits*, either *tax havens* or other entities (in particular so-called *Special Purpose Entities - SPEs*) operating in jurisdictions providing favourable legal and financial treatment for foreign investors. The key objective is to quantify to what extent tax and other financial (non-business) factors affect global corporate investment patterns.

The reader should note that this annex is intended as technical background material and a methodological contribution. As clearly stated in WIR chapter V, no policy implications are implied by the scope of the perimeters for offshore investment hubs used in this annex. As highlighted in WIR chapter V, the patterns and size of transit investment flows are determined by tax policy characteristics of base (home) countries, conduit (transit) countries, and source (host) countries alike.

The idea to use investment data for the analysis of offshore financial patterns is not new; there are examples of studies alluding to this approach both by international organizations and in the academic literature. However this is the first study that provides an analytical framework for a systematic and comprehensive investigation of FDI offshore patterns at a global scale. In its recent report on BEPS (OECD, 2013a), the OECD acknowledges FDI statistics as one of the potential sources of data on profit shifting practices from multinational enterprises or MNEs (together with data on corporate income tax revenues) stating that "*an analysis of the available data on FDIs may give useful indications in relation to the magnitude of BEPS*" and provides some anecdotal supporting evidence from reported FDI data through tax havens. Two recent studies by NGOs (Christian Aid, 2013; ActionAid, 2013) notice the "unusual" FDI patterns related to some locations. A recent academic paper by Haberly and Wojcik (2014) resorts to the notion of "*offshore FDI*" in a study aimed at investigating the determinants of FDI routed through tax havens. The IMF's (2014) recent paper on "Spillovers in International Corporate Taxation", after showing a number of countries with disproportionately high FDI stock, acknowledges that: "*...Such lists [...] confirm the impression that taxation plays a key role in shaping the structure of international capital flows: jurisdictions known for attractive tax regimes and extensive treaty networks commonly feature prominently as 'conduits' through which investments pass*".

The scope of this analysis fits in the analytical work-stream initiated in the *World Investment Report 2013* aimed at quantifying the link between offshore finance and MNE cross-border investments.¹ However it improves on WIR13 in two critical aspects.

- (i) It provides a comprehensive analytical tool (the Offshore Investment Matrix) that allows the analysis of FDI-patterns through OFCs and conduits from different perspectives - inward/outward, one-sided/two sided.
- (ii) It explains how the scope of OFC and conduit jurisdictions may be extended beyond tax havens and countries that report SPEs to include other major *offshore investment hubs* for international corporate investment.

In particular, two options are presented:

1. a conservative approach with a restricted perimeter of offshore investment hubs, including (apart from tax havens) only *self-declared SPE-countries* (adopted in WIR chapter V);

¹ See UNCTAD WIR13, Section A.1.d.

2. an extended approach that widens the OFC perimeter beyond *self-declared SPE-countries*.

The approach followed for mapping corporate investment patterns (WIR chapter V, section B) is the first, the conservative approach, where the perimeter of offshore investment hubs is limited to tax havens and to the set of countries explicitly reporting SPEs at the time of the analysis. Unlike WIR chapter V, where the main objective is to provide inputs for policy recommendations, the purpose here is methodological, i.e. to formulate an analytical proposal that is broad and flexible enough to allow different options and modeling choices. In fact, the analytical results on the tax revenue losses associated with offshore-linked investments (WIR chapter V, section D; see also section B of this annex) are based on the second option, the extended approach, which allows for a more inclusive definition of offshore investment hubs.

The methodologies developed here require bilateral investment data, for which the source adopted in the analysis is the IMF Coordinated Direct Investment Survey, to which UNCTAD contributed. (The IMF CDIS data explicitly reports SPE investments, which are removed from UNCTAD's own FDI data.) The use of stocks instead of flows adds to the robustness of the analysis considering the very high volatility of investment flows involving tax havens and jurisdictions with a strong presence of *SPEs*. In addition, given the importance of the analysis in the study of tax-avoidance and BEPS, stocks provide the more relevant insights as taxes are avoided on income streams resulting from stocks, not flows.

2. Database

The analysis is based on *bilateral corporate investment inward stock* from the *Coordinated Direct Investment Survey* of IMF. The reference edition of the survey is the IMF CDIS 2012, the most recent year available at the time of analysis, released on the IMF website in December 2013.² IMF CDIS 2012 was supplemented by IMF CDIS 2011 for 16 countries for which data are available for 2011 but not for 2012 to achieve the largest possible coverage.³ The resulting sample consists of 104 reporting countries. Its representativeness can be estimated at more than 90% of total inward FDI stocks.⁴ CDIS includes also direct investments from/to SPEs,⁵ unlike official FDI statistics that do not report inward stocks to SPEs

² IMF website <http://elibrary-data.imf.org/public/FrameReport.aspx?v=3&c=11666811>. Figures are those reported at the time of the analysis and do not necessarily correspond to currently reported data. The latest download of the data from IMF CDIS was in April 2014.

³ Data based on the 2011 survey for the following reporting countries: Albania, Barbados, Benin, Georgia, Ghana, Guatemala, Guinea-Bissau, Honduras, Morocco, Rwanda, Samoa, Slovak Republic, Tanzania, Togo, Uruguay, West Bank and Gaza. Integration of 2012 data with (few) 2011 data allows increasing the coverage of the sample without affecting the overall consistency/accuracy as stock data are only marginally sensitive to yearly changes.

⁴ The ratio between the total bilateral inward stocks reported by the sample and 2012 global inward stocks is 93%. The calculation requires the comparison of two different sources of data: the CDIS data for the sampled bilateral inward investment stocks and the UNCTAD data for the total inward FDI stock. Since CDIS data include SPEs while official UNCTAD data do not include SPEs for the four countries Austria, Hungary, Luxembourg and the Netherlands, the total inward FDI stock reported by UNCTAD statistics was adjusted upward to account for the SPE component (retrievable from the four countries' Central Bank statistics).

⁵ From the IMF CDIS Guide: "*SPEs are residents of the economies in which they are incorporated or organised and, therefore, they may be direct investors or direct investment enterprises. Even if they are shell companies or pass-through entities without any other productive economic activity of their own, they qualify as direct investors or as direct investment enterprises by virtue of being resident in one economy and being owned by, or owning, an enterprise in a different economy. Thus, positions between direct investors and direct investment enterprises that are SPEs are to be treated in the same way as those with investors and enterprises that are not SPEs*".

for Austria, Hungary, Luxembourg and the Netherlands. Thus the total value of investment stock reported by IMF CDIS is higher than reported by UNCTAD FDI statistics.⁶

The guidelines for the compilation of the IMF CDIS are consistent with the official reporting standards established by the fourth edition of the OECD *Benchmark Definition of Foreign Direct Investments (OECD BD4)* and the sixth edition of the IMF's *Balance of Payments and International Investment Position Manual (IMF BPM6)* also followed by UNCTAD in the compilation of the FDI data. The most relevant international organizations providing FDI statistics (including UNCTAD, OECD and European Central Bank) actively participated in the IMF project.

3. The Offshore Investment Matrix

The key analytical tool is the Offshore Investment Matrix, which provides a comprehensive mapping of corporate international investment through OFCs and offshore investment hubs (*tax havens* and *SPEs*). For each "unit" of MNE investment stock, bilateral FDI data provide a pairing of direct investor and recipient jurisdictions, which are then mapped according to the following classification: "*tax havens*", "*SPEs*" or "*Non-OFCs*". The first two categories represent the *offshore* or *conduit component* of global corporate investment stock, while the latter represents the "standard" FDI stock. Analytical issues related to the definition and quantification of the three components will be discussed in detail in the next section.

The Offshore Investment Matrix provides two main ways to analyse corporate investment through offshore hubs (see also [figure 1](#)).

- *One-sided analysis* shows the extent to which investment "to" and "from" standard jurisdictions is routed through hubs as direct partners. More specifically, *inward one-sided analysis* provides the size/share of investment stock into *Non-OFCs* originating from either *tax havens* or *SPEs*; *outward one-sided analysis* provides the size/share of investment stock from *Non-OFCs* invested into *tax havens* or *SPEs*.
- *Two-sided analysis* takes a more comprehensive view, looking at all corporate investment links involving offshore investment hubs, either as investors or as recipients. Two sided analysis also maps investment *between tax havens* and *SPEs*, often a substantial component of tax-driven investment schemes (see for example the "*Double Irish-Dutch Sandwich*" - see WIR15, chapter V, section B.2).

Limiting the scope of the *one-sided analysis* to investment links between *Non-OFCs* and *tax havens/SPEs* highlights the penetration of offshore hubs into "real" investment, i.e. investment to/from *Non-OFCs*. It also allows a more realistic sizing of the offshore component, not inflated by potential *double-counting* generated by investment *between hubs*. Conversely, the aim of the two-sided analyses is to highlight the *conduit role* of offshore investment hubs where corporate investments "pass through", generating double counting in global investment figures.

Notice that *two-sided analysis* does not allow disentangling the inward and the outward side and is thus not appropriate when the geographic perimeter is not "global" but limited to a country or a region of interest. In these cases *one-sided analysis* provides an effective tool to assess and compare exposure to offshore hubs of inward/outward investment into/from different regions.

