



Office Memorandum

To: Members of the Executive Board

June 24, 2014

From: The Secretary

Subject: **Spillovers in International Corporate Taxation**

The attached corrections to FO/DIS/14/69 (5/9/14) have been provided by the staff:

Evident Ambiguity

Page 19, now page 18, Box 2, fifth bullet, line 2: footnote 35 added to read "The term 'conduit country' is used widely, but with little precision. As used in this paper, it simply refers to countries that are widely perceived as attractive intermediate destinations in the routing of investments—whether for tax or other reasons." Subsequent footnotes renumbered.

Page 46, para. 78, new para. 79, first bullet, lines 3–6: for "But such coordination can make participating countries more vulnerable to pressures from lower tax jurisdictions elsewhere."¹⁰⁸ This does not mean that participants are harmed by coordination—but points to the potential benefit from negotiating with leading non-participants, as the EU has in several cases done."
read "There is, however, some risk that such coordination can make participating countries more vulnerable to pressures from lower tax jurisdictions elsewhere."¹⁰⁸ This does not mean that participants are harmed by coordination, and the IMF continues to support such regional efforts—but points to the potential benefit from negotiating with leading non-participants, as the EU has in several cases done."

Page 55, Appendix III, first paragraph, line 4: for "by the standard CIT rate."
read "by the standard CIT rate; this is referred to as the 'implicit' corporate tax base."

Page 71, Appendix V, first paragraph, lines 1–4: for "Such provisions grant MNEs that benefit from source country tax incentives tax credits equal to the residence country tax they would have paid had they not received the incentives: this preserves the value to the investor of host country tax incentives,"
read "Such provisions grant to MNEs that benefit from source country tax incentives a credit against residence country tax equal to the source country tax saved as a result of those incentives: this preserves the value to the investor of host country tax incentives,"

Comment for the following changes: These changes are made to reflect the discussion during the Board meeting on May 23.

Pages 21 and 22, now pages 20 and 21, para. 24, second bullet, lines 11–22: for “Nonetheless, with these and other limitations in mind, it is notable that the spillover impacts which emerge from this exercise are more than twice as large in non-OECD as in OECD countries. Further, Figure 2 shows that revenue losses from spillovers—in the sense of the shortfall of actual revenue from what it would be were countries’ tax bases aligned with their GOS—are found most often (though not only) among lower income economies. And these losses are in many cases substantial: more than 50 percent of current CIT revenue in several cases. The (unweighted) average revenue loss across all countries in the sample is about 5 percent of current CIT revenue—but almost 13 percent in the non-OECD countries. These calculations rest on heroic assumptions, and, for the reasons above, the results for particular countries cannot be interpreted as estimates of aggregate losses from profit shifting. They are, nonetheless, suggestive of broad patterns, and broadly consistent with the direct econometric analysis of base spillovers above.”

read “For all these reasons, country-specific estimates can be highly misleading. The broad impression, nonetheless, is instructive. And what is notable is that the spillover impacts which emerge from this exercise are more than twice as large in non-OECD as in OECD countries. These losses are in many cases substantial: more than 50 percent of current CIT revenue in several cases. The (unweighted) average revenue loss across all countries in the sample is about 5 percent of current CIT revenue—but almost 13 percent in the non-OECD countries. While there is considerable scope to refine the methodology. The results are, nonetheless, suggestive of broad patterns, and broadly consistent with the direct econometric analysis of base spillovers above.

Page 22, now page 21, Figure 2: removed. Subsequent figures renumbered.

Page 22, now page 21, paragraph 25: removed. Subsequent paragraphs renumbered.

Page 34, now page 33, para. 50, new para. 49, second bullet: for “Risk transfer among affiliates—standard practice in MNEs, including for many operations in developing countries—is achieved contractually by judicious allocation of functions, especially managerial or entrepreneurial. Risks are stripped from one (highly taxed) entity and assigned to another (low taxed) affiliate, converting the former into a routine operation with correspondingly low profit margins. Overall, however, the risk faced by the MNE as a whole remains unaltered.”

read “Risk transfer among affiliates has become standard practice in MNEs, including for many operations in developing countries. It is achieved by contractual arrangements that, in effect, provide implicitly some (potentially quite complex) degree of insurance between affiliates. Risks can, for instance, be stripped from one (highly taxed) entity and assigned to another (low taxed) affiliate by converting the former into a routine operation with correspondingly low profit margins. The allocation of risk within a group may of course be driven by commercial considerations, and is not in itself problematic. The question for transfer pricing purposes is how to value the transactions by which such risk transfers are achieved. A fundamental issue here is that, since a pure reallocation of risk within the

group cannot affect the risk borne by the group as a whole—to the extent, at least, that it is hard for all other group members to step away from the failure of any affiliate—there is inherently no comparable price between unrelated parties on which to draw; and the bundling of such risk transfers with changes in function whose substance can be hard to judge adds further difficulty. Companies may be able to secure reduction in taxation by exploiting these difficulties of pricing.”

Page 66, Appendix IV, second paragraph, line 3: for “The data on GOS can be used to assess the possible scale of this collective revenue loss—and to give a sense of where,”
read “The data on GOS can be used to give a sense of where,”

Page 66, Appendix IV, third paragraph, line 10: “(or loss, if negative)” added

Page 67, Appendix IV, second and third paragraphs: for “In doing the calculations, we use data between 2001 and 2012 to reflect only the more recent period.”¹⁴¹ Appendix Figure 2 shows the average CIT efficiency per country during this period, ranked from low to high. The GOS-weighted average is 43 percent. Revenue in the absence of apparent profit shifting, R_i^* , and the associated revenue effect, Δ_i , are computed as in (2) and (3), respectively. Figure 2 in the text shows the revenue impacts (the Δ_i) for individual countries. The (unweighted) average revenue loss from apparent profit shifting is 4.6 percent of current CIT revenue. For OECD countries, there is an (unweighted) average gain of 2.4 percent, while for non-OECD countries there is a loss of 12.9 percent. The aggregate revenue loss from apparent profit shifting is computed as the sum of all revenue changes: $\sum_i \Delta_i$. Relative to current CIT revenue, the aggregate revenue loss is 1.8 percent. The aggregate revenue loss for the group of OECD countries is 0.2 percent of current CIT revenue; that for non-OECD countries is 11.7 percent.”
read “For the calculations, we use data between 2001 and 2012 to reflect only the more recent period. Appendix Figure 2 shows the average CIT efficiency per country during this period, ranked from low to high. The GOS-weighted average is 43 percent. Revenue in the absence of apparent profit shifting, R_i^* , and the associated revenue effect, Δ_i , are computed as in (2) and (3), respectively. This gives the results described in the text.”

Page 67, Appendix IV, footnote 141: removed. Subsequent footnotes renumbered.

Page 68, Appendix IV, third paragraph, line 1: for “the true loss from profit shifting”
read “the true revenue gain from profit shifting for country i shifting”

Page 68, Appendix IV, third paragraph, lines 4 and 5: for “Conversely, Δ_i underestimates the loss from profit shifting if a country has fewer exemptions”
read “Conversely, Δ_i overestimates the gain from profit shifting (or underestimates the loss) if a country has more exemptions”

Page 68, Appendix IV, fourth paragraph: “While the calculations in Figure 2 are thus highly speculative, evidence in this area is so sparse that this avenue seems worth exploring. Overall, what is striking for instance is that the revenue implications for some countries can

be quite marked; and that non-OECD countries, on average, lose more than OECD countries." removed

Factual Errors Not Affecting the Presentation of Staff's Analysis or Views

Page 10 , now page 9, para. 9, line 3: for "(e.g., that establish what will be considered to constitute a PE abroad by that country)."

read "(which establish, for instance, what will be considered to constitute a PE abroad by that country)."

Page 13, now page 12, para. 13, line 2: for "have on others not party to the underlying decisions."

read "has on others."

Page 18, now page 17, footnote 29, lines 1 and 2: for "on the new investment that will be taxed and the (offsetting) investment-related deductions"

read "on investment that will be taxed and investment-related deductions"

Page 19, now page 18, Box 2, first bullet, line 5: for "on the other hand, reports elasticities that are very small."

read "on the other hand, reports responses of transfer prices with respect to cross-country differences in tax rates that are very small."

Page 21, now page 20, para. 24, second bullet, line 2: for "A separate exercise (Appendix IV)"

read "A separate and very preliminary exercise (outlined in Appendix IV)"

Page 35, now page 34, para. 54, new para. 53, lines 6 and 7: for "much tax planning by MNEs in developing countries seems, to many observers, to not just stretch the ALP concepts, but to flout them."

read "much tax planning by MNEs in developing countries appears to be perceived by at least some observers not just to stretch ALP concepts but flout them."

Page 37, para. 58, new para. 57, line 5: for "These incentives have been seen above,"

read "These incentives will be seen,"

Page 41, para. 70, new para. 69, first bullet, line 3: for "up to 50 percent of CIT revenue."

read "up to 50 percent of current CIT revenue."

Page 52, Appendix II, line 3: for "architecture for the source"

read "approach to identifying the source"

Page 65, Appendix IV, footnote 138, line 2: "(see also footnote 121)" removed

Typographical Errors

Page 1, last para., line 3: for "strengths" read "grows"

Page 6, now page 5, footnote 4, line 3: for “about” read “of”

Page 8, now page 7, footnote 8, line 1: “countries” added

Page 15, now page 14, para. 18, line 6: for “straight” read “straightforward”

Page 16, now page 15, para. 19, line 8: for “conduits” read “ ‘conduits’ ”

Page 19, now page 18, Box 2, first bullet, line 8: for “countries lack” read “countries may lack”

Page 20, now page 19, footnote now 36, line 2: for “and strategic spillovers and strategic spillovers as defined above”
read “and strategic spillovers as defined above”

Page 24, now page 23, Table 4: for “**Spillover Effect on country i’s tax base**”
read “**Spillover Effect on country i’s tax base (in percent)**”

Page 24, now page 23, Table 4: for “**Own-tax rate Effect on country’s i’s tax base**”
read “**Own-tax rate Effect on country’s i’s tax base (in percent)**”

Page 27, para. 37, new para. 36, line 10: for “presumably” read “could”

Page 33, now page 32, para. 47, new para. 46, line 4: for “operations and defines”
read “operations while also defining”

Page 33, new page 32, footnote 69, new footnote 70, line 1: for “formula” read “formulary”

Page 34, para. 50, new para. 50, lines 4 and 5: for “and management becomes geographically diffuse, intra-group operations”
read “management becomes more geographically diffuse, and intra-group operations”

Page 39, new para. 62, fourth bullet, line 6: “they” added

Page 48, Appendix I, first bullet, lines 1 and 2: for “and type of policy action and ensure coherence in policy responses.”
read “and the appropriate type of policy action, and to ensure coherence in policy responses.”

Page 51, Appendix II, third paragraph, line 2: “such” removed

Page 51, Appendix II, footnote 115, new footnote 116, line 1: for ““abusive transfer pricing””
read “abusive transfer pricing”

Page 52, Appendix II, line 9: for “is the notion – relying upon the existing tax architecture”
read “is the notion—relying on the existing tax architecture”

Page 52, Appendix II, footnote 120, new footnote 121, line 5: "should" removed

Page 54, Appendix III, second paragraph, line 9: for "only on those jurisdictions"
read "only across those jurisdictions"

Page 54, Appendix III, fifth paragraph, line 11: for "The results, for this reason,"
read "The results, for these reasons,"

Page 58, Appendix III, second paragraph, line 9: for "only on those jurisdictions"
read "only across those jurisdictions"

Page 66, Appendix IV, first paragraph, line 2: for "suggest" read "suggesting"

Page 66, Appendix IV, third paragraph, line 10: for "can" read "could"

Page 77, Appendix VIII, first paragraph, line 8: "total of" removed

Page 82, first references: for "Devereux, Michael, and Simon Loretz, 2008, "The Effects of EU Formula Apportionment on Corporate Tax Revenues," Oxford University Centre for Business Taxation Working Paper 07/06 (Oxford: Oxford University Centre for Business Taxation).
read "Devereux, Michael, and Simon Loretz, 2008, "The Effects of EU Formula Apportionment on Corporate Tax Revenues," *Fiscal Studies*, Vol. 29, pp. 1–33."

Questions may be referred to Mr. Keen (ext. 34442) and Ms. Perry (ext. 36392) in FAD.

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Att: (34)

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FO/DIS/14/69
Correction 1



SPILOVERS IN INTERNATIONAL CORPORATE TAXATION

May 9, 2014

EXECUTIVE SUMMARY

This paper explores the nature, significance and policy implications of spillovers in international corporate taxation—the effects of one country’s rules and practices on others. It complements current initiatives focused on tax avoidance by multinationals, notably the G20-OECD project on Base Erosion and Profit shifting (BEPS). The paper draws on the IMF’s experience on international tax issues with its wide membership, including through technical assistance (TA), and on its previous analytical work, to analyze spillovers and how they might be addressed. In doing so, it goes beyond current initiatives to look at a wide set of possible responses.

These spillovers can matter for macroeconomic performance. Capital account data are impossible to understand without referring to taxation, and there is considerable evidence that taxation powerfully affects the behavior of multinational enterprises.

New results reported here confirm that spillover effects on corporate tax bases and rates are significant and sizable. They reflect not just tax impacts on real decisions but, and apparently no less strongly, tax avoidance.

The analysis also finds that spillovers are especially marked and important for developing countries. These countries typically derive a greater proportion of their revenue from corporate tax; TA experience provides many examples in which the sums at stake in international tax issues are large relative to their overall revenues; and the empirics reported here suggest that spillovers are especially strong for them.

Limiting adverse spillovers on developing countries requires not just capacity building, but also addressing weaknesses in domestic law and international arrangements. The paper makes specific suggestions in areas that Fund TA has found to be especially problematic for developing countries. Sight must not be lost, however, of the need for capacity building and reform in less high profile but critical tax areas.

Wider reforms to the international tax system that have been proposed address some spillovers under current arrangements, but would bring their own difficulties. ‘Formula apportionment’ for instance, which has been widely canvassed, involves significant risk of distortion, and may not benefit developing countries.

The institutional framework for addressing international tax spillovers is weak. As the strength and pervasiveness of tax spillovers become increasingly apparent, the case for an inclusive and less piecemeal approach to international tax cooperation grows strengths.

Approved By
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Prepared by a staff team from the Fiscal Affairs Department comprising Michael Keen, Victoria Perry, Ruud de Mooij, Thornton Matheson, Roberto Schatan, Peter Mullins, and Ernesto Crivelli. Production assistance was provided by Liza Prado, research assistance by Kelsey Moser, and editorial assistance by Linda Long.

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INTRODUCTION

1. International aspects of corporate taxation, which have long arisen in IMF technical assistance, have come to prominence in public debate. Revenue concerns are now prominent around the world, reflecting the need for consolidation while protecting spending in many advanced economies, and the need to support spending for poverty alleviation and growth in developing¹ countries. In this context, the relatively low amounts of tax that, as a result of cross-border tax planning (Box 1), many multinational enterprises (MNEs) pay has given rise to significant public disquiet.² The underlying issues themselves are not new. For many years, corporate tax design has had to pay close attention to international issues, and—as documented in IMF (2013a)—these issues have featured prominently in the technical assistance (TA) work of the Fund. These long-standing problems—including the concern sometimes expressed that the system allocates too little tax base to developing countries—have now come to a head.

2. The G20-OECD project on base erosion and profit shifting (BEPS) is an ambitious and constructive effort to strengthen the international corporate tax system. Building on the central role that the OECD has played in developing and maintaining that system, and the unique expertise this has given it, the BEPS Action Plan (OECD, 2013a) aims to make progress on 15 areas by the latter part of 2015. This is an unprecedented effort to address major avoidance opportunities that arise under current international tax arrangements, and one that is already having some effect on national tax policies and, perhaps, the behavior of MNEs. The European Commission is also active on a range of issues bearing on tax spillovers in the context of the single market, through its Code of Conduct on harmful tax practices and proposals on corporate taxation (discussed later), and having, for example, recently issued recommendations on aggressive tax planning.³

3. Drawing on the IMF's TA expertise, macroeconomic perspective and engagement with its near-universal membership, this paper complements current initiatives⁴ by identifying and analyzing macro-relevant spillovers arising through international aspects of corporate taxation. It does this not only for the current, but also for possibly reformed, international corporate tax arrangements. A core task of the paper is to begin unpacking these 'spillovers' (by which is meant

¹ "Developing countries" refers in this paper to countries other than advanced economies, and so comprises both low-and middle-income countries.

² This disquiet begs some fundamental questions, concerning for instance the extent to which the real burden of corporate taxation falls on labor—one of several reasons why the link between these issues and inequality concerns is not straightforward—and, ultimately, the proper role and design of the corporate tax (often regarded as, potentially, a particularly inefficient form of taxation). This paper steps back from these questions, so far as possible, taking as given the objective of at least preserving revenue from corporate taxes structurally much like the present.

³ European Commission (2012).

⁴ The paper does not address issues related purely to exchange of tax information, which, as described in IMF (2013a), are the subject of much current international attention; nor does it go deeply into issues related to transparency in the context of MNE tax avoidance—notably, the question ~~of about~~ "country-by-country reporting" on which the G20-OECD project focuses.

the impact that one country's international tax practices has on others), both conceptually and empirically, and to assess how they are shaped by actual and potential policy decisions. Two broad and related sets of questions run through the discussion.

4. One set of questions concerns whether international corporate tax spillovers matter for macroeconomic performance. For capital movements, at least, it seems clear that they do. Table 1, showing characteristics of the ten countries with the highest FDI stocks relative to GDP,⁵ suggests that patterns of FDI are impossible to understand without reference to tax considerations (though these of course are not the only explanation). And the point is significant not only for some individual countries (accounting for a stock of FDI extremely high relative to their GDP) but globally (with relatively small countries accounting for a very large share of global FDI). The potential economic implications of international tax spillovers thus go well beyond tax revenue, with wider implications for the broader level and distribution of welfare across nations. The paper explores these and other dimensions of spillovers.

Table 1. FDI stocks relative to GDP—The Top Ten (2012)

<i>Country</i>	<i>FDI in percent of GDP</i>	<i>Share of world FDI (%)</i>	<i>Share of world GDP (%)</i>
Luxembourg	4,710	10.2	0.07
Mauritius	2,504	1.1	0.01
Netherlands	530	15.4	0.91
Hong Kong SAR	409	4.1	0.31
Cyprus	252	0.2	0.03
Ireland	171	1.4	0.25
Hungary	170	0.8	0.15
Switzerland	148	3.6	0.75
Malta	101	0.0	0.01
Belgium	100	1.8	0.57

Source: Calculations from IMF Coordinated Direct Investment Survey (<http://cdis.imf.org/>).

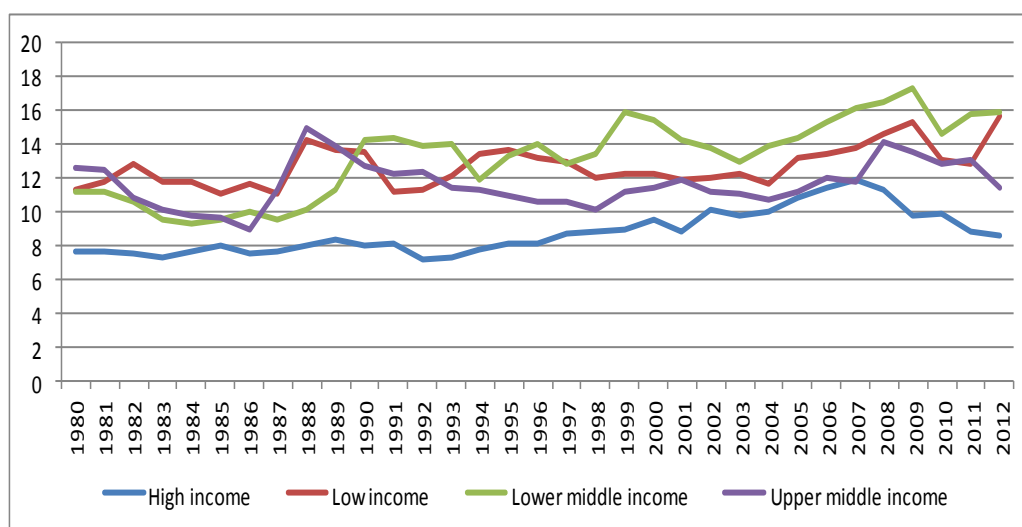
Note: Figure shown is average of outward and inward positions. Singapore and Mongolia (for which outward data are unavailable) would enter the top ten if only inward positions were considered.

5. A second set of questions concerns the impact on developing countries. Since the early 1980s, the stock of inward FDI in developing countries relative to their GDP has roughly tripled, to about 30 percent—making its tax treatment increasingly germane to these countries' wider fiscal performance. The amounts at stake in a single tax planning case now quite routinely run into tens or hundreds of millions of dollars. These sums may be small relative to total tax revenue in sizable

⁵ As explained later, FDI data need to be interpreted with caution.

advanced economies, but are large for the developing countries that are increasingly involved in such cases—especially, but not only, in the extractive industries.⁶ And substantial revenue effects can of course arise from the accumulation of individually modest ones. Moreover, the pervasiveness of the tax incentives that the IMF and others have long stressed as significantly undermining revenue in developing countries⁷ may to a large extent be a spillover reaction to policies pursued in other countries: a clear instance of tax competition. As a share of all revenue, the corporate income tax (CIT) is actually more important in low and upper middle income countries than in advanced (Figure 1),⁸ so that their overall fiscal performance is more vulnerable to pressures on these receipts.⁹ Mindful of these risks, the paper pays particular attention to both the quantification of spillovers on developing countries and specific aspects of current international tax arrangements that IMF TA and surveillance have found to be of particular concern to them.

Figure 1. Revenue from the Corporate Income Tax in Percent of Total Revenue



Source: IMF staff estimates.

Notes: Total tax revenue excluding social contributions (data on which are incomplete); resource-rich counties are excluded due to divergences in the reporting of taxes on natural resources.

Figure shows medians with countries ranked by income per capita each year and divided into four equal-size groups.

⁶ A forthcoming IMF book addresses international tax issues for the extractive industries, which are also touched on in IMF (2012a).

⁷ See for instance, Dethier and Madies (2010), IMF (2011), Keen and Mansour (2010) and Abbas and Klemm (2013).

⁸ Indeed there is something of a puzzle as to why CIT revenues in developing [countries](#) have proved so robust, see IMF (2013b).

⁹ Even if any reduction in CIT revenue were to be made up from other sources, a welfare loss is presumably suffered since otherwise those sources would be used already.

6. The plan of the paper—which has benefited from extensive consultation¹⁰—is as follows. The next section provides background on current international tax arrangements and the nature of associated spillovers. This is followed by an assessment of the quantitative importance and welfare effects of these spillovers, after which the paper takes up selected issues of particular importance to developing countries. The final section considers a variety of proposals, beyond those considered in the current OECD BEPS project, that have attracted interest from government officials, academics and civil society; and assesses the case for and obstacles to enhanced coordination in international tax matters. Each section begins with a short summary of its main messages.

CONSIDERING INTERNATIONAL CORPORATE TAXATION

Key Messages

- Current international tax arrangements rest on concepts of companies' 'residence' and the 'source' of their income, both of which globalization has made increasingly fragile (some would say meaningless).
- The appropriate balance of taxing rights between residence and source countries, long contentious, has lately become an even more focal question. Traditional tax arrangements that are felt to result in unfair allocation of the tax base may increasingly—if not addressed—give rise to unilateral actions that further undermine the coherence of the international system.
- There is a distinction between *worldwide* tax systems, under which a country taxes the income of companies resident there wherever that income arises, but gives a credit for taxes paid abroad, and *territorial* systems, under which the residence country exempts business income of resident companies arising abroad—but, in practice, there is a spectrum between these extremes.
- MNEs have many devices—often highly complex, interlocking, and very effective—by which to reduce their total tax bills.
- The paper focuses on two broad types of fiscal externalities, or 'spillovers': 'base spillovers,' by which one country's actions directly affect others' CIT bases; and 'strategic spillovers,' by which they induce changes in other countries' tax policies.
- Such spillovers potentially give rise to a collective loss of revenue and welfare—but not all countries are necessarily losers.

¹⁰ Staff have participated in discussions and meetings with civil society organizations, business representatives, country authorities and leading academic economists and lawyers in the area. An invitation to submit comments online received a lively response. Appendix I provides a list of interlocutors and an overview of the views they expressed.

A. Current Practice and Key Concepts

7. The present international corporate tax framework is defined by the interplay of domestic laws and tax treaty obligations. There is no comprehensive architecture comparable, for example, to that which regulates international trade. Instead, current arrangements that define and divide the international corporate tax base have evolved over the last century or so with little explicit coordination (other than through bilateral treaties that touch only a subset of relevant matters).¹¹

8. Taxing rights over business profits are based on identifying, on the one hand, the ‘source’ of profits... *Source* refers—very loosely—to where investment is made and production takes place, and is traditionally determined largely by the physical presence of labor and/or capital. Certain thresholds of contact (proxies for the creation of value)—said to create a *permanent establishment* (PE)—must be met for a foreign company to become liable to pay tax to the country deemed the ‘source’ of profit. Importantly, the location of ‘sales’ (in the sense of the country into which the goods or services produced are sold) is not, under this long-standing architecture, taken to give rise to a place of ‘source,’ nor, thus, as triggering any liability for income taxation. Under territorial taxation (more often referred to in Europe as the *exemption* method), tax on business profits is levied only in the source country.

9. ...and on the other, on identifying the ‘residence’ of corporate taxpayers, since the right to tax profits is under the traditional architecture retained legally by the *residence* country unless it is given up by that country through domestic or treaty rules (~~e.g., which that~~ establish, for instance, what will be considered to constitute a PE abroad by that country). Residence means the place where the company receiving the income is deemed to have its primary location, with common tests for this being where the company is incorporated (applicable for example in the U.S.) or from where it is effectively managed (in most countries). Assertion in domestic law of the right to tax profits from any geographic source based on a company’s domestic residence is generally referred to as *worldwide taxation*. The *double taxation*¹²—taxation, that is, by both source and residence countries—that would then otherwise arise is typically avoided by the residence country granting a *foreign tax credit*¹³ against its own tax on the same profits taxed by the source country. This is done either or both in domestic law and/or in applicable bilateral treaties. The result is that the residence tax is limited to the excess of the residence country’s effective tax rate over that in the source country.

¹¹ These bilateral treaties are informed by guidelines produced by the OECD and, with somewhat less impact, the UN. Further, some regional agreements also have considerable effect, notably in the EU, where directives and decisions of the Court of Justice reflecting the principle of non-discrimination among member states continue to have a major impact.

¹² While the rhetoric commonly abhors ‘double taxation,’ what investors presumably care about (compliance costs aside) is not how many times they are taxed but how much.

¹³ A credit directly reduces tax payable; a deduction, in contrast, reduces the base on which tax is charged.

10. In practice, neither worldwide nor territorial taxation is found in pure form.

Importantly:

- ***‘Worldwide’ basis countries generally provide for deferral of tax on active business profits earned elsewhere, not levying tax until earnings are repatriated to the residence country***—which brings the system in effect closer to source taxation for *active business income* (by which is meant, broadly, income arising directly from some commercial activity entered into directly or controlled by the company in question).
- ***Controlled Foreign Corporation (CFC) rules play a prominent role***. These vary significantly across countries, but are in essence (complex) provisions that bring immediately into tax *passive income*—the complement of active business income—arising abroad that has not paid tax there of at least some minimum amount. For worldwide countries, CFC rules in principle provide some protection against tax avoidance through deferral; for territorial countries, they typically simply ensure that only active—not passive—income is exempt in the residence country. CFC rules make the distinction between passive and active income arguably the most critical one for modern tax planning, since they normally apply only to the former.

There is thus a spectrum between worldwide and territorial systems, movements along which—as have recently occurred in some large countries—can have major effects on the tax bases of other countries. This trend is taken up later.

11. Identifying the country that is the ‘source’ of income—critical for applying the current architecture—is increasingly problematic. It has been made more difficult, conceptually and practically, by the increased importance of intra-firm transactions (about 42 percent of the value of U.S. goods trade in 2012,¹⁴ for instance) and, more recently, of intangible assets of various kinds—patents, trademarks, other intellectual property (IP)—which can be much more easily relocated than can the bricks-and-mortar facilities of the world for which the current framework was initially built. The digitalization of economic activity also raises issues for which the present system was not designed (discussed in OECD (2014d); see also Appendix II). Nor is the notion of residence entirely clear cut, in the sense that—however defined—companies can change it; and, moreover, the increasing disconnect between a company’s country of residence and that of its shareholders makes even the relevance of the concept less clear. The main issues of this kind, and the planning devices to which they lead—of which Box 1 gives a flavor—are the primary focus of the OECD BEPS project.

12. Once the source of profits and residence of companies have been determined, fundamental issues arise in determining the appropriate balance between source and residence taxation. At its core, a key issue in assessing any international tax arrangement is how it divides the rights to tax between source and residence countries. The existing system worked fairly

¹⁴ U.S. Census Bureau (2013).

Box 1. International Tax Planning—Tools of the Trade

The essential aim of tax planning schemes is of course to shift taxable income to low tax jurisdictions. Precisely how this is done is driven by specific features of national tax systems and treaty networks,¹⁵ but common strategies (some of which are looked at more closely below) include:

- **Abusive transfer pricing** (stretching, violating or exploiting weaknesses in the arm's length principle) is often raised as a concern, ranging from potential mispricing of natural resources to the transfer of IP rights to low tax jurisdictions early in their development, when they are hard to value verifiably.
- **Taking deductions in high-tax countries...**—by, for example, borrowing there to lend to affiliates in lower-tax jurisdictions;
- **...and as many times as possible**—passing on funds raised by loans through *conduit companies* (ones, that is, serving solely as intermediaries within a corporate group) may enable *double dipping*—taking interest deductions twice (or more), without offsetting tax on receipts—leading to *thin capitalization* (high debt ratios).
- **Risk transfer**—conducting operations in high tax jurisdictions on a contractual basis, so limiting the profits that arise there.
- **Exploiting mismatches**—tax arbitrage opportunities can arise if different countries classify the same entity, transaction, or financial instrument differently (the U.S. 'check the box' rules¹⁶ being a prime example of a provision with major unintended consequences in this regard);
- **Treaty shopping**—treaty networks can be exploited to route income so as to reduce taxes (discussed further below);
- **Locating asset sales in low jurisdictions**—to avoid capital gains taxes (a particular concern in the context of recent resource discoveries in some low tax countries, and also explored further later).
- **Deferral**—companies resident in countries operating worldwide systems can defer home taxation of business income earned abroad by delaying paying it to the parent.
- **'Inversion'**—companies may be able to escape repatriation charges or CFC rules by changing their residence.

Schemes commonly combine several of these devices, turn on quite fine legal distinctions and span several countries and tax systems. They are often extraordinarily complex.¹⁷

smoothly when capital movements were essentially a matter of relatively balanced bilateral flows among industrialized countries: ex ante, any country could be assumed to be sometimes 'source' and sometimes 'residence.' The allocation of rights is especially important for low-income countries, however, as flows are for them commonly very asymmetric—they are essentially 'source' countries,

¹⁵ Excellent accounts are in OECD (2013b) and Mintz and Weichenreider (2010).

¹⁶ Issued by the U.S. Treasury in 1996, these essentially allow businesses to elect—for themselves and for each of their foreign and domestic subsidiaries, and within certain parameters—whether to be taxed as a corporation or treated as transparent for tax purposes (a 'disregarded entity'). Intended as a simplification, the rules gave rise to major tax planning opportunities, including—among others—the easier avoidance of CFC rules.

¹⁷ Box 5 of IMF (2013b) provides one relatively comprehensible illustration.

the recipients of capital inflows and the site of production, not investors in business activities outside their borders. Since the current architecture allocates taxing rights to the source country through rules regarding PEs, for example, it might seem to favor them. Looking deeper, however, the network of bilateral double taxation treaties based on the OECD model¹⁸ significantly constrain the source country's rights (as discussed later). And, determining 'source' itself relies on allocating earnings to particular entities within corporate groups. The core allocation rule for this purpose is the *arm's length principle* of valuing transactions within MNEs at the prices that would be agreed by unrelated parties—which leaves considerable scope for manipulation by MNEs to shift their tax base away from high tax (often source) countries.¹⁹ At issue here are deeper notions as to the 'fair' international allocation of tax revenue and powers across countries (which current initiatives do not address). Arrangements that seem to contradict broad perceptions of fairness, even if those are imperfectly articulated, may increasingly give rise to unilateral domestic measures to change them—with a consequent risk of uncoordinated defensive measures even further undermining the coherence of the international tax system.

B. Spillovers

13. By 'spillover' is meant here the impact that one jurisdiction's²⁰ tax rules or practices have on others ~~not party to the underlying decisions~~. 'Fiscal externalities' of this kind can arise from many aspects of national tax systems, including purely domestic ones: changes in the excise taxes on the consumption of particular commodities, for instance, can have powerful effects on foreign producers of those commodities. The focus here, however, is on cross-border effects arising through taxation at the corporate level. This perspective sets aside important issues regarding taxation at personal level of the income earned by multinationals,²¹ but captures the core concern with the level and cross-country allocation of corporate tax payments.

14. Spillovers can have macro-relevant effects through several channels. One country's international tax decisions may affect other countries by their impact on:

- **Real and financial flows**, with potential impacts, through FDI and corporate financing arrangements, on growth and macroeconomic stability.

¹⁸ The UN model allocates somewhat more rights to the source country, in, for instance, not prescribing maximum withholding tax rates and providing for source taxation of royalties. Lennard (2009), Lennard and Yaffar (2012), and Lang and Owens (2014) elaborate on the differences between the two models.

¹⁹ Further, the definition of PE may be limited in domestic law as well as treaties, to raise the bar on what contacts with a jurisdiction will cause it to be deemed the 'source' of profits.

²⁰ Reference is made to 'jurisdictions' here and elsewhere as several important players in international tax context are territories or dependencies.

²¹ Higher taxes at shareholder level could in principle offset reduced corporate tax payments resulting from international tax gaming, but would imply a very different cross-country allocation of tax revenue. Analytically, the working assumption here is that personal tax arrangements do not affect the tax incentives implied by the CIT alone (such as the bias towards debt finance discussed later). This will be so, for instance, in the important case in which shareholders are tax exempt: IMF (2009) discusses further.