⁶ Total inward investment stock reported by CDIS for the sampled countries amounts to \$26 trillion against some \$20 trillion reported by official UNCTAD statistics for the same group of countries.

4. The analytical approach

The Offshore Investment Matrix requires a preliminary identification of a perimeter of jurisdictions to focus the analysis and quantification of offshore investment patterns. These are ideally the most relevant jurisdictions acting as global *OFCs*, *conduits* or *investment hubs*.

"Listing" jurisdictions offering offshore financial services to international investors has been a common practice, especially in relation to efforts aimed at fighting corporate tax avoidance and tax secrecy. Nevertheless currently there is no officially defined "list" of OFCs. It is possible to identify two broad approaches.

(i) In its initial phase (1998 - mid-2000s) the OECD approach identified a group of jurisdictions qualifying as *tax havens* based on a comprehensive (although high-level) set of tax-related features.⁷ More recently the OECD has increased its focus on transparency and information exchange. The perimeter of monitored jurisdictions has been extended to around 100 countries, with the objective to guide them towards better transparency and information sharing practices. However, focusing on progresses in transparency and information sharing may be not sufficient to effectively scope all offshore investment hubs as some major financial centers for corporate tax planning operate in a relatively transparent regulatory and institutional environment. Even the approach towards small secrecy jurisdictions is challenging, as some of the reportedly most secretive jurisdictions in the world, like the Cayman Islands or Bermuda,⁸ rate as "*largely compliant*" according to the OECD 2013 review.

(ii) The *approach of NGOs* aims at targeting (in a "*naming and shaming*" approach) all jurisdictions presenting tax-related features that may be considered harmful. As a result, NGO *lists* are very comprehensive.⁹ They also include "*countries that offer some tax facilities or offshore financial services, even if they do not account for a major part of the economy*".¹⁰ The acknowledgement of the role played by some large countries in offering offshore financial services is a value added of the NGO approach. However the undifferentiated treatment of small islands economies, like Cayman Islands or British Virgin Island, almost entirely dedicated to offshore finance, as compared to larger economies in which offshore financial services make up only a proportion, can be misleading.¹¹ Furthermore the inclusion of additional jurisdictions or even local cases (like Trieste in Italy or Madeira in Spain) can be problematic from a methodological perspective.

⁷ In 1998 the OECD launched the project identifying the four criteria that qualify a jurisdiction as a Tax Haven (OECD, 1998). (i) No or low taxes; (ii) Lack of effective exchange of information; (iii) Lack of transparency; (iv) No requirement of substantial activity.

⁸ According to the Tax Justice Network ranking of secrecy jurisdictions, in 2013 the Netherlands and Ireland rank in the lower mid-range of the secrecy scale. Conversely Cayman Islands and Bermuda are classified among the most secretive jurisdictions in the world. In particular Cayman Islands ranks fourth globally in the Financial Secrecy Index (compound index of the secrecy level weighted by the size of the offshore financial activity) and Bermuda is classified "*exceptionally secretive*". <http://www.financialsecrecyindex.com/introduction/fsi-2013-results>.

⁹ Tax Justice Network (2007) released one of the most comprehensive lists including 69 jurisdictions; a similar, slightly more conservative, approach including 50 OFCs was followed by ActionAid (2013).

¹⁰ Tax Justice Network (2007).

¹¹ Tax havens and SPE-countries have different characteristics and uses. Tax havens essentially have no or low effective taxes and no or low requirements for substantial economic activity. They usually have very few tax treaties, if any. Often they also lack effective exchange of information and transparency, but this more in relation to taxation of private wealth than of corporate income. SPE countries also have no or low requirements for economic presence, but they may have normal corporate tax rates. A key benefit for conduit investments is that SPE countries usually have large tax treaty networks that eliminate or substantially limit withholding taxes. Exemption of dividend income may also play a role. Thus, these two types of jurisdictions should be considered separately where possible.

The approach developed in this study divides jurisdictions within the offshore-hub perimeter in two main groups, *tax havens* and *SPE-countries*. (The "SPE" label is adopted for ease of exposition, as special purpose entities account for the bulk of stocks assigned to this category; they include other types of entities or legal structures that facilitate transit investment.)

- *Group 1: Tax havens.* A list of 38 small jurisdictions originally defined by the OECD.¹² It includes small countries whose economy is entirely, or almost entirely, dedicated to the provision of offshore financial services.
- *Group 2: SPE-countries.* The qualification *SPE-countries* applies to countries (that do not qualify as tax havens) with substantial real economic activity (unlike tax havens) that also act as financial centers or investment hubs for MNEs due to a favorable tax and investment regime, typically granted through the option to operate by means of Special Purpose Entities (SPEs). Unlike tax havens, such as the British Virgin Islands or Cayman Islands, the scoping of *SPE-countries* and the assessment of their offshore component are more controversial. In order to minimize arbitrary classification, the approach adopted in WIR chapter V limits the scope of this group to *self-declared SPE-countries*, a limited set of jurisdictions that (at the time of the analysis) explicitly report the share of inward/outward investment into/from their SPEs. The group includes *Austria, Hungary, Luxembourg* and *the Netherlands*. The number of jurisdictions publishing SPE investment data is currently increasing rapidly as more countries are aligning to the *OECD BD4* and *IMF BPM6* reporting standards. The countries used here have a long record of publishing SPE data and (especially through the Netherlands and Luxembourg) account for the bulk of global SPE flows.

Once the perimeter is established, the key analytical issue is to map bilateral investment stocks into the Offshore Investment Matrix; i.e. to allocate any given unit of corporate investment stock between two jurisdictions to an investor/recipient pairing properly classified according to the matrix categories "*Non-OFCs*", "*SPEs*" or "*tax havens*" (figure 2.a).

The share of the investment stock allocated to the three categories varies according to the jurisdictions involved; this makes this approach more challenging but at the same time more realistic than the approach followed by other similar studies. Specifically, for each unit of investment stock (see figure 2.b):

- If the investor/recipient from bilateral data is a country not included in the scope of the selected offshore investment hubs: the stock is 100%-allocated to investor/recipient classified as "*Non-OFCs*".
- If the investor/recipient from bilateral data is a country in the scope of the *tax havens*: the stock is 100%-allocated to investor/recipient classified as "*tax havens*".
- If the investor/recipient from bilateral data is a country in the scope of the *SPE-countries*: a given share of the stock is allocated to investor/recipient classified as "*SPEs*" (or other types of conduit entity to the same effect) while the remaining part is allocated to investor/recipient classified as "*Non-*

¹² Anguilla, Antigua and Barbuda, Aruba, Bahamas, Bahrain, Belize, Bermuda, British Virgin Islands, Cayman Islands, Cook Islands, Cyprus, Dominica, Gibraltar, Grenada, Guernsey, Isle of Man, Jersey, Liberia, Liechtenstein, Malta, Marshall Islands, Mauritius, Monaco, Montserrat, Nauru, Netherlands Antilles, Niue, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Seychelles, Turks and Caicos Islands, US Virgin Islands, Vanuatu. The 38-list is a review of the OECD initial (2000) list of 41 jurisdictions meeting the four criteria (i)-(iv) to qualify as *Tax Havens*. The list has not been explicitly updated in recent years as the OECD has increasingly focused on transparency standards and information exchange. The 38-list of *Tax Havens* however is still published on the OECD website as "*Jurisdictions Committed to Improving Transparency and Establishing Effective Exchange of Information in Tax Matters*". The list has also been referred to by a number of other studies comparing different OFC perimeters, including Tax Justice Network (2007), U.S. Government Accountability Office (2008), Gravelle (2013). Note that the 38-list employed in this study is slightly different from the list (of 35 *Tax Havens*) used in WIR13 (p.36, Note 4) based on a more restricted list published in OECD (2000) excluding some *advance commitment jurisdictions* even if they met the tax heaven criteria.

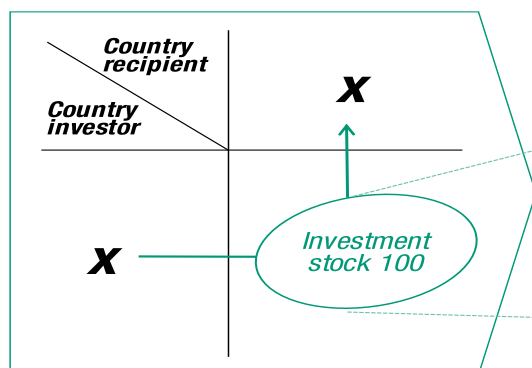
OFCs". The share of the SPE component depends on the country and the investment direction (inward/outward). For *self-declared SPE-countries*, the shares are derived immediately using the share of investment stock to/from SPEs in total inward/outward investment stock as reported by national Central Banks.

The distinction (in the last bullet point) between the SPE component and the not-SPE component for the countries classified as *SPE-countries* is important. As these are often sizable economies with significant real economic activity, the treatment of their entire investment as *offshore* or *conduit investment* (like in other studies)¹³ would lead to an overstatement in the estimation of the offshore component.