- The **corporate tax base**, as taxable profits change in reflection of both real responses (through investment and the like) and profit-shifting responses (affecting, loosely speaking, only where profits are booked for tax purposes). This channel of effect, holding constant the tax policy of the affected country, is referred to here as *base spillover*.
- **Tax-setting incentives**, since the best response to tax changes abroad may be to change national tax rules too. These are *strategic spillovers*—‘tax competition’ in its broadest sense—most obviously in the potential form of a ‘race to the bottom,’ as countries respond to lower CIT rates elsewhere by reducing their own rates.²² The focus below will be on direct strategic spillovers of this kind—changes in corporate taxation at home in response to changes abroad—but there can also be important indirect strategic effects. In particular, pressures to reduce the CIT rate create pressures to reduce the top personal income tax rate too, to prevent avoidance of the latter through incorporation.
- **World prices**, as significant tax-induced changes in investment and saving behavior may generate, for instance, changes in world interest rates and/or, to the extent that corporate taxes ultimately fall on labor, in wages. These are pecuniary externalities (that is, they operate through prices), so will affect global efficiency only to the extent that they interact with other distortions: a tax-induced reduction in the world interest rate, for instance, could amplify the adverse effect of taxes that reduce private incentives to save.

15. These effects are closely related, Decisions on the location of real activities, for instance, may be influenced by the associated opportunities for profit shifting; and awareness of an ability to affect world prices can create its own tax-setting incentives (analogous to the familiar optimal tariff).²³ There are other potentially important spillover effects too: on, for instance, companies’ choice of organizational form. The focus here, however, is on the first three spillovers above—and especially on base and strategic spillovers, these being the most directly fiscal.

16. Spillovers can arise from several aspects of national tax policies, and reflect complex interactions between them. Most obviously, spillovers can arise from differences in ‘headline’ statutory rates of corporate taxation, since these create incentives to shift taxable profits between countries. So too do more narrowly-defined *preferential regimes* that offer special treatment for particular types of income—a topical example being the ‘IP boxes’ that charge reduced rates of tax

²² Theory does not unambiguously predict, however, that tax rates are ‘strategic complements’ in the sense that the best response to a lower tax rate abroad is to cut one’s own tax rate, and matters are still more complex given the wide range of rate and base parameters countries may set. Related, countries may also have incentives to set tax rates ‘too high’ from the collective perspective, rather than too low (for instance, where foreign ownership is large). See the review in Keen and Konrad (2013).

²³ A large capital exporting country, for instance, has an incentive to set a low source tax in order to increase domestic demand for capital, driving up the world interest rate and hence the return on its investments abroad.

on income from patents and other forms of intellectual property.²⁴ But spillovers can arise from other than these core parameters of the corporate tax. For example:

- **Network externalities** can arise within the system of double tax treaties: if country A, having a treaty with country B, signs a treaty with country C, it may in effect create a treaty between B and C (see Box 3 and related discussion below).
- **Mismatches** in national rules can also create spillovers. These can arise, for instance, in terms of how financial instruments are treated: one country may regard an instrument as debt, for example, and so allow an interest deduction, while the country in which payments are received regards it as equity, and so imposes no or little tax. Or the mismatch may be in terms of the characterization of business entities (as corporations or otherwise).
- **Tighter CFC rules**, raising the effective tax rate on funds placed in low tax jurisdictions, can indirectly affect other countries by raising the tax cost of investing there.

17. The form and severity of spillovers depend on the structure of the international tax framework. The rate of tax levied in source countries would not matter for corporate decisions, for instance, under a pure system of worldwide taxation in which such income was fully subject to tax, without deferral, by the residence country: the company would then simply pay the residence country rate on all its earnings, wherever they arose. Addressing spillover problems thus inevitably raises issues concerning not just particular tax arbitrage opportunities under current arrangements, but the wider architecture itself.

18. The effects of spillovers are not zero sum, but can create a collective inefficiency—and national interests can diverge sharply. This is clearest in relation to profit shifting: moving taxable income from a high tax jurisdiction to a low tax one so as to reduce total tax payments. Since the company's purpose in doing so is to reduce its total tax payments, the collective revenue of the countries affected must fall. But revenue in the low tax country can only increase. And similar effects arise more broadly than from such straightforward income shifting techniques. Non-cooperative policy making in the presence of externalities can result in outcomes that, from the collective perspective, are inefficient but from which some countries or jurisdictions nonetheless gain. In a very much second best world it may be, however, that non-cooperative tax policymaking eases other distortions. This complex set of issues is taken up in the final section.

²⁴ These schemes, which have spread rapidly over the last decade or so, are described and assessed in Evers and others (2013).

ASSESSING THE SPILLOVERS

Key Messages

- There is substantial evidence that tax considerations significantly affect FDI and a wide range of other corporate decisions—but estimating aggregate revenue effects remains elusive.
- New evidence for a large panel of countries assessed here suggests that:
 - Both base and strategic spillovers are significant and large.
 - Base spillovers arise at least as much from profit shifting as from effects on real activities.
 - These spillover effects are especially strong for developing countries.
- Assessing the welfare effects of tax spillovers remains problematic:
 - While spillovers are presumptively a source of inefficiency, low tax rates on the most mobile activities ease economic distortions from the corporate tax.
 - A small observed collective revenue loss associated with spillovers (from profit shifting, for instance) does not imply a small efficiency loss, as the overall level of taxation could be too low.

A. Quantification

This section assesses evidence on the nature and importance of the first three types of spillovers identified above.

Real and Financial Flows

19. Aggregate international investment positions and behavior are strongly marked by tax considerations. Tables 2 and 3 show for, respectively, selected G20 and developing countries, where their outward investment immediately goes to and /or their inward investment immediately comes from: 16 percent of outward investment from Brazil, for instance, goes (as least initially) to the Cayman Islands. Such lists—and the countries selected are not in this respect atypical—confirm the impression from Table 1 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.²⁵ There is some direct evidence

²⁵ Some of these flows, no doubt, reflect ‘round tripping’: investing through an entity abroad to obtain (legally or not) more favorable treatment than is available by investing directly at home.

Table 2. Top 10 Destinations and Sources of FDI, Selected G20 Countries, 2012/1

Outward FDI			Inward FDI		
United States	Russia	Brazil	China	India	South Africa
Netherlands (14)	Cyprus (37)	Austria (28)	Hong Kong SAR (46)	Mauritius (26)	U.K. (45)
U.K. (13)	Netherlands (16)	Cayman Isl (16)	Br. Virgin Isl (15)	U.K. (16)	Netherlands (19)
Luxembourg (9)	Br. Virgin Is (11)	Br. Virgin Isl (10)	Japan (6)	U.S. (15)	United States (7)
Canada (8)	Switzerland (3)	U.S. (10)	Singapore (4)	Singapore (8)	Germany (5)
Bermuda (7)	U.S. (3)	Spain (8)	U.S. (3)	Japan (7)	China (3)
Cayman Isl (5)	U.K. (2)	Bahamas (7)	Korea (2)	Germany (6)	Japan (3)
Ireland (5)	Luxembourg (2)	Netherlands (7)	Germany (2)	Switzerland (5)	Switzerland (2)
Singapore (3)	Germany (2)	Luxembourg (6)	Cayman Isl (2)	Netherlands (5)	Luxembourg (1)
Japan (3)	Austria (2)	Argentina (3)	Taiwan, Province of China (1)	France (2)	Malaysia (1)
Australia (3)	Bahamas (1)	Peru (1)	Samoa (1)	Korea (1)	France (1)

Source: IMF Coordinated direct investment survey (<http://cdis.imf.org>).

1/ Main destinations/sources of FDI from/to country in bold; percent of total in parentheses.

Table 3. Top 5 Sources of Inward FDI, Selected Non-OECD Countries, 2012/1

Uganda	Botswana	Philippines	Mongolia	El Salvador	Peru
Australia (36)	Luxembourg (67)	Netherlands (22)	Netherlands (57)	U.S. (32)	U.S. (24)
U.K. (17)	South Africa (15)	Japan (17)	Singapore (11)	Panama (29)	Canada (12)
Netherlands (11)	U.K. (5)	U.S. (17)	U.K. (7)	Mexico (9)	Spain (10)
Mauritius (10)	Namibia (2)	Singapore (10)	China (5)	Br Virgin Isl (6)	Panama (7)
Kenya (8)	Zimbabwe (2)	Hong Kong S. (7)	Hong Kong S. (4)	Spain (3)	Cayman Isl (7)

Source: Coordinated direct investment survey (<http://cdis.imf.org>).

1/ Percent of total in parentheses.

too that tax changes can have significant capital account effects.²⁶ Reviewing a large econometric literature on investment effects, the meta analysis of De Mooij and Ederveen (2008) suggests that a 10 percentage-point reduction in a country's effective average tax rate²⁷ increases its stock of FDI, on average and in the long run, by over 30 percent. Not all of this FDI, it should be noted, represents the development of new productive capacity (so-called 'greenfield' investment). Estimates suggest that more than half may reflect mergers and acquisitions. There are some indications though that

²⁶ An early example is the analysis of Sinn (1985); Keen and Syed (2006) also find, more generally, that own CIT rate changes have significant effect on net exports, with quite complex dynamics.

²⁷ By an 'effective' tax rate is meant one that reflects not just the statutory rate but depreciation allowances and other elements of the tax base.

greenfield investments—which, are presumably more likely to generate the benefits for which inward investment is often sought, such as additions to employment—are a larger proportion of total FDI in lower income countries than in more advanced economies.²⁸

Base Effects

20. One country's tax policy can impact others' CIT bases by affecting either real activities or the shifting of paper profits. Effects on real investment of the kind just noted would be expected to feed through to corporate tax bases.²⁹ Pure (paper) profit shifting might be regarded in a quite different and (even) more negative light, being seen as undermining the traditional notion that profits be taxed in geographic line with the activities that generate them (though, as stressed above, quite where that location is can be very unclear).

21. There is strong evidence of extensive profit shifting... It is highly suggestive, for instance, that more than 42 percent of the net income earned by U.S. majority-owned affiliates is earned in 'tax havens',³⁰ while less than 15 percent of their value added is created there;³¹ and that the presence of an additional 'tax haven' subsidiary reduces the consolidated tax liability of a corporate group by 7.4 percent of total assets.³² And more granular evidence increasingly confirms the long-standing but largely anecdotal impression that the opportunities for profit shifting indicated in the previous section are indeed used extensively (Box 2).

22. ...but it is very difficult to arrive at 'bottom line' numbers for the overall sums at stake. Many attempts have been made to arrive at a single estimate of the extent of profit shifting. For the U.S., one estimate points to a revenue loss of \$60 billion—about 25 percent (at that time) of CIT revenue.³³ For non-advanced countries, Christian Aid (2008) arrives at an aggregate annual loss from trade mispricing alone of USD 160 billion. Estimates such as the latter, however, have been forcefully criticized.³⁴ In assessing these and other estimates it is also important to remember that they often look at only one side of the story: one country's revenue loss may be offset, though only partly, by other countries' revenue gains.

²⁸ UNCTAD (2013).

²⁹ Effects through this route will have potentially complex dynamics. For example, both the return on ~~the new~~ investment that will be taxed and ~~the (offsetting)~~ investment-related deductions and allowances to be granted will be affected.

³⁰ The otherwise unhelpful and ill-defined term 'tax haven' is used in this paper only to refer to specific lists of jurisdictions used in the literature cited.

³¹ Dharmapala (2014).

³² Maffini (2009).

³³ Gravelle (2013).

³⁴ Fuest and Riedel (2009) reviewing this and several other studies, conclude that "...most existing estimates of tax revenue losses in developing countries due to evasion and avoidance are not based on reliable methods and data."

Box 2. Responses to International Tax Rules—Evidence

There is a large and growing literature, exploiting firm level data (available in usable quantities only for advanced economies) tending to confirm that the planning opportunities outlined in Box 1 do have significant effects on corporate behavior:

- **Transfer pricing abuse.** Direct empirical evidence is scarce, and does not unequivocally point to large effects. Clausing (2003) finds signs of significant tax-motivated transfer pricing abuse of intracompany trades by U.S. multinationals; and Heckemeyer and Overesch (2013) attribute about two-thirds of their consensus spillover effect to transfer pricing abuse. Swenson (2001), on the other hand, reports responses of transfer prices with respect to cross-country differences in tax rates³⁵ that are very small. It seems likely that the potential for abusive transfer pricing in advanced countries occurs not so much for trade in tangible goods—as it may for developing countries, which often lack appropriate information on comparable prices even for these transactions—as for transactions for which even advanced countries may lack comparables, such as intangibles, risk premia or management services.
- **Location of intangible assets.** CIT rates appear to have large negative effects on the number of patents filed by a subsidiary (Karkinsky and Riedel, 2012) and on the magnitude of intangible assets reported on a company's balance sheet (Dischinger and Riedel, 2011). This is consistent with profit shifting and indeed there is evidence that profit shifting activities are larger in MNEs with high IP holdings and R&D intensities (Grubert, 2003).
- **Intra-company debt shifting.** There is substantial evidence that taxation induces intracompany borrowing to reduce tax payments in high-tax locations (De Mooij, 2011). Effects are larger for affiliates located in developing economies than for those in developed economies (Fuest and others, 2011); and are found to be important also for multinational banks (Gu and others, 2014).
- **Mismatches and other devices.** For the U.S., Altshuler and Gruber (2008) find that 'check-the-box' rules in the U.S. (by which such mismatches can be exploited) created a revenue loss for the U.S. treasury of \$7 billion between 1997 and 2002.
- **Treaty shopping.** Tables 2 and 3 above, and similar, provide quite compelling prima facie evidence for extensive use of *conduit countries*.³⁵ Using firm-level data, Mintz and Weichenrieder (2010) find strong effects for German MNEs, while Weyzig (2014) documents a significant impact of Dutch Special Purpose entities on the routing of FDI.
- **Inversion.** Between 1997 and 2007 about 6 percent of all MNEs relocated their headquarters. Voget (2011) finds that a 10 percentage point higher tax on repatriations increases the probability of such relocation by more than one third. Huizinga and Voget (2009), moreover, estimate that if the U.S. were to eliminate worldwide taxation, the number of parent companies that would choose residence in the U.S. after a cross-border merger would increase by 5 percentage points.
- **Deferral.** When the U.S. tax rate on repatriated dividends was reduced from 35 percent to 5.25 percent for one year in 2005, corporations repatriated \$312 billion, much of which was distributed as dividends to U.S. shareholders (Marples and Gravelle, 2011; Dharmapala and others, 2011). Studies by the Joint Committee on Taxation and the U.S. Treasury estimate that eliminating deferral would yield an annual revenue gain in the U.S. of between \$11 and \$14 billion (Gravelle, 2013), allowing a revenue-neutral reduction of the CIT rate to around 28 percent (Altshuler and Grubert, 2008).

³⁵ The term 'conduit country' is used widely, but with little precision. As used in this paper, it simply refers to countries that are widely perceived as attractive intermediate destinations in the routing of investments—whether for tax or other reasons.

23. Panel data analysis points to marked base spillover effects, from both real activities and profit shifting.

Much of the literature has focused on how a country's tax system affects its own tax base (to identify, for instance, revenue-maximizing tax rates). The spillovers that are the focus here, however, have received much less attention. Appendix III develops an empirical approach for assessing base spillovers, relating (proxies of) the corporate tax base in 103 countries, over the period 1980-2013, to both their own statutory CIT rate and the rates of others.³⁶ This approach is in important respects simplistic: many jurisdictions are attractive for tax purposes not because their statutory rate is especially low, for instance, but because of special regimes not captured in this data. The wide country and time coverage, however, provides some offsetting analytical benefits. Several suggestive conclusions emerge.³⁷

- **Spillover base effects through real activities are significant and large.** Theory suggests that the base spillover effects felt by any particular country will reflect a weighted average of tax rate changes elsewhere, but with weights that differ depending on the channel of the spillover. If it is only through real activities, then tax rates set by (broadly speaking) larger countries should matter more: intuitively, this is because one would in this case expect that the tax base of a large advanced economy would not be much affected by the statutory rate of a small island. Weighting other countries' tax rates by GDP to capture this idea, the (short run) semi-elasticity of the implicit corporate tax base³⁸ with respect to statutory CIT rates abroad is around 3.7; that is, a one point reduction in the statutory CIT rate in all other countries reduces the typical country's corporate tax base by 3.7 percent. With corporate tax rates having fallen, on average, by 5 points or so over the last 10 years, this implies a sizable effect.
- **Spillover base effects through profit shifting are also large—and no less significant.** If, on the other hand, effects are through shifting of paper profits, it is simply cross-country differences in statutory tax rates that matter, together with the ease with which they can be exploited: in this case, the tax policy of a small island could well matter for a large economy. To explore this, not having any direct measure of the ease of profit shifting, two weighting structures are considered in the empirical exercise: the simple average of all tax rates elsewhere, and the average only across 'haven' jurisdictions. These 'haven-weighted' effects prove to be marked; indeed spillovers from this group imply as large an effect as is found using GDP weights—and one estimated with greater confidence.

³⁶ Changes in the tax base may also be policy responses to changes in tax rates elsewhere; in this sense the results reported here potentially conflate base and strategic spillovers ~~and strategic spillovers~~ as defined above.

³⁷ The own tax base effect—the focus of most other studies—that emerges implies a short-run semi-elasticity of between -1 and -2 , which is fairly high, relative to the wider literature. The results in the appendix also suggest that spillovers have become more marked over time.

³⁸ This is CIT revenue divided by the main statutory rate of CIT.

24. There is also evidence that tax base spillovers are especially pronounced for low-income countries.³⁹ IMF TA has encountered several instances in which single cases account for a significant part of all revenue. Many of the most spectacular relate to the extractive industries: a gold mining sector in which USD 100 billion has been invested over the last decade, but which is almost entirely debt financed; a potential loss from effective elimination of withholding taxes on a single project equivalent to around 15 percent of total revenue;⁴⁰ and further, especially striking examples related to indirect transfers of ownership interests (Appendix VI). But the issues are not confined to the extractive industries: there are cases, for example, of telecom companies in Africa—often among the most profitable enterprises—being almost entirely debt financed. Civil society has also drawn attention to cases in which substantial sums are at stake for developing countries in the proper application of international tax rules.⁴¹ Less anecdotally, the econometric evidence reported in Appendix III points to particular macro-relevance of tax spillovers for these countries, suggesting that:

- **The spillover base effect is largest for developing countries.** Compared to OECD countries, the base spillovers from others' tax rates are two to three times larger, and statistically more significant.
- **The apparent revenue loss from spillovers, relative to a benchmark akin to source taxation, is also largest for developing countries.** A separate and very preliminary exercise (outlined in Appendix IV) derives estimates of 'apparent spillovers' by comparing actual CIT revenue with that which would be collected were the base simply proportional to gross operating surplus (GOS) —a very crude approximation to a form of source-based taxation. Data limitations mean that this can be done only for a relatively small sample of countries,⁴² and one that excludes, moreover, the conduit countries that the evidence above suggested to be an especially important source of spillovers. So the exercise cannot capture profit shifting involving such countries. There are other caveats too: as explained in the appendix, apparent gains from spillovers will be higher, for instance, in countries with relatively few exemptions and for those implementing worldwide taxation. For all these reasons, country-specific estimates can be highly misleading. The broad impression, nonetheless, is instructive. And with these and other limitations in mind, it what is notable is that the spillover impacts which emerge from this exercise are more than twice as large in non-OECD as in OECD countries. Further, Figure 2 shows that revenue losses from spillovers—in the sense of the shortfall of actual revenue from what it would be were countries' tax bases aligned with their GOS—are found most often

³⁹ Results reported in the Appendix III also suggest that spillovers have increased over time. Dharmapala (2014), reviewing the literature, reports evidence for increasing firm-level elasticities over time in the US, but declining elasticities in Europe. Still, even with smaller responses at the micro level, the macro elasticities explored here may have grown in light of the increasing importance of MNEs and the growth of intangibles.

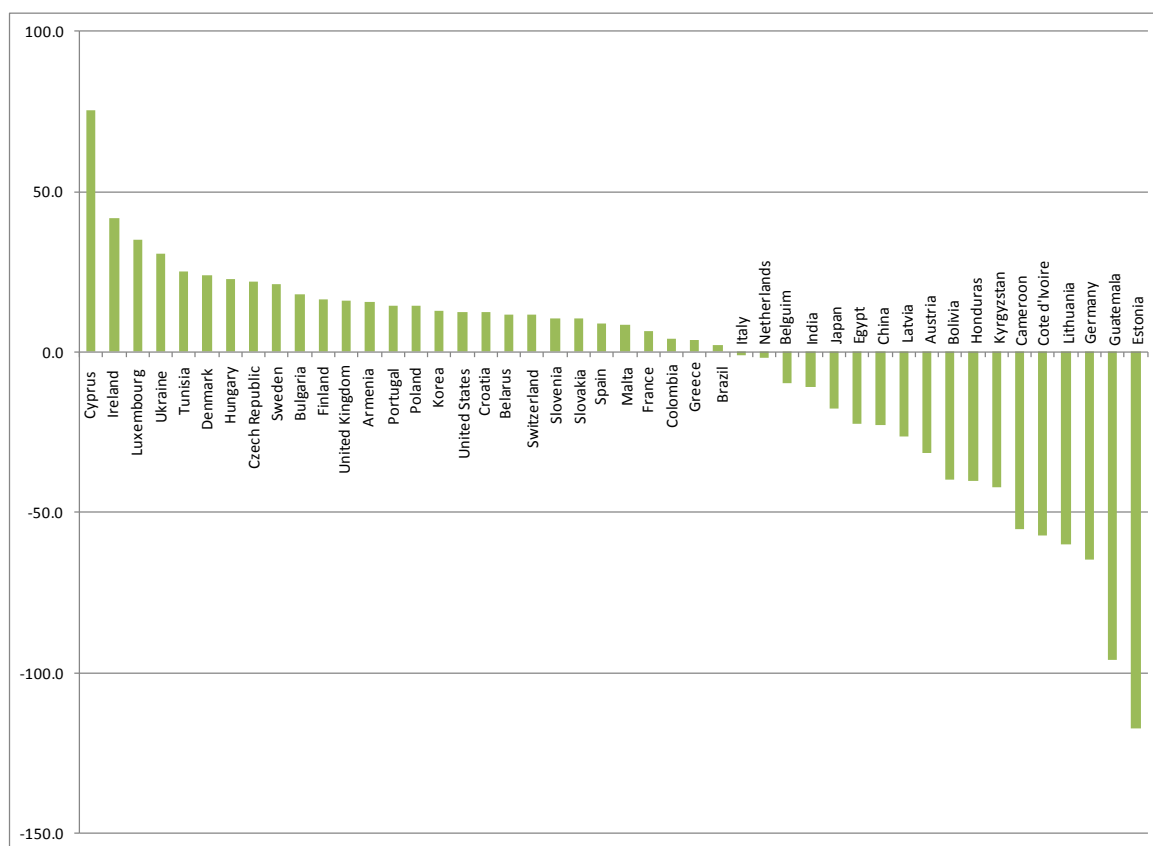
⁴⁰ Some care is needed with this and other examples, however, which compare the present value of a stream of foregone revenue with an annual revenue flow.

⁴¹ As for example Action Aid (2010); on which see also Schatan (2012).

⁴² Listed in Appendix IV.

(though not only) among lower income economies. And these losses are in many cases substantial: more than 50 percent of current CIT revenue in several cases. The (unweighted) average revenue loss across all countries in the sample is about 5 percent of current CIT revenue—but almost 13 percent in the non-OECD countries. While these calculations rest on heroic assumptions, and there is considerable scope to refine the methodology, for the reasons above, the results for particular countries cannot be interpreted as estimates of aggregate losses from profit shifting. The results are, nonetheless, suggestive of broad patterns, and broadly consistent with the direct econometric analysis of base spillovers above.

Figure 2. GOS-based Estimated Apparent Spillover Effects
(in percent of CIT revenue)



Source: Staff calculations as reported in Appendix IV.

Note: A positive number indicates a revenue gain from apparent spillovers. These figures are not measures of the gain or loss from profit shifting, as discussed in the text.

25. The impact of profit shifting on tax revenues is not zero sum—while some countries gain, the aggregate effect is a loss. Profit shifting is not zero sum from governments' collective perspective: the firm's aim being to reduce its total tax bill, aggregate revenue must fall if it is motivated solely by tax considerations. The GOS-based calculations in Appendix IV imply, for instance—and subject to all the caveats of the preceding bullet point—a collective loss of around 2 percent of CIT revenue (relative to a benchmark system of source taxation, and assuming

~~unchanged tax rates). The aggregate revenue loss for non-OECD countries is relatively large, at around 12 percent of current CIT revenue.~~

Strategic Spillovers

26.—25. There is increasingly strong evidence of strategic interactions in tax setting...

The dramatic worldwide decline in statutory CIT rates over the last three decades is well-known: most significant in Europe and Central Asia, somewhat less in Sub-Saharan Africa and Latin America—and perhaps now leveling off (Figure 2). The recent spread of IP boxes, noted earlier, is also highly suggestive of strong strategic spillovers, which one would indeed expect to be most marked for the most mobile elements of tax base. And the econometric evidence increasingly confirms that, as policymakers' rhetoric often suggests, this reflects deliberate competition. For OECD countries, Devereux and others (2008) find that a one percentage point decrease in the statutory CIT rates of others generates, on average, a cut of 0.7 percentage points in response. For developing countries too, there is evidence that their setting of incentives responds to the incentives available in neighboring countries; and that a race to the bottom has become evident among special regimes—most notably in Africa where tax burdens under these regimes have fallen to almost zero.⁴³

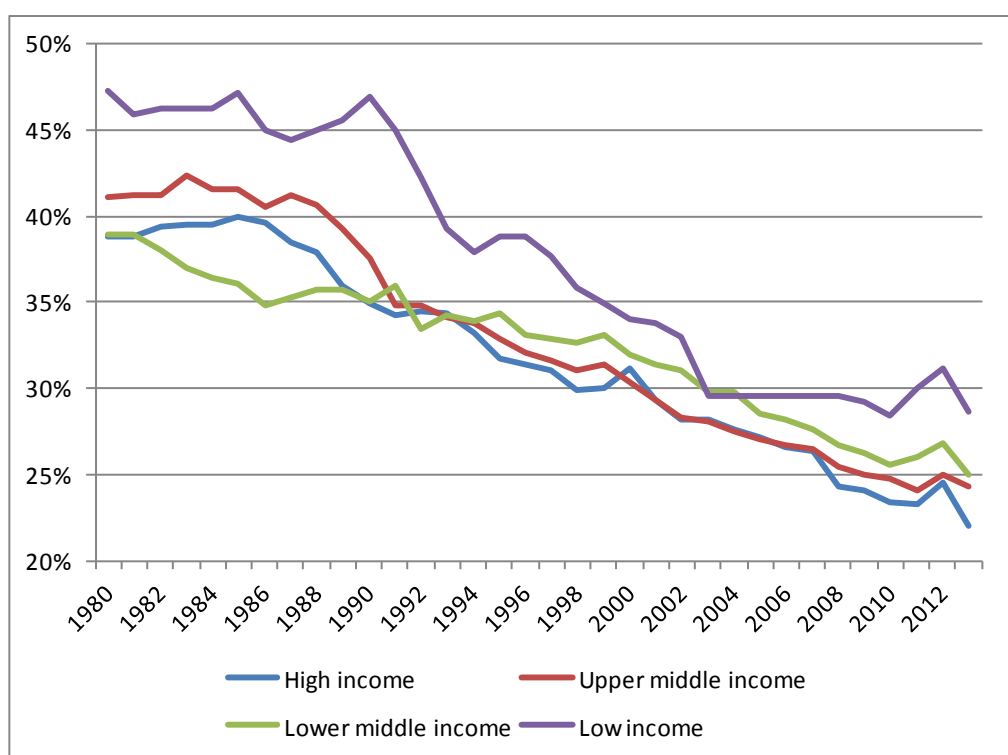
27.—26. ...including for the panel data used here. Appendix III finds a significant strategic tax response of statutory CIT rates (using either GDP or 'haven' weights') of around unity. Results on strategic responses in terms of *effective* corporate tax rates, which take account not only of statutory tax rates but also depreciation allowances and other considerations that will matter for real but not for paper transactions, tend on the other hand to find insignificant strategic effects.⁴⁴ This greater sensitivity to statutory than to effective tax rates thus suggests—tentatively, as for most conclusions in this area—that tax competition is driven at least as much by profit-shifting concerns, including in relation to 'havens', as by the desire to attract real investments.

28.—27. Strategic responses diminish the direct revenue effect of base spillovers, but do not eliminate it. The results above imply, for instance, that, holding its own tax rate constant, a one percentage point reduction in statutory rates in all other countries—again, a relatively small cut in terms of historical experience—reduces the typical country's CIT base by (in the long run) about 6.5 percent (Table 4). But they also imply that the country will not hold its rate constant, but rather cut it by, on average, 0.5 points. This increases its CIT base by 4 percent, leaving a net base loss of 2.5 percent. And the proportional revenue loss will be larger than the proportional base reduction, of course, since the rate cut reduces revenue across the entire base.⁴⁵

⁴³ Klemm and van Parys (2012) and Abbas and Klemm (2013).

⁴⁴ Leibrecht and Hochgatterer (2012).

⁴⁵ With possible further revenue loss, not explored here, to the extent of any indirect strategic consequence of a reduction in the top personal income tax rate.

Figure 2. Corporate Income Tax Rates, 1980–2013

Source: IMF staff estimates.

Note: Figure shows medians with countries ranked by income per capita each year and divided into four equal sized groups.

Table 4. Simulated Impact on a Country's CIT Base of a Change in Foreign CIT Rates

	simple average	GDP-weighted
1. All countries $j \neq i$ reduce own CIT rate by 1 percentage point		
Spillover Effect on country i's tax base (in percent)	-6.5	-12.8
2. Estimated reaction of country i's own CIT rate	-0.5	-1.0
Own-tax rate Effect on country i's tax base (in percent)	4.0	7.0
Net effect on country i's tax base	-2.5	-5.8

Source: Staff calculations using estimates reported in Appendix III.

B. Welfare Implications

29.—28. If there are no other distortions, spillovers are presumptively sources of collective inefficiency—with the revenue impact itself, however, saying little about their scale.

A fundamental difficulty in assessing the potential inefficiencies which, as noted above, spillovers can create, is that the proximate revenue losses (whether collective or national) are not directly informative of the associated welfare loss. If all tax rates were competed to zero, for instance, there would be no profit-shifting or revenue loss actually observed, but there would be a collective loss from inefficiently low taxation nonetheless. At best, measured revenue losses provide a lower bound indication of the inefficiencies involved.

30.—29. The effects are potentially very different in different countries. Theory suggests,⁴⁶ for example, that small countries can be winners in tax competition games—because they have relatively little to lose from reducing taxation of their small domestic bases, but much to gain from attracting large bases from abroad.

31.—30. Interactions with other distortions may be important. Two are prominent:

- Some see tax competition as welcome in *counteracting a political bias* towards excessive public expenditure.⁴⁷ Such arguments have become less prominent, however, with the needs for fiscal consolidation now felt in many countries; and perhaps too with recognition that fiscal rules may better address such concerns.
- Spillovers may also *ease distortions from the corporate tax itself*, by, for instance, reducing marginal effective tax rates on investment. More subtly, to the extent that avoidance opportunities are more easily exploited by—perhaps even targeted by policymakers to—firms whose assets or activities are more mobile internationally, this can result in a more efficient tax system (consistent with standard tax policy prescriptions) by taxing more elastic tax bases at lower rates. In this respect, low tax and conduit countries can improve the efficiency with which capital is allocated.⁴⁸

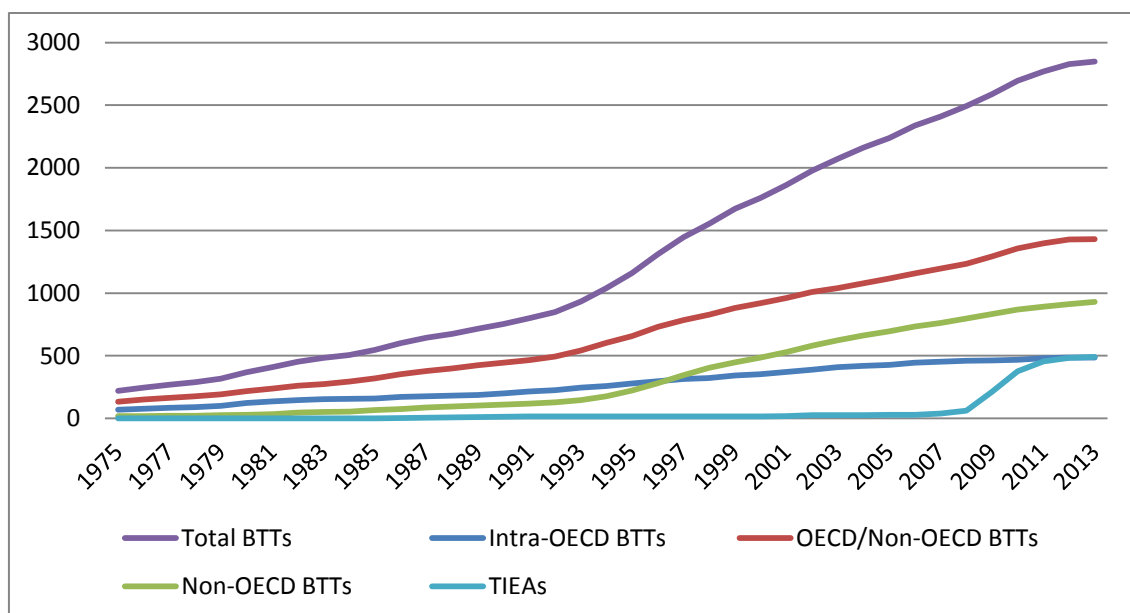
These considerations generate heated dispute, but remain essentially uninformed by empirical knowledge.

32.—31. Tax planning through intra-group borrowing amplifies (unconsolidated) leverage, but may pose few financial stability risks. Such borrowing affects the apparent

⁴⁶ This and other aspects of the theory of tax competition referred to in this paper are reviewed in Keen and Konrad (2013).

⁴⁷ The classic argument is Brennan and Buchanan (1980).

⁴⁸ As is argued, for instance, by Hong and Smart (2010). Desai, Foley and Hines (2006) also discuss potential social benefits from ‘haven’ operations.