Figure 2. The analytical approach

a. The problem: mapping bilateral investment stock into the Offshore Investment Matrix

Data input: bilateral investment stock
(IMF-CDIS matrix)



Output: Offshore Investment Matrix

	Recipients		
	Non-OFCs	SPEs	Tax Havens
Non-OFCs			
Investors			
SPEs			
Tax Havens			

b. The rules for allocation

Bilateral investment stock		% of investment stock	Investment Matrix	
Investor	Recipient		Investor	Recipient
SPE-country	Other country	β % (1- β) %	SPE	Non-OFC
Tax Haven	Other country	100%	Tax Haven	Non-OFC
Other country	Other country	100%	Non-OFC	Non-OFC
Other country	SPE-country	α % (1- α) %	Non-OFC	SPE
Other country	Tax Haven	100%	Non-OFC	Tax Haven
SPE-country	SPE-country	α % (1- α) %	SPE	SPE
Tax Haven	SPE-country	α % (1- α) %	Non-OFC	Non-OFC
Tax Haven	SPE-country	α % (1- α) %	Tax Haven	SPE
Tax Haven	Tax Haven	100%	Tax Haven	Non-OFC
SPE-country	Tax Haven	β % (1- β) %	SPE	Tax Haven
Tax Haven	Tax Haven	100%	Non-OFC	Tax Haven

SPE-countries	SPE share in inward stock (α %)	SPE share in outward stock (β %)
Austria	40%	36%
Hungary	58%	81%
Luxembourg	96%	95%
Netherlands	83%	78%

Note: For each SPE-country, α and β represent the share of the OFC component over the total inward investment stock and the total outward investment stock, respectively. Shares are derived from Central Bank statistics, based on 2012 figures updated as of April 2014.

Source: UNCTAD.

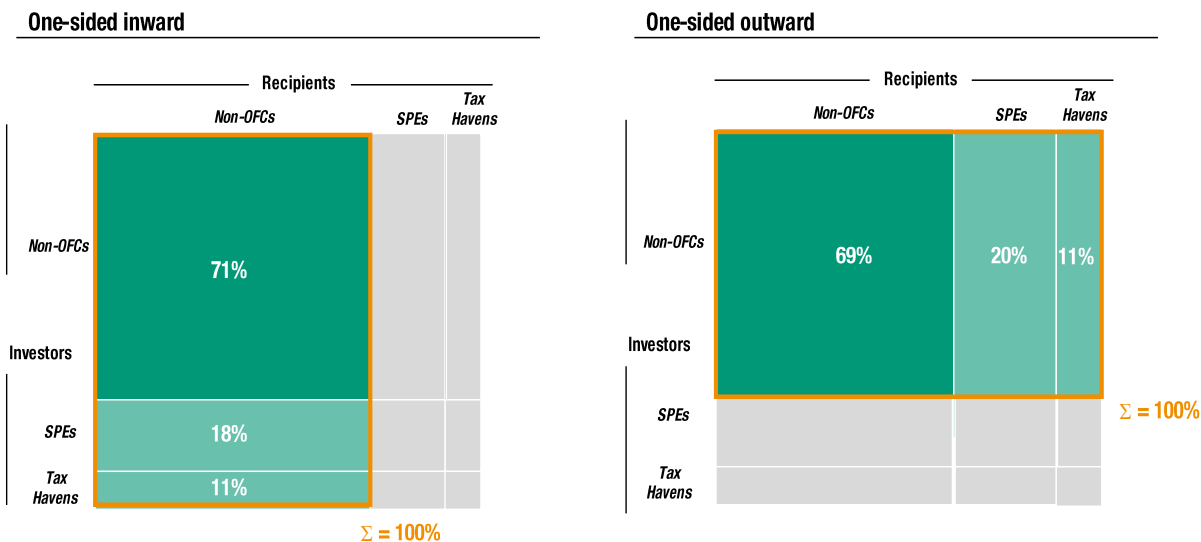
¹³ See for example ActionAid (2013) and Christian Aid (2013).

In the calculation of the matrix, an important caveat is the assumption of "inward/outward symmetry" for the investment stock into/from tax havens. In the sample of the 104 reporting economies in the IMF CDIS database, tax havens are heavily under-represented. In fact only eight out of 38 tax havens are included in the reporting group, corresponding only to some 15% of the total reported inward stock to tax havens, against 100% for the *SPE-countries* and 93% for "*Non-OFCs*" countries. This distribution of the statistical sample penalizes the share of inward stocks to tax havens. As a consequence the share of inward stock to tax havens resulting from the bilateral data as reported by the IMF CDIS, at 1% of total stock, is lower than the share of stocks from tax havens, at 9% of total stock. To correct this bias the share of inward stocks to tax havens was adjusted upward and made fully symmetric to the share of outward stock from tax havens (at 8% of total stock).¹⁴

Figure 3 shows the resulting outcome of the Offshore Investment Matrix (as also presented in WIR chapter 5).

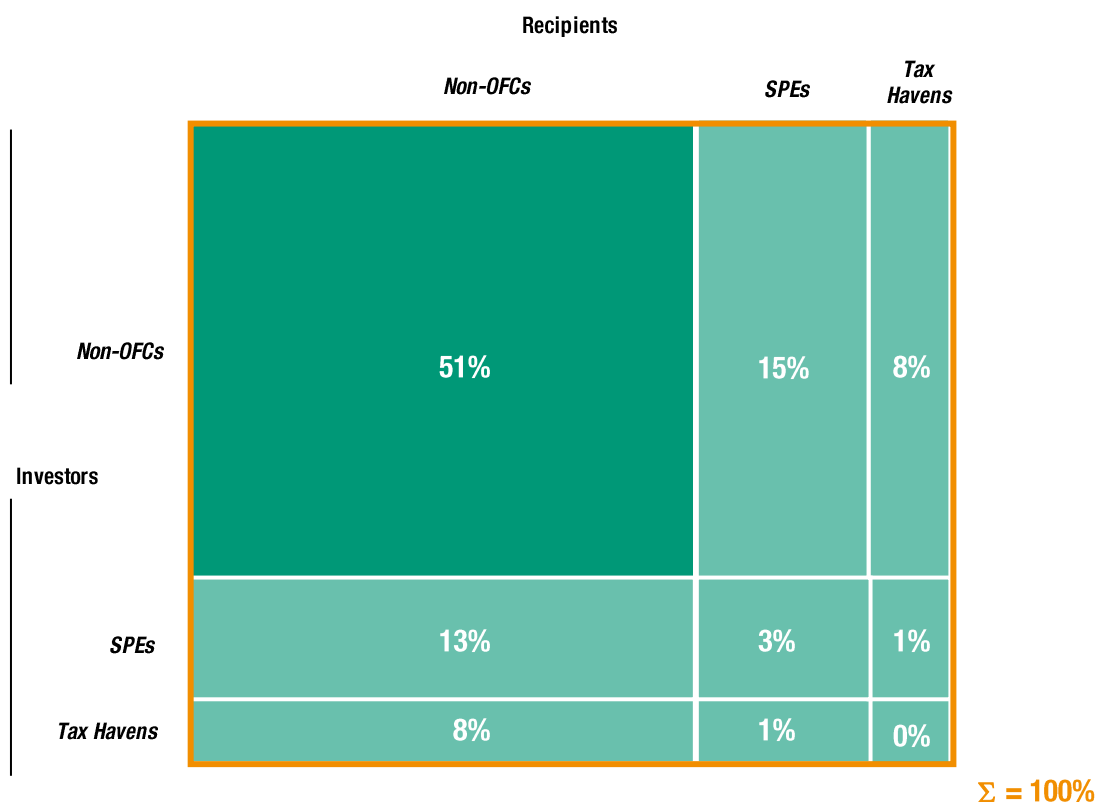
Figure 3. Outcome of the Offshore Investment Matrix

(restricted perimeter approach adopted in WIR chapter 5, see figure V.9)



¹⁴ Notice that to maintain the overall balance of the matrix, for each category of investor, the "missing share" of tax havens as recipients is subtracted from *Non-OFCs* or *SPEs* proportionally to their relative weights as recipients.

Two-sided



Source: IMF Coordinated Direct Investment Survey 2012 and 2011; national statistics; UNCTAD estimates.

5. Extending the perimeter of the offshore component: the *Implied Investment Method*

The "implied investment method" provides an empirical and FDI-driven way to:

- Identify major offshore investment hubs (beyond *self-declared SPE-countries*);
- Size their offshore component or the *SPE-share* (in the absence of reported SPE investment data).

The general idea is that the level of investment stock in countries with relevant offshore activity is outsized compared to the size of the economy due to the fact that a part of it is routed through SPEs as transit investment, and driven by financial rather than real operational considerations.

a. Identification of major offshore investment hubs. The goal is to identify countries acting as global offshore investment hubs with exceptionally large inward and outward investment (transit investment). This method is not designed to select a comprehensive list of jurisdictions offering favorable offshore services to MNEs (many countries do so to some extent); however it focuses on those that have been particularly successful in becoming major global investment hubs. This can be established on the basis of two dimensions:

- They host a relevant amount of FDI stock (including SPEs); and
- The amount of inward FDI stock is disproportionately high compared to the size (as measured by GDP) of the economy.