Figure 3. Numbers of BTTs and TIEAs, 1975–2013

Source: International Bureau of Fiscal Documentation database.

treaty negotiation—which is heavy on the time of skilled staff.⁵⁴ (The EOI aspects of BTTs, however, run in the other direction: they may increase source country revenue at unchanged behavior and, by the same token, could presumably discourage inward investment).

38.—37. The empirical evidence on the investment effects of treaties is mixed....(Appendix V). Identifying causality is inherently problematic, since treaties may precede investment not because they spur the latter but because they may be concluded only when there is an expectation of such investment. (This can be a deliberate feature of treaty policy, as it traditionally has been in the U.S.). Studies using macro-level data indeed find a wide range of effects, though perhaps with some signs that a positive effect on FDI is most likely for middle-income countries. Work using firm-level data finds a significant impact on firms' entry into a particular country, though not on the level of their investment once they are present.

39.—38. ...while the potential revenue loss, especially to developing countries—including through 'treaty shopping'—has caused increasing concern. With a treaty in place, the MNE's incentive is to extract income in forms that attract a low or zero WHT rate, which may be ones—management fees, for instance, or royalties—that the host authorities find particularly difficult to value. The opportunities for this are amplified by the possibility of *treaty shopping*: constructing advantageous routing by linking bilateral tax treaties, typically through low tax conduit

⁵⁴ Multilateral treaties can reduce these (Thuronyi; 2001) and several regional treaties have been negotiated (as, for instance, in the Arab Maghreb Union (1990) and WAEMU).

countries.⁵⁵ (Box 3). In effect, a treaty with one country can become a treaty with the rest of the world, and the network externalities noted earlier arise. Examples of base erosion arising from treaty structures have frequently arisen in IMF TA, as with the 2004 Mongolia-Netherlands treaty (IMF, 2012b). And the effects can be very sizable. One estimate, for instance, is that treaties with the Netherlands led to foregone revenue for developing countries of at least EUR 770 million in 2011;⁵⁶ similar, very rough, calculations suggest that U.S. tax treaties cost their non-OECD country counterparts perhaps \$1.6 billion in 2010.⁵⁷ Treaties are rarely cancelled, particularly by developing countries, so it is indicative of the level of current concerns—and the wider pressures on the international tax system—that both Mongolia and Argentina have done so since 2011.

40.—39. ‘Limitation of benefit’ (LOB) provisions can provide important protection...

These stipulate that reduced withholding rates and other treaty provisions apply only to companies that meet specific tests of having some genuine presence in the treaty country (such as a minimum share of ownership by its residents or a minimum level of income from conducting an active trade or business there). LOB provisions have not, however, been the norm in treaties other than those of the U.S.⁵⁸ There are, though, welcome signs that anti-abuse provisions are spreading: India and Japan have been moving in this direction; a recent OECD discussion document⁵⁹ recommends inclusion of LOB provisions; and the Netherlands has taken the very positive step of indicating an intention to approach all developing countries with which it has (or is negotiating) a tax treaty with a view to strengthening anti-abuse provisions. LOB provisions are, however, often complex and are not self-executing: where capacity is weak and access to information limited, verifying that the pre-requisites for treaty benefits are met can be difficult.

41.—40. ...but, more fundamentally, considerable caution is needed in entering into any

BTT. A critical decision for any primarily capital-importing country is whether it can achieve more by signing a treaty than it can simply through its own domestic law.⁶⁰ The reciprocal benefits that a treaty could provide to such a country may actually be of relatively little value, except perhaps for the EOI aspects—but those can in principle be achieved through a TIEA or by signing the Convention on Mutual Administrative Assistance. And key provisions regarding, for instance, WHT rates and the PE definition, can be provided in domestic law. Treaties are, moreover, inherently discriminatory as between partners and others. The main or even only advantage that a BTT can offer may then be one of signaling, acting as a strong commitment device for the tax assurances given to foreign

⁵⁵ And/or jurisdictions that offer low WHT rates even without a treaty.

⁵⁶ McGauran (2013). These estimates do not include revenue foregone on royalties.

⁵⁷ Taking into account dividends and interest only.

⁵⁸ Treaties sometimes include anti-abuse provisions in the form of more general ‘beneficial ownership’ rules—though these normally apply only to withholding provisions and not to entire treaties, and are subject to much more interpretation by the source country.

⁵⁹ OECD (2014a, 2014b).

⁶⁰ Easson (2000) remains the classic treatment.

treaties can protect and clarify the source country's rights, but in practice, many existing treaties do not make clear provision on the issue (or define source rights narrowly).⁶⁴

44.—43. Implementation, however, can be problematic—especially for developing countries. Challenges arise in both discovering the transactions and collecting the tax due. It can be difficult for a tax administration to know about offshore transactions. Possible mechanisms to address this include requiring that relevant authorities be notified of any indirect disposal and the sharing of tax information between countries. And once a gain is identified, it can be difficult to collect the tax from a non-resident: some countries address this by requiring a resident to be liable and/or imposing non-tax penalties (such as withdrawal of a mining license) for non-payment. Appendix VI elaborates on the rules and procedures that can be used to bring indirect transfers into tax.

C. Interest Deductibility

45.—44. Debt shifting through intra-group loans—a common method of profit-shifting—is a significant concern in many developing countries. With interest deductible under the CIT, and low or no withholding taxes, an obvious way to shift profits out of high tax jurisdictions is by lending to them through low tax ones. In itself, this problem is much the same for all countries,⁶⁵ but its importance for developing countries bears emphasis: examples from IMF TA abound.

46.—45. Restrictions on interest deductibility, which can be relatively straightforward, have considerable potential for addressing avoidance through debt shifting.⁶⁶ It is reasonable to ask why, in principle, any deduction at all should be given for interest paid to related parties. Certainly, many countries have started to take measures to address the issue. The rules used take different forms: some are based on debt/equity ratios, others on net interest payments; some apply only to intracompany debt, others apply to all debt.⁶⁷ Restrictions are generally limited to larger companies, and banks are often specially treated. Recently, several countries have adopted comprehensive *earnings stripping* rules that restrict deductions for interest payments exceeding some specified proportion of a company's income. These measures are relatively easy to apply, and can be especially attractive for developing countries in protecting their tax base from base erosion. Many countries, however, continue to be made vulnerable by the absence of such provisions.

⁶⁴ Burns and others (forthcoming 2014) provide a comprehensive treatment of the complex issues in this area; Krever (2010) discusses the range of approaches used and the reasons countries have adopted them.

⁶⁵ And are the subject of the G20-OECD BEPS Action Plan item 4.

⁶⁶ Blouin and others (2014).

⁶⁷ This is an important distinction: restrictions that apply to all debt address (imperfectly) the wider and conceptually distinct problem of 'debt bias' that arises from the deduction of interest but not of return to equity (IMF (2009) and de Mooij (2012)).

D. Arm's Length Pricing

47.—46. The Arm's Length Principle (ALP)—valuing intra-firm transactions at the prices that unrelated parties would reach⁶⁸—is at the heart of current international tax arrangements...⁶⁹ The underlying rationale is that use of ALP to allocate income across members of a corporate group, and hence countries, preserves neutrality between MNEs and independent

operations **while also** defining the tax base on which countries can exercise their primary taxing rights. Following conventional CIT practice, the ALP is self-assessed; taxpayers have to document that their internal *transfer prices* correspond to arm's length prices, and tax authorities can challenge this. Close comparability with independent transactions between unrelated parties is crucial for establishing that prices satisfy the ALP. Verifying this requires reviewing the functions performed, assets used and the risks genuinely assumed by the entities within an MNE—all of which depends very heavily on the facts and circumstances of each case.

48.—47. ...but is seen by many as having become too complex and permissive, allowing in practice a massive concentration of corporate profits in a few low tax jurisdictions. The empirical evidence on profit shifting through transfer pricing, discussed in the previous section, reaches no consensus on precise magnitudes, but few doubt that the sums at stake in applying the ALP are very considerable. Reflecting this, the ALP has come under increasing pressure—and criticism—both conceptually and in application.

49.—48. Some conceptual criticisms of the ALP are misplaced. The most common theoretical criticism is that, following the classic discussion in Coase (1937), MNEs exist precisely as a more efficient alternative to market transactions, so that market prices cannot provide an appropriate benchmark. But Coase's is a theory of the size of the firm, a key implication of his argument being that MNEs expand up to the point at which they are no more efficient than the market—in which case market prices are, at the margin, just as relevant for them as for independent parties. In this view, Coase's argument does not undercut the ALP but, to the contrary, rationalizes it. There may be cases, however, in which MNEs undertake, for non-tax reasons, operations that are very hard to conceive of unrelated parties entering into. They may, for instance, exist to overcome 'hold up' problems. MNEs may also enter transactions for which there is no unique price at which one would expect unrelated parties to arrive. Guidelines for applying the ALP implicitly recognize this, by including a methodology—the 'residual profit split method' (RPS)—that attributes the total profit associated with a transaction among transacting entities according to their respective contributions to the value created—often in a way that is quite formulaic.⁷⁰

⁶⁸ See, more precisely, Article 9 of the current OECD tax model convention. The principle is explained and developed for operational purposes in the OECD Transfer Pricing Guidelines. The UN Committee of Tax Experts recently drafted a complementary transfer pricing manual focused on its application in developing countries.

⁶⁹ The ALP was formally adopted with the multilateral tax treaty drafted by the League of Nations in 1928.

⁷⁰ RPS differs from the formulaic apportionment and related systems discussed in the next section: it attributes the residual profit on specific transactions—consistent with standard interpretations of the ALP—not (as do the methods below) on a group-level basis.

50.—49. But significant issues of principle arise because intra-group transactions may occur only because of MNEs' ability to exploit cross-border tax differentials. Prominent examples include:

- The **transfer of intangible assets** within a corporate group at an early stage in their development (to low tax jurisdictions, where the subsequent return will then accrue) can raise severe valuation problems given the inherent absence of comparables—and is evidently subject to significant issues of asymmetric information.⁷¹
- **Risk transfer** among affiliates—~~standard practice in MNEs, including for many operations in developing countries—is achieved contractually by judicious allocation of functions, especially managerial or entrepreneurial. Risks are stripped from one (highly taxed) entity and assigned to another (low taxed) affiliate, converting the former into a routine operation with correspondingly low profit margins. Overall, however, the risk faced by the MNE as a whole remains unaltered.~~ has become standard practice in MNEs, including for many operations in developing countries. It is achieved by contractual arrangements that, in effect, provide implicitly some (potentially quite complex) degree of insurance between affiliates. -Risks can, for instance, be stripped from one (highly taxed) entity and assigned to another (low taxed) affiliate by converting the former into a routine operation with correspondingly low profit margins. The allocation of risk within a group may of course be driven by commercial considerations, and it's not in itself problematic. The question for transfer pricing purposes is how to value the transactions by which such risk transfers are achieved. -A fundamental issue here is that, -since a pure reallocation of risk within the group cannot affect the risk borne by the group as a whole—to the extent, at least, that it is hard for all other group members to step away from the failure of any affiliate——there is inherently no comparable price between unrelated parties on which to draw; and the bundling of such risk transfers with changes in function whose substance can be hard to judge adds further difficulty. Companies may be able to secure reduction in taxation by exploiting these difficulties of pricing.

The current methodological framework is inadequate for fending off such schemes because it asks what independent parties would do in such a situation—but with no comparables to use, as none could exist. The ALP under such circumstances allows re-characterizing transactions so as to ignore for tax purposes those deemed artificial, but this potentially introduces discretion, uncertainty and complexity.⁷²

51.—50. The practical difficulties in applying the ALP are substantial—as is widely recognized. The burden on companies of justifying, and on the authorities of verifying, that transfer

⁷¹ This issue though is unlikely to be significant for most low income countries, where relatively little R&D is undertaken.

⁷² In this respect the ALP is akin to a General Anti-Avoidance Rule (GAAR), which would apply to the generality of transactions. Indeed a GAAR can be helpful in addressing international tax issues more broadly—but with the same weaknesses.

prices used correspond to ALP is widely recognized to be substantial. And they will increase: as businesses become more knowledge-intensive and technology driven, ~~and~~ management becomes more geographically diffuse, and intra-group operations become easier to transfer and more difficult to price. This does not mean that other arrangements would be any simpler—but is cause for legitimate concern.

52.—51. Developing countries face particular challenges—with capacity building important... The inherent complexities of applying the ALP are especially challenging where administrative capacity is weak. Strengthening it—including by improving access to information needed⁷³—will be key to progress.

53.—52. ...but not all that is needed. The ALP is very sensitive to the facts and circumstances in which controlled transactions take place, and many situations that are more significant to or common in developing countries receive relatively little attention in existing transfer pricing guidance. For example, a large proportion of non-natural resource based multinational businesses located in developing countries are organized as low risk, routine, light manufacturing or commercial ventures, rewarded with accordingly low profit rates. It is common, under the application of transfer pricing methods, to assign these operations a fixed rate of return for tax purposes, under which productivity gains rarely translate themselves into higher local profit margins. A risk in introducing such simplified schemes, despite their attractions for administration, is that they thus may not respond to changing commercial circumstance, and can perpetuate inappropriately low fixed profit rates in developing countries.

54.—53. A specific agenda for developing countries is needed to protect and expand their corporate tax bases in the face of challenges in applying the ALP. This means, first, having appropriate transfer pricing rules in place—including, not least, for domestic transactions as well as cross border.⁷⁴ Incentives, such as tax holidays, can create significant profit shifting opportunities even among domestic companies. It also means making the best use of the existing tools based on the ALP: much tax planning by MNEs in developing countries appears to be perceived by at least some observers seems, to many observers, to not just to stretch ~~the~~ ALP concepts, but ~~to~~ flout them.⁷⁵ Countering this aggressiveness would be greatly facilitated by developing concrete guidance where it is lacking and repudiating perverse interpretations of the ALP (commonplace and often tacitly accepted), such as condoning risk stripping and other arrangements that provide no documented productivity gain for the MNE. Carefully designed safe harbors that apply a fixed mark

⁷³ Public availability of information is critical, as taxpayers can only apply the ALP with publicly accessible data. Documentation requirements (discussed in OECD (2014a, 2014b) relate to compliance procedures which do not directly address this.

⁷⁴ India, for example, has specifically included domestic transactions of various sorts within its transfer pricing rules.

⁷⁵ See for instance Schatan (2012).

- ‘Formula apportionment,’ which has attracted much attention, would limit conventional transfer pricing problems, but would create new difficulties around the factors used to apportion profits across jurisdictions, and would not necessarily shift tax base towards developing countries.
- Hybrid schemes that combine straightforward ALP methods and a formulaic allocation of profits not easily allocated by these means merit closer study, as do more radical proposals for destination –based corporate taxes.
- The obstacles to effective and inclusive action on adverse international tax spillovers are both political and conceptual, and are substantial.

A. Changing the Architecture

58.—57. The nature and extent of spillovers depend on features of international tax arrangements beyond those addressed in current initiatives. Eliminating avoidance would not eliminate spillovers. These arise from the incentives that tax rules imply for both business decisions and tax setting by governments, with the form of those incentives depending on the wider international tax architecture. These incentives ~~will have been seen above~~, for instance, to be very different under worldwide and territorial taxation—a distinction that current initiatives do not address. Differing arrangements might mitigate (or worsen) the adverse spillovers that now arise, and recognition of this has led to significant interest, among CSOs and academics, in deeper reforms of that architecture.

59.—58. This section reviews proposals that have been made for alternative international tax arrangements. These differ substantially in how far they diverge from current practice.⁷⁸ While a significant change in direction may well be impractical for the immediate future, considering the direction in which the international tax architecture could usefully evolve is important for informing choices made now.

60.—59. There are few accepted principles to guide the design of collectively efficient international tax structures. In other areas of tax policy, there are generally accepted guidelines (albeit qualified) for efficient design: there is widespread agreement, for instance, on the desirability of moving away from tariffs, or towards carbon pricing. The literature has not, however, produced guiding principles for international taxation sufficiently compelling to leave a strong mark on the policy debate (Appendix VII). Proposed alternatives to the present international tax framework are commonly framed as responding to perceived difficulties and/or furthering implicit judgments on

⁷⁸ They likely differ too in the incentives for unilateral adoption. This though has been little studied, and the focus here—consistent with the emphasis on spillovers—is on collective efficiency.

the fairness of the allocation of tax base⁷⁹ rather than being grounded in well-articulated efficiency and cross-country equity goals.

Minimum Domestic Taxation

61.—60. _____ One possible approach to bolstering the CIT base in developing countries is through some form of *minimum tax (MT)*. An MT aims to protect revenue by charging tax on something—commonly turnover, book earnings or assets—that is less subject to manipulation than is taxable income, with overall tax payment then being the larger of liability under MT and under the standard CIT. Corporate MTs are already found in over 30 countries. Schemes differ quite widely, and can lead to considerable complexity and significant distortion: a charge on net assets, for instance, can reinforce debt bias, while one on gross assets may introduce distortions between firms with differing capital structures. Nonetheless, MTs have proved both useful and practicable in protecting domestic tax bases, and might also be addressed to combating aggressive international tax planning in relation to inward investment. They could, for example, address in a simplified, aggregate way the need for increased limitations on deductibility of certain cross border payments flowing from developing countries, that is seen by many observers.

⁷⁹ The rhetoric of the debate often refers to ideas such as those of taxing ‘where value is created’, or ensuring a ‘fair share’ for lower income countries—leaving unclear exactly what that means.

Strengthening Elements of Worldwide Taxation

62.—61. Recent years have seen a trend along the spectrum away from worldwide and towards territorial systems. Seventeen OECD countries have moved significantly towards territoriality since the 1990s, and territorial countries now export about twice as much capital as do countries that tax on a worldwide basis.⁸⁰ The U.S. is now the only large OECD country applying a worldwide system, although many large emerging markets, including the BRICs, do so. Nominally territorial regimes differ widely, however: the hallmark is exemption of dividends from abroad, but some also exempt capital gains arising abroad and there are differences too in the strength of CFC provisions.

63.—62. This trend reflects a variety of concerns, from the perspective of capital exporters, in applying worldwide taxation.⁸¹ These include:

- A perception that firms resident in such countries are at a **competitive disadvantage abroad**—this in line with notions of *capital import neutrality* as an efficiency criterion (Appendix VII), but at odds with the view that home country taxes in countries applying worldwide taxation are substantially avoided by deferral.
- A **revenue risk from inversion**—essentially, moving the tax residence of a company to another country. Legislation can discourage this,⁸² though views differ on how effectively.
- Recognition that **foreign tax credit arrangements can create opportunities for base erosion**⁸³—though territoriality creates its own different opportunities for profit shifting.
- The **apparent disincentive for earnings repatriation** created by deferral (Box 2). There is no doubt that U.S. companies, for instance, retain significant amounts abroad: on one estimate, \$1.4 trillion.⁸⁴ But this may not be an inherent consequence of deferral. So long as repatriation must occur at some point in order for shareholders to attach any value to the underlying income, taxes on repatriation must be faced either now or later; and so, if the tax rate is expected to remain unchanged, they should not influence current repatriation decisions.⁸⁵ On

⁸⁰ Reflecting in part the importance of conduit countries, which are generally territorial.

⁸¹ The debate on possible movement to territoriality in the U.S. remains very active, most recently with the proposals of Senator Camp (<http://waysandmeans.house.gov/taxreform/>). See also Altshuler and Grubert (2010), IMF (2013c) and Mullins (2006).

⁸² Non-discrimination rules, however, preclude EU member states from preventing inversion into others.

⁸³ Grubert (2001) argues that, behavioral effects aside, the ability to claim foreign tax credits in respect of royalty and service income under worldwide taxation may offset the revenue gained from taxing dividends.

⁸⁴ Kleinbard (2011).

⁸⁵ This argument, due to Hartman (1985), is analogous to the ‘new view’ that dividend taxes do not affect payout decisions: equity within the company is ‘trapped,’ in that dividend taxes cannot be entirely escaped (since they must be paid either now or later). What may be affected, however, is the incentive to inject new equity into subsidiaries abroad, since these are not already inside the repatriation ‘trap.’

this view, the accumulation of funds abroad is fundamentally a reflection of the expectation of future holidays on repatriations. Studies have found significant effects of repatriation holidays (in the U.S.) and of shifts toward territoriality (in the U.K. and Japan) on dividend repatriations;⁸⁶ but this—at least in the holiday instance—is likely due at least partly to the explicitly temporary nature of the policy changes. Nor is it entirely clear why delayed repatriation should be a significant policy concern; undistributed foreign earnings are generally available to the home economy, at least with sufficient tax planning, and indeed are often invested in home-country financial assets.⁸⁷

- Considerable **practical complexities** can arise from, for instance, the operation of foreign tax credits: perhaps 40 percent of the compliance costs of U.S. MNEs relate to international aspects⁸⁸—though whether these costs would be lower under territoriality is unclear.

64.—63. Territoriality can, however, amplify profit shifting and intensify tax competition—a particular concern for developing countries. Shifting profits to, or investing in, low tax countries becomes more attractive if the income generated there becomes less heavily taxed in the parent's residence country. And there is significant evidence of such effects in practice. For instance, foreign acquisitions by U.K. and Japanese corporations increased following these countries' 2009 shift to exempting foreign business profits;⁸⁹ and U.K. outward FDI became more sensitive to source country CIT rates.⁹⁰ By the same token, this increased sensitivity to effective tax rates in source countries can lead to more intense competition to attract investment: tax holidays and other tax breaks become more attractive to investors if the tax saved in source countries is no longer offset by increased taxation in their residence country. The point is especially important for developing countries, with CIT bases often substantially weakened already by incentives. But it can reverberate on others too: one explanation that has been given for why large capital exporting countries have, historically, implemented worldwide taxation is precisely their expectation that doing so will bolster the tax rates imposed by others, and hence protect their own tax bases.⁹¹

65.—64. Spillovers would likely be less under worldwide taxation without deferral—or, as a close substitute, territoriality with tough CFC rules. Such a structure would not eliminate spillovers: a higher tax rate abroad, for instance, will reduce revenue in the residence country. But it would likely dampen strategic spillovers, mitigating pressures to cut tax rates simply to protect tax bases.

⁸⁶ Hasegawa and Kiyota (2013), Egger and others (2012), and Dharmapala, Foley and Forbes (2011).

⁸⁷ U.S. Senate Permanent Subcommittee on Investigations (2011).

⁸⁸ Blumenthal and Slemrod (1995). These results are dated, though it is notable that even then the average cost for Fortune 500 companies was around USD 1 million.

⁸⁹ Feld and others (2013).

⁹⁰ Matheson and others (2013).

⁹¹ Gordon (1992).

66.—65. Such a system does, however, put increased pressures on notions of residence, since that is what would ultimately define liability. This can be a source of difficulty, both practically given the possibility of inversion and conceptually in that the formal tax residence of a multinational is increasingly removed from the arguably more fundamental realities of its complex, inter-related and global activities and ownership.

Formula Apportionment

67.—66. The use of ‘formula apportionment’ (FA) to allocate tax base across jurisdictions is long-established at subnational level,⁹² and proposed for the EU by the European Commission as a ‘Common Consolidated Corporate Tax Base’ (CCCTB).⁹³ FA establishes a multijurisdictional enterprise’s tax base on a ‘unitary’ basis—that is, consolidated across the entire corporate group⁹⁴—and allocates this total across jurisdictions, which then apply their own rate of tax on a formulaic basis, according to varying combinations of the shares of sales, assets, payroll and/or employees located in each.

68.—67. The current debate has intensified interest in FA as a way to ease difficulties with the ALP and perceived misallocations of tax base...The primary appeal of FA is in dispensing with the need to value intra-group transactions, so eliminating direct opportunities to shift profits through transfer pricing and other devices. And by then allocating the base using proxies to substantial activities, it holds the prospect of aligning tax payments more closely with economic fundamentals. That this approach, rather than one based on ALP, is so common at subnational level—indeed there seems to be no subnational CIT that does not use some form of FA—suggests that it has at least some merit in taxing firms operating across highly integrated economies.

69.—68. ...and, in the view of some, as especially attractive for developing countries,⁹⁵ because their capacity limitations leave them especially vulnerable to profit shifting.

70.—69. Significant issues arise, however, in relation to the weights used in the formula:

- The ***cross-country allocation of revenue⁹⁶ is highly sensitive to the choice of apportionment factors...***This emerges clearly from early work on the CCCTB, which also showed that the effects could be very large for some countries: up to 50 percent of current CIT revenue. Data limitations

⁹² In various forms, FA is used at subnational level in Canada, Germany, Japan, Switzerland and the United States.

⁹³ European Commission (2011).

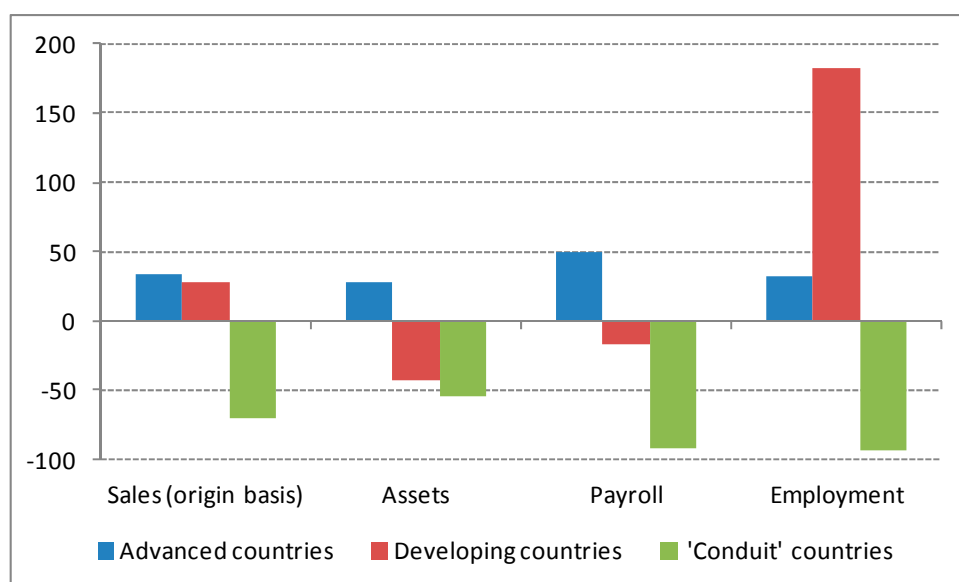
⁹⁴ Though perhaps only up to a ‘water’s edge’, in the sense of excluding activities outside participating jurisdictions.

⁹⁵ See several papers produced by the International Centre for Tax and Development (www.ictd.ac), including notably Durst (2013).

⁹⁶ A separate set of questions (arising from consolidation across group members, not FA itself) concerns the impact on aggregate revenue; unitary taxation in itself tends to reduce this, since consolidation allows greater offset of losses in one part of a corporate group against profits in others (Devereux and Loretz, 2008).

prevent similar calculations for developing countries, but rough estimates can be made of the impact for some countries of reallocating the taxable income of U.S. multinationals using the factors commonly discussed: sales, assets, payroll, and employees (Figure 4).⁹⁷ These are no more than illustrative, but point to large and systematic effects. Advanced economies generally gain tax base whichever factor is used, while substantial tax base moves out of conduit countries; emerging and developing economies clearly gain base only if heavy weight is placed on employment.

Figure 4. Reallocation of Taxable Income U.S. MNEs, Using Alternative Factors
(percentage change)



Source: See Appendix VIII. This figure shows the weighted averages for three country groups, using current taxable income as weights.

- **...with precise definitions critical.** It matters a great deal, for instance, whether sales are measured on a destination basis (that is, by residence of the purchaser) or an origin basis (residence of the seller), and whether they include or—more in the spirit of the unitary approach, but further from accounting practice—exclude sales to other members of the corporate group. For reasons of data availability, Figure 4 uses sales by origin and includes intra-group sales. This is likely to be the notion of sales most favorable to lower income countries (where sales for final consumption and to third parties are likely to be relatively modest), so that the gain shown for them for allocation by 'sales' in Figure 4 is likely to be a generous upper bound on what would arise under other sales concepts (which, indeed, might plausibly be quite negative). Note too that if sales are defined to exclude those to other members of the group, then where the first sale out of a country is within a corporate group, none of the sales—whether on a destination or

⁹⁷ Data and methods are described in Appendix VIII, which also provides the country-specific results.

identifying and securing agreement on appropriate measures of coordination is likely to be highly problematic.

77.—76. Countries' interests diverge widely, most obviously between low and high tax countries, but in other respects too. Countries that are primarily capital exporting, for instance, are likely to be more sensitive to the interests of the residence country, while resource-rich countries may attach more importance to source rights. This diversity of interest need not preclude identifying mutually advantageous forms of coordination. Minimum effective tax rates, for instance, can prove beneficial even for low tax countries initially below the minimum, since an enforced increase in their own tax rates may lead to an induced increase in tax rates elsewhere from which they can benefit. But diversity clearly does make securing agreement on coordination measures harder.

78.—77. ...and there is no institutional framework comparable to that regulating international trade. BTTs provide an important structure, but touch only a subset of corporate tax design issues. While some have argued for a 'World Tax Organization' to serve as a tax analogue to the World Trade Organization, prospects are very remote—in part reflecting the absence of guiding principles with the force of arguments for free trade.¹⁰⁵ In sharp contrast to the trade context, moreover, in tax matters smaller countries can have a major impact, making widespread participation in any agreement especially important. The OECD has come to play a powerful and constructive role in the area, drawing on the technical expertise of its member countries and beyond, and has taken an inclusive approach to its current BEPS project. Drawing too on the long-standing expertise of the UN on treaty and transfer pricing issues in particular, and on the wide membership and experience of other international organizations, as well as on regional organizations, current initiatives may ultimately lead to a more coherent framework for managing international tax relations.

79.—78. In designing specific measures, the notion of 'harmful tax practices' remains ill defined. Attempts have been made to identify particular sources of tax spillover as being distinctively 'harmful.' These have largely focused on preferential regimes as potentially harmful, as for instance in the European Union's Code of Conduct for Business Taxation. Even this, however, is problematic: aggressive competition for very mobile parts of the tax base may be preferable to less intense competition over a wider base. The literature points to various margins of behavior on which this issue turns, but in practical terms the issue is unresolved.¹⁰⁶

¹⁰⁵ The WTO export subsidy rules, however, have likely had a powerful and positive effect in discouraging CIT incentives for export promotion.

¹⁰⁶ Empirically, some handle on the issues can be gained by asking whether countries that offer preferential regimes, presumably intended to attract the most mobile forms of tax base, tend also to have higher general rates of CIT, presumably applying to less mobile tax base. There is some very tentative evidence that they do; for the same data set as used in the spillover analysis above, 'havens' tend to have higher CIT rates, conditional on their size (GDP or population) and other features, than do non-havens.

80.—79. Partial coordination can be problematic:

- Coordination among only a **subset of countries**, perhaps on a regional basis may be relatively practicable (though experiences in Europe, West Africa¹⁰⁷ and elsewhere show that it can be far from easy). There is, however, some risk that ~~But~~ such coordination can make participating countries more vulnerable to pressures from lower tax jurisdictions elsewhere.¹⁰⁸ This does not mean that participants are harmed by coordination, and the IMF continues to support such regional efforts—but points to the potential benefit from negotiating with leading non-participants, as the EU has in several cases done.
- Coordinating only on a **subset of instruments** can worsen distortions by putting more pressure on those not coordinated.¹⁰⁹ Making treaty abuse more difficult, for instance, might in itself simply lead to more aggressive use of transfer pricing or intra-group borrowing as profit shifting devices. This makes it important for instance, to view the elements of the BEPS Action Plan as a package; and, more generally, to avoid a piecemeal approach to identifying and addressing spillovers in international taxation.

ISSUES FOR DISCUSSION

1. Do Directors agree that spillovers from international corporate taxation can impact macroeconomic performance?
2. Do Directors agree that these spillovers are especially large for developing countries?
3. Do Directors see merit in alternative approaches discussed in the paper, ranging from the wider use of minimum taxes to more fundamental reforms, including to protect the corporate tax bases of developing countries?
4. Do Directors see scope for regional and international tax cooperation to address international spillovers?

¹⁰⁷ Mansour and Rota Graziosi (2012).

¹⁰⁸ See Konrad and Schelderup (1999); de Mooij and Vrijburg (2010) show, however, that this is sensitive to the form of strategic interaction between countries. Simulations in Sørensen (2004) and Parry (2003) suggest that participants' gains from regional coordination can be modest.

¹⁰⁹ Keen (2001).

Appendix I. Consultations

Consultation process

In preparing this paper, staff held: several discussions with civil society organizations, including in both small groups and in an open, large panel discussion at the 2014 IMF-World Bank Spring Meetings; a conference call with international business, including six major corporations, organized through the Confederation of British Industry (CBI); and meetings with academic economists and lawyers expert in the area.

Staff also participated actively in two consultations held with developing countries by the OECD Center for Tax Policy and Administration in connection with the G20-OECD BEPS project (a regional event in Colombia and a global meeting in Paris). Staff have also been providing input into the OECD's Tax and Development working group report to the G20 development working group on these consultations and related issues.

Many submissions were also received in response to an online invitation for views, posted on the IMF's external website.

Key issues raised

Civil society expressed the views that....

- **International inequities** exist in the corporate tax take, particularly with respect to developing countries who suffer capacity constraints. The misalignment of taxation and value creation is a major flaw in the current architecture. Several highlighted the impact of 'non-inclusive' international processes with the development of international standards in fora composed only of developed country/G20 members.
- **Tax treaties**, with significant risk to developing countries from treaty shopping and the lowering/abolition of withholding taxes. The benefits of treaties in terms of investment are doubtful; and treaties systematically favor developed countries over developing countries.
- **Tax havens**, as vehicles for profit shifting are responsible for significant revenue losses in developed and developing countries. The latter could undertake more action, requiring more transparency and disregarding transactions if there is no economic substance involved.
- **The ALP** might have reached its limits due to practical problems and conceptual flaws. A fundamental review of allocation rules is needed to better align profit to economic activity. Simplified approaches (such as fixed margins, profit split methods and cost caps) may be useful for developing countries.
- **Tax competition** is generally seen as harmful, and especially problematic in developing countries, where tax competition is often in the form of tax incentives, such as tax holidays,

which have doubtful benefits for these countries. Such tax competition raises coordination issues that go beyond simple tax avoidance.