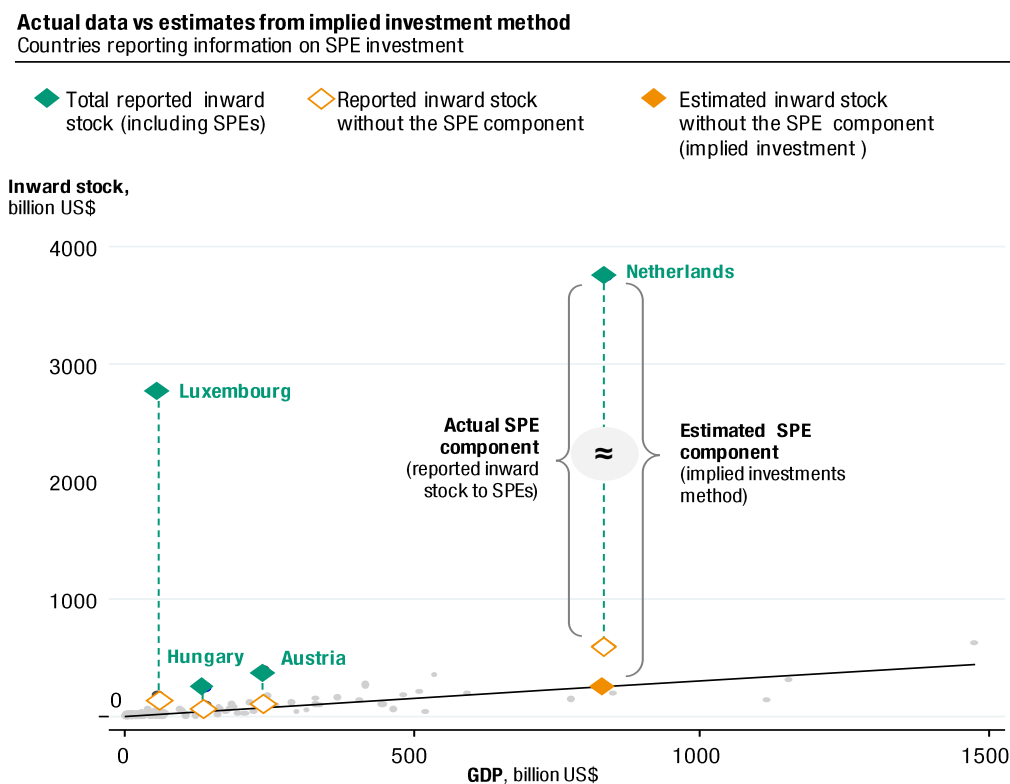
The first dimension ensures the relevance of the group from an FDI perspective; the second signals the presence of significant offshore financial activity (beyond real investment operations). Clearly the actual perimeter of this set depends on how the two conditions are translated into selection criteria. Ultimately a large number of countries have a certain degree of offshore activity; adopting a more or less restrictive perimeter is a methodological and analytical decision.

Notice that the four countries in the group of *self-declared SPE-countries* also rank high according to both conditions (i) and (ii); the Netherlands and Luxembourg rank first and third globally in terms of inward FDI stock and (respectively) third and first in terms of ratio of inward FDI stock to GDP.

b. Seizing of the offshore component. The idea is to estimate an expected amount of international corporate investment stock as "implied" by the size of the economy (measured by GDP) first, and then, by difference, the theoretical *SPE component*. The SPE label here is used for ease of exposition – transit investment may be facilitated through other types of entities or structures.

Figure 4 illustrates the procedure and tests it for the inward side (i.e. estimation of the share of SPEs in the inward corporate stock) against actual data for the four countries for which SPE information is available from official statistics. As desired, the estimated outsized portion of the investment stock, not explained by the size of the economy, is largely captured by the reported SPE component. An identical procedure can be applied to the outward side (estimation of the share of SPEs in the outward corporate stock) with similar results.

Figure 4: Illustration of the methodology to estimate the SPE component, 2012 data - inward case



Source: UNCTAD FDI database; United Nations data; national statistics, UNCTAD analysis.

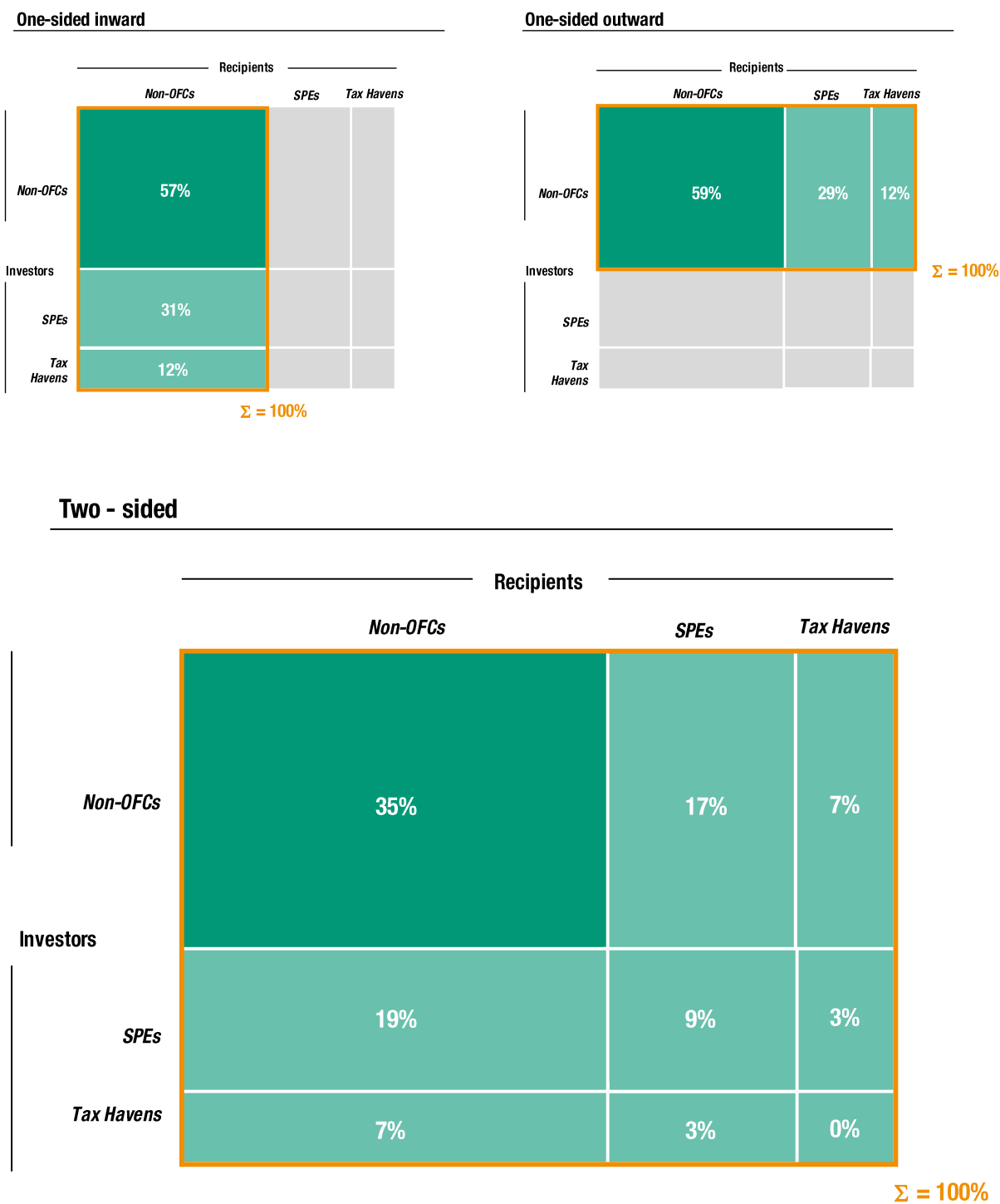
Note: The method is based on the comparison between "reported" and "implied" corporate investment stocks (FDI+SPEs). Implied investment stock is estimated through linear regression of corporate investment inward stock on GDP (r-squared at 0.75) for a sample of countries for which complete 2012 information on GDP and corporate inward stock is available.

Figure 5 shows an application of the implied investment method; the simulated outcome of the Offshore Investment Matrix is based on an extended perimeter that include tax havens and a number of other major investment hubs selected through the implied investment method. In particular for the specific simulation in figure 5 features (i) and (ii) above for the definition of the offshore investment hub perimeter have been translated into the following operational criteria: *all and only those jurisdictions* that, as of 2012 data, (i) Rank globally in the first quartile in terms of inward FDI stock; (ii) Have a ratio of inward stock to GDP higher than 1.¹⁵ Notice that jurisdictions in the group of *self-declared SPEs* also meet the investment-driven conditions (i) and (ii) (with a partial exception for Austria),¹⁶ and thus qualify as offshore investment hubs also according to the implied investment method.

¹⁵ Corresponding to the top 15th quartile of the global ranking in terms of ratio of FDI inward stock to GDP

¹⁶ Austria does not meet condition (ii). Although its investment over GDP ratio is relatively high (in the first quartile, at 0.66), it does not exceed 1, as per the defined criteria.

Figure 5. Simulation of the *Offshore Investment Matrix* based on the *Implied Investment Method* (extended perimeter)



Source: IMF Coordinated Direct Investment Survey 2012 and 2011; national statistics; UNCTAD estimates.

SECTION B: AN FDI-DRIVEN ESTIMATION OF PROFIT SHIFTING AND TAX REVENUE LOSSES RELATED TO BEPS FOR DEVELOPING ECONOMIES

1. Objective and scope of the analysis

The quantification of profit shifting is a challenging exercise. First, tax avoidance options can be numerous. MNEs employ highly sophisticated and creative combinations of individual tax avoidance levers. Second, by the nature of the phenomenon, the available data and information is limited. In particular the profits shifted to offshore locations are difficult to track as they typically do not appear in any official reporting: not, obviously, in the financial reporting of the foreign affiliates where the value is generated; and not in that of the foreign affiliates where it is shifted to due to often lax reporting requirements. Given the complexity of the issue, existing studies aim at quantifying specific aspects of corporate profit shifting rather than attempting a holistic approach. The effort is still valuable as integrating the different approaches provides an order of magnitude of the losses caused by international corporate tax avoidance.

Table 2 provides an overview of the main approaches developed so far to estimating tax revenue losses due to corporate profit shifting.¹⁷ The FDI-driven approach proposed in this study stands at the intersection of some of the research areas reviewed in the table. It builds on the profitability approach to investigate the role of offshore investment hubs in corporate profit shifting and the related loss of tax revenues for developing economies. The perimeter of the approach addresses specifically the revenue losses generated by profit shifting practices enabled by *direct* investments from offshore hubs. The method exploits a relationship at country level between the share of investment stock from hubs and the average rate of return on total foreign investments.

The methodology proposed in this study builds on the assumption of a negative relationship at country level between the share of inward investment stock from offshore hubs (hereafter “*Offshore Indicator*”) and the rate of return on the total inward FDI stock (hereafter “*Rate of Return*”). The rationale underlying this assumption is that the income generated by foreign direct investments from offshore investment hubs is subject to a greater extent to profit shifting practices with the effect of “*artificially*” deflating the rate of return.

To capture the full impact of exposure to offshore hubs on investment profitability, and to ensure greater statistical validity of the relationship between offshore investment links and rates of return on investment, the econometrics are based on the extended perimeter, including tax havens, countries reporting SPEs and other important investment hubs (selected and analytically treated as explained in section A). The perimeter and resulting Offshore Investment Matrix are the same as the simulation in figure 5.

Once a significant relationship is established between the *Offshore Indicator* and the *Rate of Return*, then the tax revenue losses can be calculated through appropriate assumptions on the *profitability gap* (“*how*

17 The overview is based on Fuest and Riedel (2009) and Fuest and Riedel (2010). Both studies give a comprehensive account of the literature on profit shifting and tax revenue losses for developing economies. Another reference for a review of studies in this area is Heckemeyer and Overesch (2013). Notice that the overview in table 2 does not include other valuable efforts concerning the *domestic component* of tax avoidance. A study by Cobham (2005) estimates that developing countries miss some \$285 billion per year due to tax evasion in the domestic shadow economy. It also excludes studies on *offshore holdings by wealthy individuals*. A recent study from Henry (2012) estimates \$21 to \$32 trillion of unreported financial assets held offshore by wealthy individuals, resulting in related tax revenue losses in the range of \$190-\$280 billion. The study does not provide the breakdown between developing and developed economies. A previous study by the same author for Oxfam (2009) (<https://www.oxfam.org/en/pressroom/pressreleases/2009-03-13/tax-haven-crackdown-could-deliver-120bn-year-fight-poverty>) estimates the revenues loss for developing economies in the range of \$64 - \$124 billion.

much FDI income is missing due to investments from offshore hubs") and on the average corporate tax rate.

Table 2. Overview of existing approaches to estimating profit shifting and tax revenue losses

Approach	Description and examples
Trade mispricing approach	<p>Baker (2005) uses interviews to estimate a 7% mispricing in trade with developing economies.</p> <p>Based on Baker's share of mispriced trade, Christian Aid (2008) estimates the revenues lost by trade mispricing and false invoicing for developing economies at \$160 billion per year. The same estimate was then revised in Christian Aid (2009) to \$121.8 billion.</p>
Profitability approach	<p>The idea behind this approach is to investigate the profitability of foreign affiliate operations to detect profit shifting. When a portion of foreign affiliate income is shifted abroad, reported profits are artificially depressed with the result that observed profitability on foreign operations is lower than expected in the absence of profit shifting.</p> <p>Employing this idea Oxfam (2000) comes to a low estimate of annual tax revenue losses of \$35 billion per year. However, the penetration of offshore practices in developing economies has significantly expanded since 2000 when the work was done. Despite other weaknesses, this work is particularly relevant because it envisions some key concepts used in the FDI-driven approach introduced in this study.¹⁸</p>

Source: UNCTAD literature review; Fuest and Riedel (2009); Fuest and Riedel (2010).

It is important to stress that the estimated profit shifting and tax revenue losses are mostly confined to those associated with tax avoidance schemes that require a direct investment relationship. Financing schemes (Archetype 2 in WIR chapter V) are an important example (but other schemes also rely on offshore hubs and financing schemes cannot account for the entirety of the estimated revenue loss).

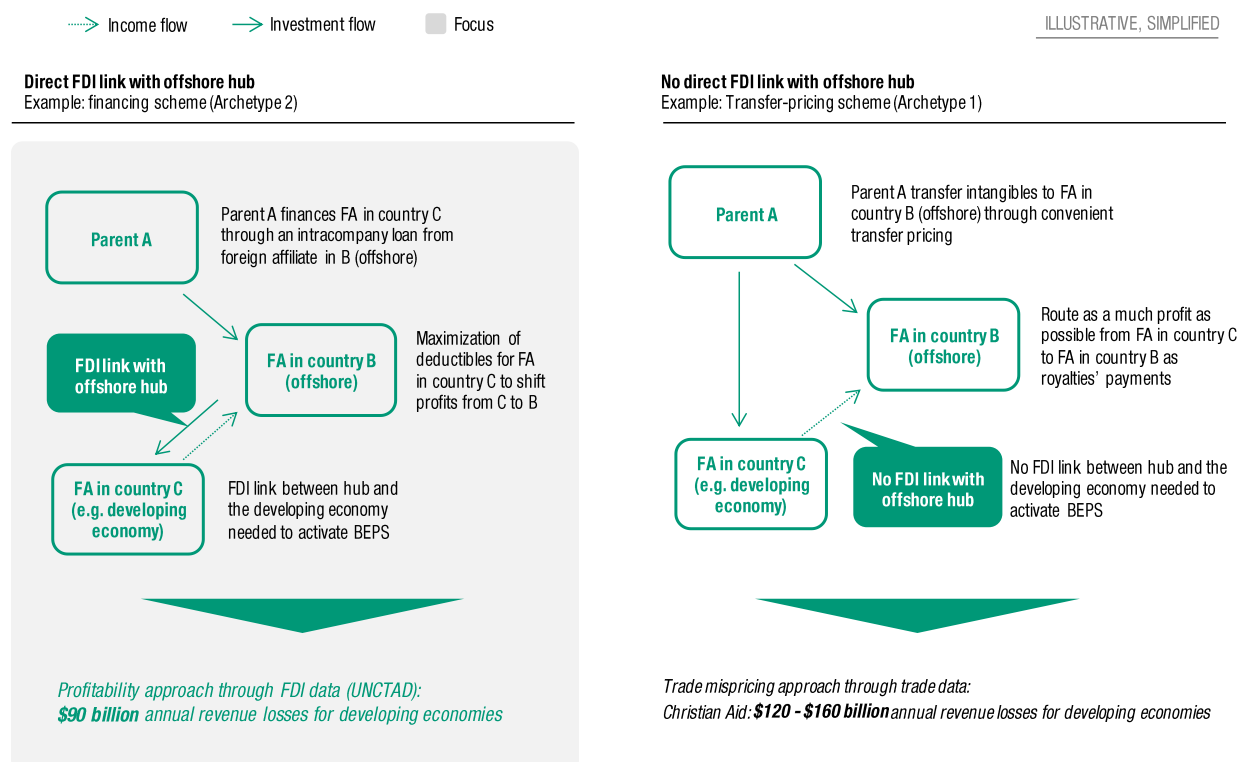
However while a direct link with an offshore investment hub is likely to amplify profit shifting opportunities, it is not the only means to achieve profit shifting. Trade mispricing does not require a direct investment link: MNEs can shift profits between any two affiliates based in jurisdictions with different tax rates. Especially in the context of the digitalized economy, a significant share of transfer pricing practices exploits schemes similar to Archetype 1 – *intangibles-based transfer pricing schemes*. Although these schemes also involve conduits, they do not necessarily appear in host-country FDI inflows; it is enough that the corporate network includes an affiliate based in an offshore hub, even if the investment to the particular host country is not channeled through it. It can therefore be argued that the two estimation types are really complementary, i.e. potentially (but partially) additional. The trade mispricing approach

¹⁸ The Oxfam methodology assumes a "theoretical" rate of return on FDI stocks in developing economies at 20%, adjusting upward the observed rate of return (at 16-18%) to account for profit shifting. The difference between the corresponding theoretical income and the reported income approximates the amount of profit shifting. Application of a corporate tax rate of 35% to shifted profits yields the estimated tax revenue losses. The most challenging step in the methodology is the determination of the upward adjustment from 16% - 18% to 20%. Similarly to Oxfam, the FDI-driven approach proposed in this study resorts to profitability considerations to investigate profit shifting and employs FDI-related data.

leads to tax loss estimates based on the shifting of *operating costs*, while the offshore investment hub-based method used here leads to estimates based on the shifting of *financing costs*. See Figure 6 for a schematic representation of the two approaches.