... and proposed steps in the following directions:

- **Systematic analysis of spillovers** to help identify the need for and the appropriate type of policy action, and to ensure coherence in policy responses.
- **Limitation of interest deductions** in broader more effective ways.
- **Better data**, to understand the quantitative importance of spillovers.
- **Further research** in areas such as (i) unitary taxation with formula apportionment (which some saw as a logical response to globalization, with smaller risk of spillovers and a fairer distribution of tax revenue); (ii) a multilateral treaty approach; (iii) global harmonization of accounting standards. Some comments went beyond calling for more research, to urge action in these directions.
- **Greater transparency** to better identify profit shifting risk and take proper actions. Many called for (publicly disclosed) country-by-country reporting by MNEs; others emphasized automatic exchange of information between tax authorities—although limitations on potential use and capacity constraints are important in this regard, especially for developing countries.

Business made the points that:

- **There is risk of conflict over tax take**, with new rules potentially allowing for extensive interpretation by individual tax authorities that could end up in a battle between (advanced) countries in claiming part of the tax base. It could lead to double taxation, increased tax uncertainty and rising litigation.
- **Country-by-country reporting** could significantly raise the compliance burden for MNEs.
- **Unitary taxation** with formula apportionment has little merit in an international context, as agreement on the formula will be virtually impossible.
- **Residual profit split** runs the risk of increased uncertainty, as two governments negotiate about the tax take.
- **Tax incentives** are not a major factor in the location choice of businesses; and discretionary incentives can also deter investment by creating uncertainty.
- **Digital economy** transactions should be subject to common rules and laws based on the same principles as applied elsewhere, not subject to special treatment.

The place of taxation for VAT is typically defined as the ‘place of supply.’ With regard to non-physical—digital, virtual, or electronic—products that are purchased from sellers abroad, such as movie downloads, the place of supply may be less obvious than for goods but must be defined. New EU rules that are to come into effect on January 1, 2015, explicitly treat the place of supply for all purchased electronic services as being in the country where the customer is located—logical where the basis for taxation is ‘destination,’ the place where the consumer consumes.¹¹⁴ Again, this is relatively straightforward conceptually, and the issue is one of administration and enforcement.¹¹⁵ Unlike the issues in regard to CIT, the core issue is practical, not conceptual.

Direct Taxation Issues

The issues posed by ‘digitization’ for direct taxation are much thornier conceptually, as well as posing practical issues—and have now risen to the fore in the international debate. Fundamentally, the questions relate to the issue of locating the ‘source’ of corporate profits.

There are various problems. First is the location of ‘intangible’ factors of production. Many modern products within the ‘digital’ economy tend to rely more heavily than those of a century ago on **such** intellectual property as important contributors to their value. One aspect of tax planning revolves around strategically ‘locating’ these assets in low tax jurisdictions, and assigning as much value to them as possible in the production process, through the payment of high service fees, royalties, and the like from the actual place where production is occurring to the place where the asset is deemed to ‘be.’¹¹⁶

A second problem arises because ‘sales’ alone do not in the standard architecture give rise to a basis for corporate income taxation in a jurisdiction. The problem is now sometimes re-framed as needing to determine where an enterprise has ‘economic presence,’ but not a physical or traditional tax presence—using the rationale that in some businesses, there is (relatively) little in the way of physical assets anywhere that are contributing to the formation of value and profits. Advances in technology more generally facilitate the carrying on of economic activity with little or no need for employees to be present.¹¹⁷ There is a strong sense, for example, that providers of search engines or online movies are ‘doing business’ or somehow ‘present’ in a country where large numbers of

packages that could be imported, in an effort to protect domestic retailers; and Argentina’s recent restrictions on on-line shopping on foreign internet sites (an attempt to protect foreign currency reserves)—though these were reportedly not directly motivated by VAT concerns.

¹¹⁴ Although in many non-OECD/EU countries, this issue will not yet have been explicitly addressed.

¹¹⁵ This is easier for business to business sales, where both parties are registered VAT taxpayers, than for business to final consumer sales.

¹¹⁶ This can be an example of ‘abusive transfer pricing’—over-valuing the contributions that such ‘intangibles’ make to the final value of the product in question.

¹¹⁷ This is sometimes called ‘scale without mass.’ See, for detailed discussion of the digitization of business and related tax problems, OECD (2014d).

people are using their products, even if there are no hardware or employees there—but the existing tax system does not capture this sense.¹¹⁸ In essence, the question becomes whether the traditional ~~approach to identifying architecture for~~ the source of profits should be altered, to move further toward, in these instances, the location of the customer base. This is partly due to the difficulty in determining the ‘real location’ of production activity where that activity is much less reliant upon bricks, mortar, and large numbers of production workers. If it were to be agreed that in such a case the country in question ‘should’ be able to capture a portion of the company’s tax base, the question then arises, what rules would need to be changed to permit this?¹¹⁹ An approach under discussion, for example, is the notion ~~—relying upon~~ the existing tax architecture but extending it—of creating a ‘virtual permanent establishment’ in the country where consumers of digital services are located, or, less radically, to lower the threshold regarding what sorts of activities (such as preliminary or preparatory actions) will give rise to a PE.¹²⁰ In any event, there is now wide agreement that rules should apply to all enterprises, irrespective of their degree of digitalization. To the extent this results in sales themselves creating a presence that could trigger a CIT liability, the change in the current international tax architecture would be profound.¹²¹

¹¹⁸ Early attempts to deal with this question tended to rely on the location of hardware—asking where the servers were. But this is itself already an anachronism.

¹¹⁹ A further question, not addressed here, would then be whether such rules can be enforced.

¹²⁰ OECD (2014d).

¹²¹ A special case that has received much attention is that in which consumers do not pay for the product, but their participation is in some way what gives the enterprise its value. The question arises whether, for example, French ‘clickers’ (internet searchers using a search engine, without paying for the privilege), by providing information on themselves, give rise to some of the value inherent in the enterprise—and if so, how to measure that. If the answer is deemed to be yes, should some of the corporate tax base ~~should~~ therefore be allocated to France (the ‘source’ country), and if so, how? VAT issues also arise: arguably, the VAT corresponding to the value of the service provided by the search engine provider could properly be deemed offset by the VAT that should be payable on the provision by ‘clickers’ of valuable information about themselves.

Appendix III. Estimating Spillovers from International Corporate Taxation

This appendix elaborates on the empirical analysis of spillovers reported in the text.

Empirical Strategy

Base spillovers are explored by estimating equations of the form

$$B_{it} = \delta B_{it-1} + \beta \tau_{it} + \gamma W_{-i} \tau_{-it} + \zeta' X_{it} + \alpha_i + \mu_t + \varepsilon_{it} \quad , \quad (1)$$

where B_i denotes the CIT base in country $i = 1, \dots, N$ at time $t = 1, \dots, L$, τ_{it} is the domestic CIT rate in percent, and $W_{-i} \tau_{-i}$ indicates some weighted average $\sum_{j \neq i}^N \omega_j \tau_{jt}$ of the statutory tax rates in countries $j \neq i$ (with $\sum_{k=1}^N \omega_k = 1$), X_{it} is a vector of controls, and country and time-specific effects are also included. The lagged dependent variable allows for sluggish response in the tax base to changes in tax rates.

The coefficient β in (1) represents the short run marginal impact of a country's own CIT rate on its CIT base, with the long run impact given by $\theta(\beta) \equiv \beta/(1 - \delta)$; both are expected to be negative. The focus here, however, is on base spillover effects from tax rates set by others. This is captured by the coefficient γ for the short run, and by

$$\theta(\gamma) \equiv \frac{\gamma}{1 - \delta} \quad (2)$$

for the long run, with both expected to be positive: higher tax rates abroad would be expected to increase the tax base at home. As discussed in the text, such effects can operate by two channels: through tax effects on real investment decisions, and on profit shifting. These imply different structures for the appropriate weighting matrix in (1), which in turn provides a crude but potentially instructive way to assess the importance of each channel.

To see this, suppose first that only real decisions can respond to tax considerations. With capital mobile across borders, after-tax rates of return will be equalized in equilibrium, since otherwise investors will have an incentive to reallocate assets to wherever the after-tax return is higher. This implies that the before-tax rate of return will be higher in countries with higher tax rates, which, assuming decreasing returns to capital, means a lower capital stock than would otherwise be the case. Standard models then imply that how much capital will flow between countries in response to a change in the foreign tax rate—the magnitude of the spillover term in (1)—will depend on such factors as their relative population sizes and quality of their technologies.¹²² Intuitively, real investment in a large advanced economy is likely to be much more sensitive to the tax policies of other advanced economies than to those of small or poor low-income countries. As a simple way of

¹²² This follows, for instance, from equation (3) of Keen and Konrad (2013).

capturing these considerations, we explore using as weights ω_i in (1) each country's share of global GDP.

Spillovers through profit shifting are different. The benefit of shifting a dollar of taxable profit between countries is simply the tax saving from doing so, measured by the absolute difference in their statutory tax rates: the tax base of an advanced economy could indeed then be strongly affected by the rate set by a small, low-tax jurisdiction. More formally, theory suggests that base effects are driven by statutory tax rates in other countries weighted not by size or income but by the ease with which profits can be shifted in or out of them (reflecting other aspects of tax rules or the degree of their enforcement). To explore this possibility, we consider two other possible weighting schemes in (1): an unweighted average of statutory rates in all other countries, and a weighted average only ~~across~~ those jurisdictions included in a commonly-used list of 'tax havens.'

To explore strategic spillovers—the response of country i 's tax rate to the tax rates set by other countries—we estimate (following Devereux and others, 2008):

$$\tau_{it} = bW_{-i}\tau_{-it} + \zeta'X_{it} + a_i + c_t + \epsilon_{it} . \quad (3)$$

The same reasoning as above points to the use of the same three sets of weights: by GDP, unweighted over all countries, and unweighted across only 'havens.'

This empirical strategy has significant limitations, largely reflecting the availability of data. Cross-border real investment decisions, for instance, are likely to be driven not by the statutory rate of CIT alone but by an average effective tax rate (AETR) that also reflects depreciation and other allowances¹²³—data on which, however, are not available for as long a period or, more particularly, for the developing countries that, for present purposes, it is important to include in the exercise. There is some comfort, however, in the strong correlation between AETRs and statutory rates, and the use of instruments below should help address the implied problem of measurement error. A further difficulty is that the attractions of tax 'havens' do not solely, or even mainly, derive from low statutory CIT rates, but from special regimes and arrangements on which data are again unavailable.¹²⁴ The identification of haven effects thus depends on a plausible but untested correlation between movements in their rates and special regimes. The results, for ~~these~~ reasons, can be no more than indicative.

¹²³ Devereux and Griffith (1998).

¹²⁴ Their average CIT rate is around 17 percent, compared to 28 percent for the full sample. A low rate, however, is common among smaller countries. Using our sample to regress the CIT rate on country size (which in itself enters with a significant positive coefficient—as models of tax competition would predict) and tax haven status (and using other control variables of our analysis here), we find that tax-havens have, on average, a higher CIT rate than otherwise similar countries (with a coefficient of 1.2 and highly significant). Hence, tax havens indeed seem to rely on other incentives to attract tax bases than a low CIT rate.

Data

The sample is an unbalanced panel comprising 173 countries for the period 1980–2013. The data are taken from the IMF’s Fiscal Affairs Department tax and revenue database. The country coverage of CIT rates is full, though unbalanced in the time dimension. To approximate the CIT base in percent of GDP, we divide the ratio of CIT revenue to GDP by the standard CIT rate; this is referred to as the ‘implicit’ corporate tax base. Unavailability of CIT revenue means, however, that this can be done for only 121 countries. The total number of observations on CIT rates (relevant for estimating strategic spillover effects) is 3,037, while for the CIT base (for base spillovers) it is 2,161. Resource-rich countries, whose CIT base will likely have distinct drivers and reflect a variety of design choices (including the use of state owned enterprises, whose profits are akin to CIT revenue, and of distinct rent-based taxes) are excluded. The countries in the sample (and those classified as ‘havens’), classified by income group, are listed in Appendix Table 4; full descriptive statistics are in Appendix Table 5.

As controls, we include in both estimating equations (1) and (3) variables that have been commonly used in modeling tax revenues and rates:¹²⁵ the log of GDP per capita, the share of agriculture in value-added, trade openness (the sum of non resource exports plus imports, expressed relative to GDP), inflation, and oil rents. Estimation is by system-GMM (Blundell and Bond, 1998) to address endogeneity of both the lagged dependent variable and possibly τ_{-it} .¹²⁶

Estimation Results

Appendix Table 1 reports the results of estimating equation (1), using in turn the three different weighting matrices discussed above: column (1) uses GDP-weighted rates; column (2) the simple average; and column (3) the simple average over tax havens. The diagnostics are satisfactory, with the Arellano and Bond (1991) test for first- and second-order serial correlation (M1 and M2) suggesting that, consistent with the underlying assumptions, the former is present and the latter is not; the Hansen statistics suggest that instrument proliferation is not a major concern.¹²⁷

The impact of country i ’s CIT rate on its own CIT base is significant and large. The short-run marginal coefficient of 0.17 in column (1), for instance, means that a 1 percentage-point increase in a country’s CIT rate will reduce its CIT base by 0.17 percent of GDP; and the long run effect $\theta(\beta)$ suggests an ultimate reduction of around 0.56 percent of GDP. The own-effects for the other weighting schemes, in columns (2) and (3), are smaller but remain statistically significant.

¹²⁵ For a review of the literature see, for example, Benedek and others (2014) and Crivelli and Gupta (2014).

¹²⁶ Fixed effects estimates for equation (1) are similar; a Hausman test favors fixed- over random-effects. Excluding time effects does not alter the qualitative results.

¹²⁷ The same is true of all results, except for uncomfortably high Hansens in Appendix Table 2.

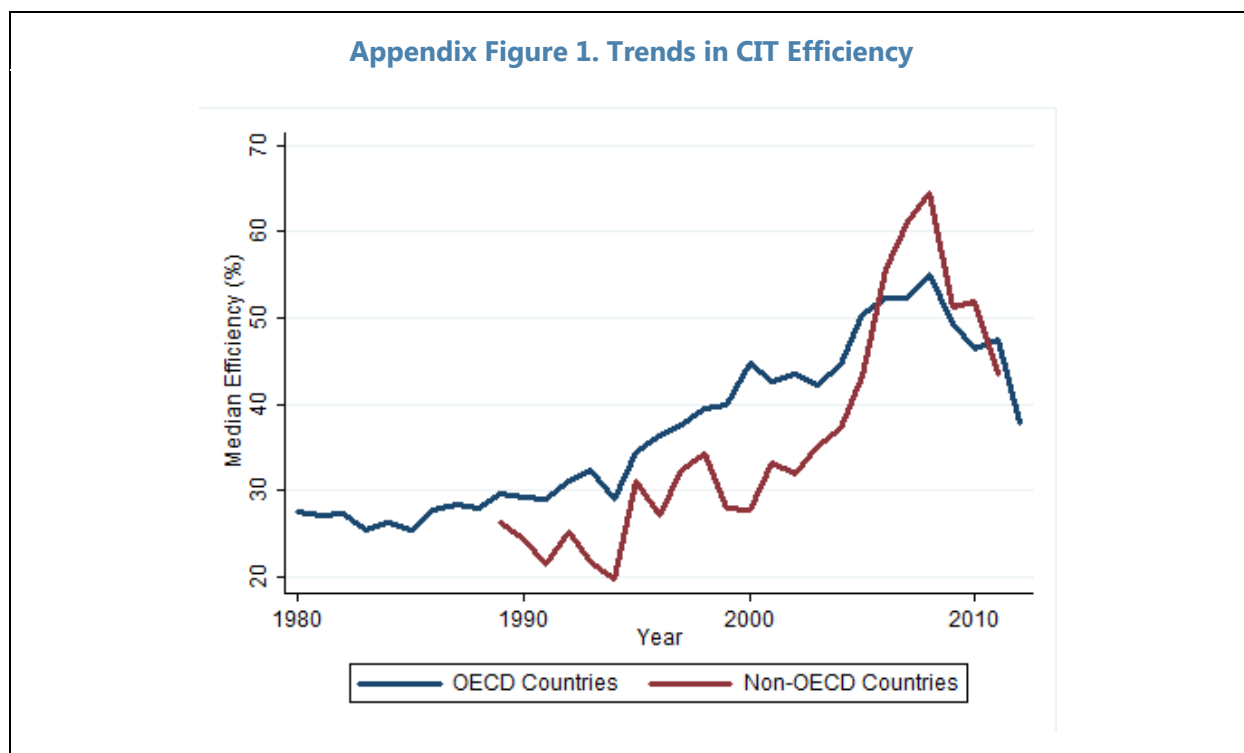
The main interest here, however, is with the spillover effects, γ and $\theta(\gamma)$. Column (1) shows a large and significant positive coefficient for the weighted average foreign tax rate, interpreted here as relating to spillovers through real capital flows: a one percentage-point reduction in the GDP-weighted world average CIT rate (excluding its own rate) reduces the typical country's CIT base in the short run by 0.3 percent of GDP. This effect becomes much smaller and less significant in column (2) where foreign tax rates are not weighted by size. In column (3), however, where only statutory rates in 'havens' are included, the spillover is again 0.3, as when using the GDP-weights—and more strongly significant. The long-run spillover of the tax base is between 0.56 and 1.12 percent of GDP, with the higher figure again corresponding to both GDP- and haven-weighted rates, and more significant for the latter. These are potentially quite large effects, as viewed for instance as a share of total tax revenue. What is striking too is that both real and profit-shifting effects seem to be significant, and with a distinct haven effect emerging despite the imperfections, as noted above, with which the distinctive features of havens are captured in the data.