It is important to note that the different types of tax avoidance schemes in practice are often used in combination and generally hard to disentangle. The different methods for the calculation of revenue losses therefore only provide alternative approaches and arrive at overlapping estimates.

Figure 6. Two approaches to estimating profit shifting compared



Source: UNCTAD.

2. Regression analysis

The relationship between the *Offshore Indicator* and the *Rate of Return* is subject to econometric testing. The reference model is a standard linear regression model (OLS) with time and region¹⁹ fixed effects:

$$y_{i,t} = \beta x_{i,t} + \delta_t + \theta_k + \varepsilon_{i,t}$$

where x denotes the *Offshore Indicator* and y the *Rate of Return*; each data point (x, y) is recorded for a number of countries (indexed by i from 1 to $N=72$), across four years (indexed by t) from 2009 to 2012; δ

¹⁹ The following United Nations regional classification is used: Africa, Asia, Europe, Latin America and the Caribbean, North America, Oceania and South-East Europe and CIS.

(indexed by t) represent the time fixed effect and θ (indexed by k from 1 to 7) represents the regional fixed effects.²⁰

For each country, the *Offshore Indicator* is calculated through a straightforward application of the methodology of the Offshore Investment Matrix (one-sided inward analysis). The relevant perimeter of offshore investment hubs (tax havens and SPE-countries) for the calculation of the *Offshore Indicator* is the *extended perimeter* (already employed in the simulation of the Offshore Investment Matrix in figure 5).

The response of the *Rate of Return* on FDI to the *Offshore Indicator* is analyzed using three formulations of the dependent variable.

- A standard formulation of the rate of return on FDI as the ratio of total FDI income (income on equity and interests on debt) over FDI inward stock.
- Two more granular formulations addressing separately the effects on the *equity component* and on the *debt component* of the FDI-income. In this version, the dependent variables become respectively the ratio of the equity income to total FDI stock (hereafter *Rate of Return_equity*) and the ratio of debt income (interest payments) to total FDI stock (hereafter *Rate of Return_debt*).²¹

Performing separate analysis for the equity and the debt component has some advantages. Primarily, profit shifting practices target the equity component of the FDI-income (the "foreign income") while the debt component (the interest rates paid to the foreign investors) represents a cost for the foreign affiliates, not subject to corporate income taxation (though withholding taxes may apply). Additionally, some BEPS practices do not only affect the ("declared") profitability of FDI but also their structure, favoring debt over equity financing (*debt financing schemes*). The change in the financing mix is actually one lever used by MNEs in BEPS schemes. The "isolation" of the equity component from the debt component allows better capturing the impact on profits of this effect.²² As a consequence, the responsiveness of the equity component to exposure to offshore investment hubs is expected to be higher ("more negative") than the one of the aggregate rate of return. Conversely, the debt component is expected to be *positively* related to exposure to offshore hubs.

The size of the sample is subject to data availability on bilateral FDI inward stock (needed to calculate the *Offshore Indicator*) and the FDI income (to calculate the *Rate of Return*). Consistently with the approach employed throughout the study, the reference source of bilateral FDI stock is the IMF CDIS database recording bilateral investment stocks for a sample of around 100 recipient countries from 2009 to 2012. The data on the FDI income, including the further split between equity and debt components, is retrieved from balance of payments data as reported by IMF BoP (current account, primary income on direct

²⁰ More formally, denoting by $I_{\{A\}}$ the indicator function that equals 1 if the event A realizes and 0 otherwise, the two variables δ and θ representing the fixed effect components can be defined in the regression equation as follows:

$$\delta = \sum_{s=2009}^{2012} \delta_s I_{\{t=s\}};$$

$$\theta = \sum_{k=1}^7 \theta_k I_{\{i \in k\}}$$
 where the event $\{i \in k\}$ realizes if country i belongs to region k .

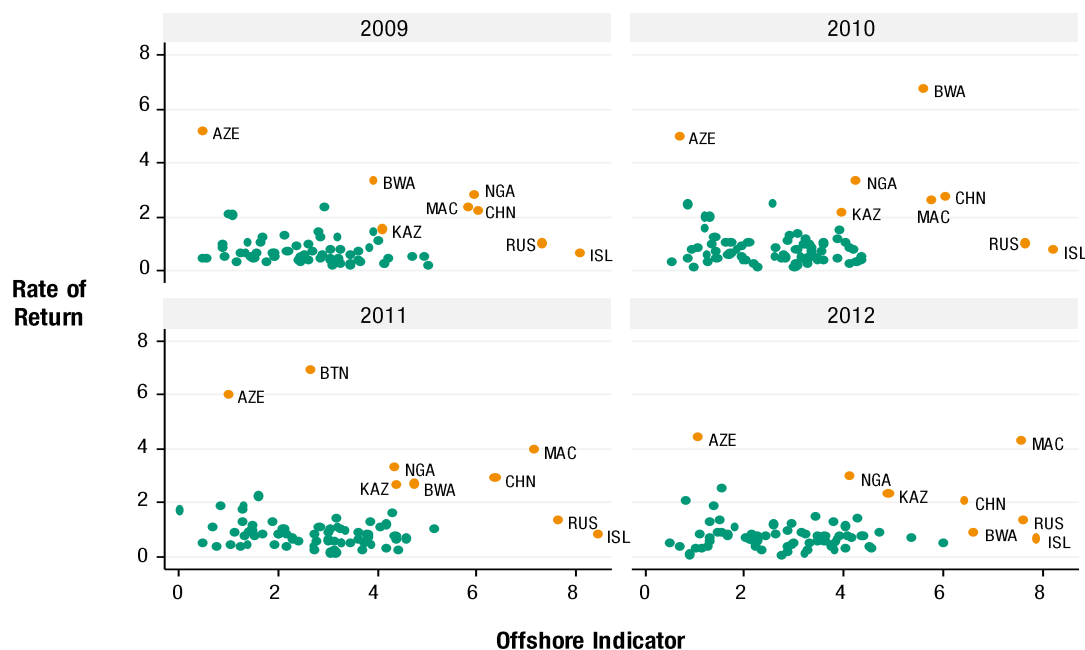
²¹ Notice here that the two ratios *Rate of Return_equity* and *Rate of Return_debt* are not strictly "rates of return" as they both have as denominator the total FDI stock rather than (respectively) the equity component and the debt component of the FDI stock. They should rather be interpreted as the *equity component* and *the debt component of the FDI-income rate of return*.

²² In the general case where the dependent variable is the aggregate rate of return, low levels of the equity component are partially compensated by higher levels of the debt component.

investment, debit side). Finally the data on the FDI inward stock employed (at the denominator) in the calculation of the rate of return on FDI are from the UNCTAD FDI database.²³

Since the goal of the analysis is to quantify the losses related to investment from offshore hubs, the sample includes only *Non-OFCs*, i.e. jurisdictions that do not qualify as tax havens or SPE-jurisdictions. Exploratory univariate data analysis led to the identification of 9 *outliers*²⁴ displaying extreme values of one variable (either of the *Offshore Indicator* or of the *Rate of Return*), consistently across the four years (figure 7).²⁵ The selection of the outliers is still robust with respect to a (bivariate) test heuristic based on the 95% confidence ellipses. The resulting sample consists of an unbalanced panel of 72 countries, including 27 developed economies, 34 developing economies and 11 transition economies, covering the years from 2009 to 2012 (53 countries report information for all the four years).

Figure 7. Sample of the regression analysis - outliers



Source: UNCTAD.

Note: United Nations standard abbreviations used for country names.

²³ All figures are those reported at the time of the analysis and do not necessarily correspond to currently reported data. The latest download of the data from IMF CDIS for the calculation of the *Offshore Indicator* was in April 2014; the latest download of the data from IMF BoP database (FDI income) and UNCTAD FDI database (inward FDI stock) for the calculation of the *Rate of Return* was in November 2014.

²⁴ The countries not considered in the econometric analysis include: Azerbaijan, Botswana, China, Iceland, Kazakhstan, Macao (China), Nigeria and Russian Federation. Bhutan was also excluded for very anomalous values of rate of return.

²⁵ A closer look at the outliers highlights the specificity of the selected countries. Outliers with a high value of the *Offshore Indicator* are characterized by special investment relations with particular offshore hubs, often in their region. In many cases these relations entail FDI *round-tripping*, with an impact on the source country potentially very different from the general (*trans-shipping*) case. The second group of outliers, characterized by unusually high *Rate of Return*, includes countries with an investment profile heavily biased toward natural resources.

3. Results from the regression analysis

Regression analyses have been performed with the three different dependent variables (1) *Rate of Return*, (2) *Rate of Return_equity*, (3) *Rate of Return_debt* against the explicative variable *Offshore Indicator*. All regressions account for time and regional fixed effects and they include a dummy variable accounting for prominent shares of natural resources in exports.²⁶

Table 3 reports the results of the regression analysis.

- (*Model 1*) Results support the assumption of a negative relationship between the *Offshore Indicator* and the *Rate of Return*, with a significant β -coefficient. Comparison of the estimated coefficients suggests that developing countries ($\beta = -11.5\%$) are relatively more vulnerable to profit shifting than developed countries ($\beta = -5.4\%$).
- (*Model 2*) The same picture is confirmed when focusing only on the equity component of the rate of return (*Rate of Return_Equity*). The negative relationship turns out to be stronger, both in terms of slope of the regression line (for developing economies: from -11.5% to -15.8%) and in terms of statistical significance of the OLS estimates. Also the R-squared increases (for developing economies from 22% to 24%). The improvement of the regression when focusing specifically on the equity income is consistent with the realization of BEPS practices. Finally, comparison of the results between developed and developing economies confirm higher responsiveness of the rate of return for developing economies.²⁷
- (*Model 3*) As expected, for the debt component the relationship is reverted: the higher the exposure to offshore investment hubs, the higher the debt component of the rate of return (*Rate of Return_Debt*). Also in this case the relationship is statistically significant. This evidence, together with evidence on the equity component from model 2, supports the assumption that exposure to offshore hubs enables profit shifting practices based on debt financing, among others.

²⁶ Countries with a share of resource-based exports in total exports higher than 90% in 2012.

²⁷ For both model 1 (*Rate of Return*) and model 2 (*Rate of Return_Equity*) the interaction term between the *Offshore Indicator* and a dummy variable which equals 1 for developing economies and 0 for developed economies is not significant, suggesting that the difference in the response to the *Offshore Indicator* between developed and developing countries is not statistically significant. However, for both models the interaction term between the *Offshore Indicator* and *GDP per capita* holds at 5% level, confirming that “poorer” countries are more vulnerable to profit shifting than “richer” countries.

Table 3: OLS regression of the *Offshore Indicator* on the *Rate of Return* - Key statistics.

	(1) Dependent variable: FDI income rate of return (<i>Rate of Return</i>)			(2) Dependent variable: equity component of FDI income rate of return (<i>Rate of Return_Equity</i>)			(3) Dependent variable: debt component of FDI income rate of return (<i>Rate of Return_Debt</i>)		
	All (1)	Developing (2)	Developed (3)	All (4)	Developing (5)	Developed (6)	All (7)	Developing (8)	Developed (9)
<i>Offshore indicator</i>	-0.097*** (0.0293)	-0.115** (0.0492)	-0.054* (0.0317)	-0.126*** (0.0299)	-0.158*** (0.0504)	-0.084*** (0.0319)	0.019*** (0.0048)	0.016** (0.0073)	0.033*** (0.0102)
Obs.	265	122	103	258	117	101	208	82	94
R ²	0.272	0.220	0.115	0.314	0.243	0.150	0.371	0.126	0.304
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1								

Source: IMF Coordinated Direct Investment Survey 2012 and 2011; IMF BOP data; UNCTAD data; UNCTAD estimates.

Note: Estimates in the table are obtained through a regression procedure with *robust standard errors* employing the Huber-White sandwich estimator. In addition, to account for potential within-country correlation between the residuals (induced by the four-years-repeated country observations), an OLS procedure with (robust) *clustered standard errors* at the country level was performed. Also the latter procedure yields OLS estimates significant at 5% level for all models. Finally, the results continue to hold at 5% level for lagged one and two years *Offshore Indicator*.

Focusing on the impact of profit shifting on developing economies (shaded columns in table 3), the result of the regression analysis can be legitimately interpreted as if "a 10% share of inward investment stock originating from offshore investment hubs is associated with a 1pp - 1.5pp lower reported (taxable) rate of return". However interpretation of this statement in a strictly causal way ("an additional 10% exposure to offshore investment hubs generates a 1pp - 1.5pp decrease in the rate of return") requires caution. As the relationship holds *across countries*, it is not possible to exclude compositional effects of specific countries driving the results. Certainly controlling for regional fixed effects allows capturing a significant part of fixed country characteristics that may influence offshore investment patterns and the rate of return on foreign investment.²⁸ This consideration is empirically supported by the increase of R-squared (from 4% to 24%) determined by the inclusion of regional fixed effects.²⁹ In addition to regional fixed effects, the

²⁸ It can be argued that a *country fixed effect model* would better address countries' fixed characteristics that potentially affect the relationship. However *within-country* variability of the explanatory variable (specified in terms of stocks, highly stable over time) over a time horizon of four years (from 2009 to 2012, the time horizon covered by IMF CDIS at the time of this analysis) is very limited to observe meaningful effects on the dependent variable at the level of the individual country.

²⁹ Notice the OLS estimation of the bivariate regression (i.e. the *Offshore Indicator* on the *Rate of Return*, without fixed effects and additional control variables) returns significant (at 1%) beta-coefficients, similar in magnitude to those reported in table 3.

inclusion of a number of control variables (described in section 4) provides further backing to the strength of the relationship.

Overall, even though it is very challenging to irrefutably prove a direct causal relationship between exposure to offshore hubs and reduced profitability of FDI, this analysis provides sound empirical underpinning to widespread evidence that MNEs leverage direct investment links to financial centers to enable profit shifting practices that ultimately result in artificially lower FDI income. More importantly, the quantification of the responsiveness of the rate of return to exposure to offshore investment hubs allows *simulating* the potential impact of these practices on tax revenues.

4. Further robustness tests

This section illustrates the results of a number of tests aimed at strengthening the robustness of the econometric exercise. For ease of exposition, the outcomes are described for *model 2* (rate of return on equity as dependent variable - columns 4 to 6 in table 3). Similarly positive results are observed also for the other models (1) and (3).

The robustness tests address three critical areas.

i. Selection of the outliers.

The selection of the outliers described in section 2, although explained by economic considerations and supported by evidence from descriptive statistics, is prone to some degree of discretionality. In order to ensure that the selection of the outliers does not affect the main findings, two robust regression analyses are performed: the *iteratively reweighted regression (IRR)* and the *quantile regression (QR)*.³⁰ The two procedures were applied to the complete sample of developed and developing countries including the outliers (column 4 in table 3). Both the *IRR* and the *QR* return negative and statistically significant beta-coefficients (at the 1% level). The magnitude of the coefficient estimated with the *IRR* decreases from the baseline value of -0.126 (column 4 in table 3) to -0.086, while the estimate obtained with the *QR* remains substantially the same as the baseline.

ii. Control variables.

Since the *Offshore Indicator* could be correlated with omitted variables that may also affect the rate of return on FDI, some economic and institutional variables were added to the baseline specification. Selected controls were tailored on the group of developing economies as they are the main focus of the analysis. Specific control variables include: (i) corporate income tax rates;³¹ (ii) a variable measuring the level of development;³² (iii) a proxy-variable for financial development;³³ (iv) a proxy-variable for the quality of institutions;³⁴ (v) a variable for levels of corruption.³⁵ With the exception of the level of corruption, all the other controls significantly explain the variation in the rate of return for developing

³⁰ The goal of the two methods is to mitigate the effect of the extreme or deviant observations by assigning them a lower weight compared to "well-behaved" observations. Both methods are in practice standardized procedures to deal with outliers.

³¹ Statutory corporate tax rate from USAID, 2012. Notice that potential endogeneity follows from the fact that higher corporate income tax rates in the host country may increase the incentive to shift profits and thus the use of offshore hubs, resulting in a higher *Offshore Indicator*; at the same time it may depress the FDI income, reported net of tax, resulting in a lower *Rate of Return*.

³² GDP per capita from UNCTAD, 2009-2012.

³³ The domestic credit to private sector as a fraction of GDP from the World Bank, 2009-2012.

³⁴ The regulatory quality index from the World Bank's worldwide governance indicators, 2009-2012.

³⁵ The corruption index from the World Bank's worldwide governance indicators, 2009-2012.

economies. After including all (significant) controls in the regression, the beta-coefficient for the *Offshore Indicator* still holds significant (at 5%) with a magnitude decreasing from -0.158 (table 2, column 5) to -0.085 and the R-squared rising from 24% to 38%, as expected.

iii. Robustness to the definition of country groups.