Appendix Table 2 explores whether spillovers vary systematically across countries at different income levels, reporting separate estimates of equation (1), using the haven weights, for: OECD countries (column (1)), non-OECD countries (column (2)), and low and middle-income countries¹²⁸—(column (3)). The coefficient for the OECD sample is much smaller, and less significant, than that in Appendix Table 1: the long-run marginal impact, for instance, is now 0.27 rather than 1.1. Moreover, the estimated spillovers are substantially larger for the non-OECD and lower income groups (especially the latter) than for OECD countries.

The last column of Appendix Table 2 explores possible changes in spillover effects over time (again for the haven-weighted case) by interacting with the spillover term a dummy variable that takes the value zero for 1980-1995 and unity for 1996-2013. The results suggest that while the own-rate effect has not increased over time, spillovers have. Indeed, spillovers from havens are significant only in the latter period.

Results on strategic spillovers—countries' responses to the tax rates set elsewhere—are in Appendix Table 3. These point to strategic complementarity in tax-setting: that is, countries respond to tax rate reductions elsewhere by cutting their own tax rate. A one point CIT rate reduction in all other countries, for instance, induces a 0.5 point rate cut, with a slightly larger response to rates in 'haven' countries. The coefficient of the GDP-weighted average is both larger and more significant, however, indicating that larger countries' tax policies have a stronger effect in driving policies elsewhere.

¹²⁸ Using the World Bank definition.



base.¹³⁷ Thus profit shifting would be expected to induce a negative correlation between E_i and τ_i .¹³⁸ To explore this, we regress E_i as the dependent variable on τ_i , controlling for time¹³⁹ and country fixed effects.¹⁴⁰

The results, presented in Appendix Table 6, point to strongly significant effects. Column (1) suggests an intercept at 85.1 percent and a slope coefficient on the tax rate of -1.2 : this implies that a country with a CIT rate of 10 percent would have, on average, CIT-efficiency E_i of 73 percent. Column (2) suggests that the relationship is convex: predicted efficiency E_i is now 104 percent in a country with a CIT rate of 10 percent. The last two columns imply that tax rates have a much larger impact on CIT efficiency in the 26 non-OECD countries, with a coefficient more than three times as large as for the 25 OECD countries. Overall, the results point to a strong negative relationship between E_i and τ_i ,

¹³⁷ To the extent that MNEs manipulate transfer prices that overstate or understate the economic value of transactions, this will lead to changes in both tax bases and GOS (and thus GDP); see for example UN (2011). The numbers presented here would on this account underestimate the degree of profit shifting.

¹³⁸ A negative correlation between E_i and τ_i may also reflect a positive correlation between CIT rates and tax incentives (see also footnote 121): as the evidence noted above suggests may be the case, countries might, for instance, use either use low tax rates or generous tax incentives to attract tax bases, or in response to lobbying pressures, but not both.

¹³⁹ This, of course, will control for common but not idiosyncratic macro shocks.

¹⁴⁰ This, it should be stressed, is quite different from the analysis of 'own rate' effects in Appendix III: there, the dependent variable is a proxy to the base itself; here it is the ratio of the actual base to a reference base.

Appendix Table 6. Fixed Effects Regressions of CIT Efficiency on CIT Rate/1

	linear	non-linear	OECD linear	Non-OECD linear
Constant	85.1 (8.3)	153.1 (3.3)	60.7 (6.9)	136.6 (3.9)
CIT rate	-1.2 (-9.4)	-5.5 (-6.8)	-0.7 (-7.4)	-2.4 (-7.4)
CIT rate squared		0.06 (5.9)		
Adj R2	0.73	0.77	0.69	0.80
No. observations	840	840	558	282

/1 t-values in parentheses, based on heteroskedasticity-robust standard errors. All regressions include time and country fixed effects.

suggestive of strong profit shifting, and—as with the analysis of spillover effects in Appendix III—again suggesting the effect to be particularly marked for developing countries.

Revenue implications

Profit shifting from high to low-tax countries reduces revenue in the former and increases it in the latter—but with an overall revenue loss, since the shifting occurs precisely to reduce total tax paid.

The data on GOS can be used to ~~assess the possible scale of this collective revenue loss—and to~~ give a sense of where, and how large, are the underlying gains and losses. These calculations suffer from a number of limitations, stressed later.

Computing for each country the product of its CIT rate and its GOS, multiplied by the average CIT efficiency, \bar{E} —as a crude but practical way of allowing for base erosion (or expansion) from sources other than profit shifting—gives a rough proxy for the CIT revenue it would receive in the absence of income shifting—or, somewhat more precisely, if CIT were effectively levied on a source basis. Revenue without profit shifting (R_i^*) is thus approximated by

$$R_i^* = \tau_i G_i \bar{E} \quad (2)$$

where \bar{E} is calculated as a weighted average of countries' CIT-efficiencies, $\bar{E} = \sum \omega_i E_i$, the weighting

being by GOS: $\omega_i = \frac{G_i}{\sum G_s}$. If—a somewhat heroic assumption—profit shifting is the only source of

cross-country variation in CIT-efficiency, the difference between the simulated and the actual CIT revenue for each country ~~could~~ then be interpreted as a rough measure of the revenue gain (or loss, if negative) from profit shifting:

$$\Delta_i = R_i - R_i^* = \tau_i G_i (E_i - \bar{E}). \quad (3)$$

which is positive if a country's CIT-efficiency exceeds the weighted average, and negative otherwise. This can be written as:

$$\Delta_i = \tau_i \left(\frac{(R_i/\tau_i)}{\sum (R_s/G_s)} - \left(\frac{G_i}{\sum G_s} \right) \right) \left(\sum_k \left(\frac{R_k}{\tau_k} \right) \right), \quad (4)$$

so that Δ_i is positive if and only if country i 's share of the world's implicit CIT base exceeds its share of the world's GOS. Using (4), one would expect aggregate revenue to decline as a result of profit shifting so long as higher tax countries tend to have a larger excess of their share in the sample's aggregate GOS over that in the sample's aggregate implicit tax base—which is as the regressions in Appendix Table 6 tend to suggest.

~~For In doing~~ the calculations, we use data between 2001 and 2012 to reflect only the more recent period.¹⁴¹ Appendix Figure 2 shows the average CIT efficiency per country during this period, ranked from low to high. The GOS-weighted average is 43 percent. Revenue in the absence of apparent profit shifting, R_i^* , and the associated revenue effect, Δ_i , are computed as in (2) and (3), respectively. ~~This gives the results described in the text. Figure 2 in the text shows the revenue impacts (the Δ_i) for individual countries. The (unweighted) average revenue loss from apparent profit shifting is 4.6 percent of current CIT revenue. For OECD countries, there is an (unweighted) average gain of 2.4 percent, while for non-OECD countries there is a loss of 12.9 percent.~~

~~The aggregate revenue loss from apparent profit shifting is computed as the sum of all revenue changes: $\sum_i \Delta_i$. Relative to current CIT revenue, the aggregate revenue loss is 1.8 percent. The aggregate revenue loss for the group of OECD countries is 0.2 percent of current CIT revenue; that for non-OECD countries is 11.7 percent.~~

Qualifications

These calculations are, of course, highly speculative as they rely on a number of assumptions. For instance, as is clear from (3), it attributes to profit shifting all cross-country variation in CIT-efficiency in the sample. 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 variations in CIT-efficiency may also reflect such unrelated features as differences in compliance and enforcement. Moreover, the approach can capture only profit shifting between countries in the sample—which in the present case excludes the

¹⁴¹ ~~The number for the U.S. is corrected to reflect that GOS data include 'S corporations,' which are not liable to pay CIT (but rather are subject to personal income tax). Bureau of Economic Analysis estimates are that profits from S corporations comprised 27 percent of total profits in the mid 2000s. We therefore reduce the relevant GOS for the U.S. by 27 percent, which increases CIT efficiency from 36 to 49 percent—close to the unweighted sample mean.~~

'haven' countries which the analysis in the preceding appendix suggests are an especially important source of spillovers.

To illustrate the importance of assumptions in the calculations above, let us expand the definition of the tax base by explicitly distinguishing three elements: (i) profit shifting within the group of countries in the sample, A_i ; (ii) profit shifting vis-à-vis countries not included in the sample (such as 'havens'), denoted by C_i ; (iii) exemptions, incentives or compliance gaps, denoted by H_i . Actual CIT revenue can then be written as:

$$R_i = \tau_i(G_i - A_i - C_i - H_i) \quad (5)$$

Since A_i is pure profit shifting, any reallocation within the group of countries in the sample is a zero sum game: $\sum_i A_i = 0$. Using this, we derive:

$$R_i^* = \tau_i \left(G_i - \frac{G_i}{\sum G_j} \sum (C_j - H_j) \right) \quad (6)$$

so that:

$$\Delta_i = \underbrace{-\tau_i A_i - \tau_i C_i}_{\text{True loss}} + \tau_i G_i \underbrace{\left(\frac{\sum H_j}{\sum G_j} - \frac{H_i}{G_i} + \frac{\sum C_j}{\sum G_j} \right)}_{\text{Misstatement of loss}} \quad (7)$$

Expression (7) shows that Δ_i represents the true revenue effect of profit shifting for country i loss from profit shifting only if the last term on the right-hand side between brackets is zero. This is the case if (i) base effects due to exemptions, incentives and compliance gaps are proportional to the GOS share for all countries, (ii) there is no profit shifting from the sample countries to the rest of the world. Conversely, Δ_i overunderestimates the gain loss from profit shifting (or underestimates the loss) if a country has more fewer exemptions or compliance problems relative to its GOS compared to the sample average, or if the group of countries in the sample together lose profits to third countries.

~~While the calculations in Figure 2 are thus highly speculative, evidence in this area is so sparse that this avenue seems worth exploring. Overall, what is striking for instance is that the revenue implications for some countries can be quite marked; and that non-OECD countries, on average, lose more than OECD countries.~~

There is evidence that ‘tax sparing’ provisions of BTTs have encouraged FDI. Such provisions grant to MNEs that benefit from source country tax incentives a credit against tax credits equal to the residence country tax equal to the source country tax saved as a result of those incentives: they would have paid had they not received the incentives; this preserves the value to the investor of host country tax incentives, which would otherwise be negated when the parent country has a worldwide tax regime.¹⁴⁴ Both Hines (1998) and Azémar and Delios (2007) find that tax sparing has a positive impact on Japanese outward FDI flows. Similarly, Davies and others (2009), studying Swedish firm-level data, show that, controlling for the presence of a BTT, inclusion of a tax sparing agreement increases affiliate production, sales and exports (but not entry). With the trend towards territorial taxation, discussed in the text, tax sparing becomes less germane—but the evidence is instructive on what that trend might itself mean.

Studies of the impact of WHTs on FDI, which typically do not control for other treaty factors, again find mixed results. Egger and others (2006) find that the outbound FDI of OECD countries is negatively related to source country dividend withholding taxes, controlling separately for CIT rates and depreciation allowances. Similarly, Egger and others (2009) find, for the same dataset, that bilateral cross-border tax rates incorporating WHTs have a negative effect on FDI, controlling for home and host country CIT rates, which have a positive influence.¹⁴⁵ Conversely, a study by Barrios and others (2012) using data on European MNEs finds that, while the overall cross-border corporate tax regime influences MNE subsidiary location, dividend WHTs exert no independent influence when separated from home and host country CIT effects. Similarly, Huizinga and others (2008) find for the same database that, while the overall cross-border tax regime influences MNE financing in the expected manner—higher taxation of dividends relative to interest correlates with a greater share of debt finance—interest and dividend WHTs have no independent effect on financing when isolated from CIT effects.¹⁴⁶ By contrast, Arena and Roper (2010), examining marginal debt issuance decisions for MNEs based in 29 countries, find that a low ratio of interest to dividend WHTs results in a higher leverage ratio for foreign subsidiaries. The importance of WHTs thus remains unclear, presumably because they often merely shift revenue from source to residence countries without lowering the overall tax rate.

Trends in Withholding Tax Rates

Like CIT rates, both domestic law and treaty WHT rates have trended downward over the past decades (Appendix Table 7), suggesting that they have been subject to a similar process of tax competition. Since the early 1980s, tax treaty WHT rates on portfolio dividends, interest and

¹⁴⁴ The U.S. has never offered tax sparing.

¹⁴⁵ The authors attribute the positive coefficient on residence and source CIT rates to the burden they place on domestic competitors of MNEs in both countries.

¹⁴⁶ Also, the allocation of debt among parent and subsidiaries depends not just on residence vs. source taxes, but on the full profile of taxation across all entities within the MNE. However, the authors find that taxes do not exert much influence on MNE leverage overall.

royalties have on average fallen by about 30 percent, while the average rate on participating dividends has fallen almost 50 percent. Key drivers of this process among OECD countries have been

Appendix Table 7. The Evolution of WHT Rates

Time Period	Participating				
	Dividend	Dividend	Interest	Royalty	
Year	Average Domestic Law WHT Rates				No. Countries
2000	15.2	14.1	15.1	17.2	107
2013	13.1	10.7	14.0	15.7	179
Treaty Age	Average Treaty WHT Rates				No. Treaties
0-5 years	10.1	5.6	7.9	8	533
5-10 years	11.7	6.9	9.1	9.3	635
10-20 years	12.4	8.1	9.6	9.8	1554
20-30 years	14.2	11.2	10.8	11.5	529
>30 years	14.6	11.1	11.7	11.3	328

Source: International Bureau of Fiscal Documentation database, 2011.

EU directives¹⁴⁷ eliminating intra-EU taxes on parent-subsidiary dividends and reducing WHTs on interest and royalty payments to a maximum of 10 percent.

¹⁴⁷ 2003/123/EC and 2003/49/EC.

Appendix VIII. Formula Apportionment: Details Underlying Figure 4

The calculations begin with the net incomes of U.S. parents and Majority Owned Foreign Affiliates (MOFAs) by country of affiliate (Table 10.2), taken from Bureau of Economic Affairs data (Barefoot, 2012), Tables 8.2 and 10.2. These are adjusted by the average effective corporate income tax rate in the respective country—taken from Hassett and Mathur (2011), PWC (2011), Chen and Mintz (2011) and Markle and Shackelford (2012)—to obtain estimates of taxable income. The average effective tax rate for global taxable income is weighted according to countries' GDP. Country shares of U.S. MNEs' sales, assets, compensation of employees and number of employees are obtained from the same tables, adding totals for U.S. parents and ~~total~~ ~~of~~ MOFAs in all countries. Shares of each apportionment key are applied to global taxable income to derive changes in taxable income.

Appendix Table 8 shows the country-specific estimates underlying Figure 4. Broadly, a country gains from FA on the basis of some factor if its share in the global total of that factor exceeds its share in the net income of US MNEs. That Italy, for instance, gains under all factors reflects the very low share of US MNEs net income reported there: about 0.16 percent. Whether that reflects inherently low profitability or particularly aggressive outward profit shifting cannot be determined from these data.

Appendix Table 8 shows the country-specific estimates underlying Figure 4.

Appendix Table 8. Reallocation of Taxable Income from Alternative Factors, U.S. MNEs
Percent of change

	Sales	Assets	Compensation	Employment
<i>Advanced economies</i>				
US	35.4	24.3	58.9	39.3
Australia	-8.9	9.7	14.9	-3.7
Belgium	3.8	-27.4	-45.6	-59.7
Canada	4.4	-34.5	-25.5	-13.3
France	220.6	79.4	273.4	277.1
Germany	276.3	138.9	313.5	222.7
Italy	383.3	105.3	315.7	291.7
Japan	166.4	213.5	117.4	50.0
Korea	116.3	61.6	49.2	102.4
Spain	-19.3	-46.2	-27.1	-25.7
UK	-13.9	101.3	-21.3	-24.0
<i>GDP-weighted average</i>	33.8	28.4	49.4	32.6
<i>Emerging markets and developing countries</i>				
Brazil	28.6	-44.9	-4.3	84.8
Chile	-21.6	-40.3	-45.0	33.1
China	50.7	-43.5	-15.1	299.7
Colombia	27.6	-57.8	-16.5	81.1
Egypt	-34.2	-68.0	-77.4	-38.2
India	34.0	-26.2	76.3	601.6
Malaysia	5.6	-64.6	-62.2	34.7
Mexico	38.7	-26.8	-16.1	233.9
Peru	-37.6	-63.0	-66.5	-17.2
Philippines	19.4	-44.4	-21.2	358.2
South Africa	134.6	-13.5	75.3	162.2
Thailand	32.0	-63.2	-54.0	99.4
<i>GDP-weighted average</i>	28.1	-43	-17.5	182.3
<i>Conduits¹</i>				
Bermuda	-92.6	-52.4	-99.5	-99.7
Ireland	-60.8	-61.4	-92.3	-93.5
Luxemburg	-96.3	-47.9	-98.7	-99.1
Netherlands	-83.4	-57.9	-90.5	-92.1
Singapore	34.1	-38.8	-73.9	-70.2
Switzerland	-28.9	-53.9	-81.1	-89.5
<i>GDP-weighted average</i>	-71.0	-54.2	-91.9	-93.3

Source: Staff calculations based on Bureau of Economic Analysis.

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