Finally, different definitions of developing or lower-income economies were adopted to make sure that the main findings are not affected by the United Nations scoping of the group of developing economies. Two definitions of lower-income countries were used: the sample of countries with GDP per capita lower than the median value (129 observations); and the sample of “low income” and “lower middle income” countries based on the World Bank classification (106 observations). For both samples, the regression returns a negative and significant (at 1%) beta-coefficient for the *Offshore Indicator* with a magnitude of -0.146 and -0.113, respectively.

5. Directions of future research

The focus of this analysis is to explore the relationship between the exposure to offshore investment hubs and the rate of return on FDI. The econometric exercise points to a reduction in the rate of return on FDI associated with higher exposure to offshore investment hubs, thus confirming the hypothesis that countries more exposed to offshore investment hubs tend to be more vulnerable to profit shifting. These findings are new and raise a number of additional research questions, potentially relevant in the economic and policy debate at the intersection between international investment and taxation.

Three promising areas for future research are outlined below.

i. An important development of this analysis would be to better understand how profit shifting through direct FDI links to offshore investment hubs actually takes place; what are the most common tax planning schemes enabled by these links (beyond the obvious example of thin capitalization); how do MNEs concretely structure their investment networks around offshore hubs and how does this reflect on FDI patterns and FDI-income flows. Addressing these questions would help to define better (through concrete examples) the range of tax planning schemes covered by this analysis and would be a valuable input for informed policymaking.

As an example of a potential next step in this area, one could split the explicative variable (the *Offshore Indicator*) into its equity (equity exposure) and debt component (debt exposure) and analyze separately their effects on the rate of return, and potentially also the correlation between the two components. This analysis would provide an indication of the relevance of thin capitalization (mainly related to debt exposure) in driving the relationship of interest. For the same purpose, though less analytical, a systematic review of some of the most common BEPS schemes with a specific focus on the role of FDI and its implications on FDI patterns/data would also be insightful. (Currently the efforts to understand the mechanics of MNEs tax planning schemes have mainly revolved around the income dimension rather than the FDI dimension).

ii. An obvious further direction of analysis is to explore the relationship between the *Offshore Indicator* and the *Rate of Return* under different perimeters of offshore investment hubs, from the most conservative to the most “extreme”, and to analyze the sensitivity of the results to different choices. In theory, this could also lead to an assessment of the level of “harmfulness” of individual offshore hubs (related to “how” they are used but also “how much” they are used in BEPS schemes). In the same spirit, separate analyses of the impact of tax havens on one side and SPE-jurisdictions on the other may also provide interesting insights.

iii. The methodology could target other relevant groups than “developed” and “developing”. In a development context, different definitions of low-income countries may be used. Preliminary results

employing an indicator based on the GDP per capita and World Bank income classification proved very promising (see section 4, item (iii)); this is a direction that is worth further investigation.

Finally, it would be ideal to be able to apply this methodology at more granular level, for example to derive information tailored to a specific region or even a specific country. It should be noted that this approach is designed to establish and assess a relationship between FDI and BEPS at the aggregate level; the resulting macro-indicator is an average over a heterogeneous sample. At the current state, granular analyses, such as country-tailored estimates, are very challenging because of the limited amount of data. *Still the estimator presented here may provide intrinsic value to policymakers as a "signal indicator" for BEPS, and as a rule-of-thumb method for country-level BEPS impact.*

6. Simulation of the tax revenue loss for developing economies

Given a negative relationship between the share of inward investment from offshore investment hubs and the rate of return on inward investment, the problem of estimating the tax revenue loss for developing economies boils down to: (i) Finding the "missing profits" due to current levels of investment from offshore hubs (estimation of the profit shifting); (ii) Translating the profit shifting into tax revenue losses.

i. It is reasonable to use the results of the regression analysis to simulate the *profitability gap* (i.e. the decrease in the profitability) associated with the actual exposure of developing economies to offshore investment hubs. Given an average exposure of developing economies at 46% of total inward stock³⁶, the estimated β at -11.5% (table 3, model 1, shaded) and -15.8% (table 3, model 2, shaded) imply a profitability gap of 5.3 pp and 7.2 pp respectively. Applying these *profitability gaps* to the actual reported FDI stock for developing countries leads to an estimate of the (after-tax) profit shifting between \$330 billion and \$450 billion. Table 4 summarizes the steps of the simulation.

Table 4: Simulation of the profit shifting

	Estimated profitability gap	Reported FDI stock, bn US\$, 2012	Simulated profit shifting <i>after tax</i> , bn US\$	Simulated profit shifting <i>pre tax</i> , bn US\$
Model 1 - Rate of Return	5.3 pp	5'000	265	331
		X	=	/(1-20%)=
Model 2 - Rate of Return_Equity	7.2 pp	5'000	360	450

Source: UNCTAD.

Note: For obvious reasons, reported FDI stock in column 2 does not include developing economies that belong to the group of offshore investment hubs (FDI stock for all developing economies in 2012 at \$7.8 trillion). Notice that as the FDI-income (and the corresponding rate of return) is reported after-tax in BoP accounting, also the profit shifting is estimated after tax (column 3). Pre-tax profit shifting is obtained by assuming an average corporate effective tax rate at 20%, roughly in line with most common empirical evidence (but see detailed discussion in annex I).

³⁶This share differs from the share reported in the WIR15 chapter V (reporting average exposure of developing economies to offshore investment hubs at 30%) because it is based on a larger perimeter (see discussion in Section A).

ii. The calculation of the tax revenue loss given the profit shifting is technically straightforward but conceptually challenging. It requires the application of a given corporate tax rate to the shifted portion of the (pre-tax) profits. The key question is which tax rate, in particular whether to resort to a metric of effective tax rate or of statutory tax rate. In this context, the effective tax rate seems to be more realistic as the revenue impact of profit shifting should be assessed against what MNEs actually pay rather than what they are supposed to pay if discounts and incentives did not apply. On the other hand, resorting to the statutory tax rate may have the methodological advantage to keep the issues of tax avoidance and tax incentives clearly separated, as they are different in nature and they imply different policy considerations. In this case the estimated revenue loss would be the result of tax avoidance alone, in an ideal world where tax incentives do not lower the income tax rate faced by MNEs. For completeness table 5 reports the simulated tax revenue losses with both the effective tax rate (at 20%) and the statutory tax rate (at 27%).³⁷

Table 5: Simulation of the revenue losses for developing economies (*preferential option shaded*)

	Effective tax rate (20%)	Statutory tax rate (27%)
Model 1 -Rate of Return	\$66 bn	\$89 bn
Model 2 - Rate of Return_Equity	\$90 bn	\$122 bn

Source: UNCTAD.

Table 5 shows the results of the simulation of the revenue losses under the four main formulations. The simulation clearly points to tax revenue losses approximately in the order of \$100 billion. Among the four options, the shaded one focusing specifically on the equity component of the FDI income and applying an effective tax rate seems to be the best description of the "real" dynamics. The corresponding value of revenue losses at \$90 billion is also well centered within the range of results covered by the sensitivity analysis.

Box. The simulation of the revenue losses for developed economies

The negative relationship between the *Offshore Indicator* and the *Rate of Return* holds significant also for developed economies (table 3, column 6); this suggests that also developed economies are impacted by profit shifting and tax revenue losses related to direct FDI exposure to offshore investment hubs. However the application of the simulation procedure to the group of developed economies gives values of profit shifting and tax revenue losses proportionally smaller than for developing economies (given the relative sizes of the economies).

There are a number of factors that contribute to mitigating the impact of the exposure to offshore

³⁷ Weighted (by the FDI income) average of the statutory corporate income tax rates for a sample of developing countries for which complete information is available. Data on corporate income tax rates from United States Agency for International Development: <http://egateg.usaid.gov/collecting-taxes>.

investment hubs for developed economies.

First and foremost developed economies display a lower beta-coefficient, indicating lower responsiveness of profits to investments from offshore hubs; in fact, in the case of developed economies, an additional 10 per cent share of exposure to offshore investment hubs corresponds to a decrease in the rate of return of "only" 0.5 to 1.0 percentage point (columns 3 and 6 in table 2).

Additionally, when applying the beta-coefficient to (a) the average exposure share of the group to calculate the profitability gap (table 4, column 1); and then to (b) the total FDI stock to calculate the profit shifting (table 4, column 2), the following elements further reduce the base for the calculation:

(a) The average exposure to offshore investment hubs (using the extended perimeter for offshore investment hubs) for developed economies (at 35%) is lower than for developing economies (46%). For the reference model 2, this translates in a profitability gap of 3 percentage points against 7 percentage points for developing economies (column 1 in table 4).

(b) The removal of some large developed-economies offshore investment hubs from the perimeter of the calculation reduces significantly the baseline of FDI stock used for the calculation of the profit shifting (from around \$14 trillion to \$11 trillion, according to UNCTAD statistics).

In this context, despite the larger size of the economies, the simulation of tax revenue losses resulting from direct offshore investment links for developed countries yields an estimate similar to that of developing countries, in the order of \$100 billion. In particular, for the reference option (model 2, with average effective tax rate - see table 5), assuming an average effective tax rate at 25%, higher than for developing economies, the simulation procedure returns an estimate of revenue losses at \$110 billion, against \$90 billion for developing economies.

Source: UNCTAD.

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