Multilateral Tax Treaty Revision to Combat Tax Avoidance: On the Merits and Limits of BEPS's Multilateral Instrument

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Abstract

Since 2015 more than 140 countries have cooperated in the OECD's "Base Erosion and Profit Shifting" (BEPS) project to fight multinational tax avoidance. Several of the key actions, most importantly measures against tax-treaty shopping, require changes to double taxation treaties. The OECD designed a special instrument - the 'multilateral instrument' (MLI) - to allow for a swift implementation of BEPS-related tax treaty changes. In this paper, we show that MLI take-up is incomplete, we present (partly surprising) correlates of the take-up decision and develop a simple theoretical model to rationalize the observed take-up behavior. A key insight is that conduit countries, which are the beneficiaries of tax treaty shopping, can benefit from anti-treaty shopping laws as firms have incentives to scale-up real activity in conduit nations in order to be exempted from the new anti-treaty shopping rules. Empirical findings are consistent with these considerations: MLI adoption rates of conduit countries are high. Treaty shopping, to date, has dropped modestly at best. And firms indeed have scaled up their real economic activity in conduit nations. Overall, our findings reject that treaty shopping has been "killed" as envisaged by the OECD.

JEL classification: F21 · F23 · F53 · H25 · H26 · H32 · H87 · K34

Keywords: treaty shopping, BEPS agreement, policy evaluation

1   Introduction

In 2013, OECD/G20 countries set out on a joint quest to fight multinational profit shifting. In 2015, the participating nations agreed on the first internationally coordinated measures against base erosion and profit shifting (BEPS) - condensed in 15 action points. In the following years, countries worldwide joined the process through the OECD's inclusive framework (IF). Today, the IF member network counts 141 countries. The agreement has been celebrated as "historic" and as the "end of tax avoidance" by policymakers and the media. Yet, little is known on its fiscal and economic consequences. Did the adopted anti-tax avoidance measures significantly constrain tax avoidance behavior? A priori, it is not clear that they did. There are hurdles. Countries that signed the agreement, still need to enact the provisions into their national tax law. Their incentive to do so may not always be high and there may be benefits from delaying ratification - as will be spelled out in the paper. Moreover, for anti-profit shifting laws to constrain profit shifting behavior, the rules need to be effectively enforced and there must be no loopholes that allow firms to circumvent the provisions.

In this paper, we aim to shed light on the outcome of the BEPS process. The focus is on the consequences of the OECD's anti-BEPS provisions that require modification of the around 2500 bilateral tax treaties between IF member countries. Tax treaties play an important role for multinational firms' investment decisions. While their intention is to avoid double-taxation, they have increasingly been perceived to create opportunities for multinational tax avoidance and "double-non-taxation" of income. Most importantly, companies have been documented to engage in tax treaty shopping, that is in channelling payments through conduit nations with attractive tax treaty networks in order to save withholding tax payments on the payment stream. The OECD's anti-BEPS measures aim at closing the aforementioned loopholes and at preventing treaty-shopping by sharpening the definition of who is entitled to treaty benefits.[1]

To allow for a swift implementation of the treaty-related modifications, the OECD designed a special instrument - the 'multilateral instrument' (MLI), which is the first multilateral tax agreement in history and an integral part of the BEPS project. It allows IF member countries to take up the OECD's treaty-related anti-BEPS measures without cumbersome bilateral renegotiations of their tax treaty network. If both treaty partners sign the MLI and select a treaty to be covered under the MLI, tax treaties are automatically amended by the OECD's anti-treaty shopping provisions. Other treaty-related anti-BEPS items can be added optionally by treaty partners. The OECD put faith in the MLI and expected that its new anti-treaty shopping rules would "kill treaty shopping" (Financial Times, 2017).

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[1]Anti-treaty shopping laws deny the application of treaty-related benefits, in particular withholding tax reductions, when the sole purpose of an arrangement or firm structure is to reduce businesses' effective withholding tax burden.

In this paper, we assess whether these goals have been achieved. In a first step, we determine whether the BEPS process indeed led to comprehensive changes of international double tax treaty networks. Did IF member countries adopt the MLI and cover their tax treaties under the agreement? We use rich data on tax treaty networks and information on MLI adoption to document that take-up of the instrument is incomplete: One third of the BEPS countries have not joined the MLI and, conditional on joining, many have not covered all of their tax treaties under the instrument (nor have countries started bilateral renegotiations of double tax treaties to implement the changes they committed to when joining the IF). We also determine correlates of the take-up decision: Intuitively, we find that countries, which are more exposed to tax-treaty shopping are more likely to take up the MLI. But there are puzzles, too: Conduit countries, which are the beneficiaries of tax treaty shopping, have unanimously joined the MLI and covered most of their tax treaties under the instrument. Moreover, we find that MLI take-up *positively* correlates with countries' tax administrative capacity. This, again, is notable as the MLI-instrument was designed to avoid cumbersome renegotiations of double tax treaties. Relying on the MLI rather than bilateral treaty renegotiations should hence be particularly attractive for countries with relatively little tax administrative capacity.

We set up a theoretical model to rationalize the observed patterns in adoption behavior. The model highlights that conduit countries can benefit from MLI take-up and from implementing anti-treaty shopping rules. This relates to the design of the OECD's anti-treaty shopping provisions, which deny treaty benefits if firm arrangements are mainly set up for tax purposes. MNEs can thus circumvent the regulation by increasing their real activity in conduit nations. If conduit countries benefit from the additional real activity within their borders, they may find it attractive to opt in favor of MLI take-up. Moreover, we illustrate that countries with low tax enforcement capacity may find it attractive to delay MLI take-up as the opportunity costs of administering complex anti-treaty shopping (and other BEPS) measures in low-capacity environments tend to be high, which may render the net benefit to countries small or even negative. The data pattern is thus consistent with allegations of some observers who suggest that low-tax capacity countries joined the IF and the BEPS process for side benefits - e.g. hoping for more tax administrative support from countries in the Global North (see e.g. Fung 2017) - rather than the intention to limit tax avoidance.[2]

In the second part of the paper, we empirically assess whether the new anti-treaty shopping provisions effectively constrained treaty shopping behavior. If the rules bite, payments channeled through conduit countries are expected to decline after the MLI became effective. We test for this presumption drawing on information on FDI flows through conduit nations. Conduit countries' large inward and outward FDI position

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[2]We consider it unlikely that the low capacity itself leads to delays in take-up: the MLI is an easy to understand and easy to implement instrument.

are widely considered to reflect treaty-shopping activities by multinational firms (see e.g. Lejour 2021 and the literature cited therein).[3] If the OECD rules constrain treaty shopping, we expect FDI flows through conduit nations to drop after the BEPS agreement. Country-level FDI statistics suggests a mild decline at best. This also holds true when we apply synthetic control methodology to filter out common time trends in FDI activity. The close-to-zero FDI response, moreover, prevails when we turn to *bilateral* FDI data linked to information on MLI adoption on given bilateral routes.[4] In complementary analyses we also show that, within conduit countries, there is a substantial shift from FDI routed through "special purpose entities" (SPEs) - foreign-owned companies with little local activity, which tend to be associated with treaty shopping behavior (e.g. Damgaard et al. 2019) - to FDI positions routed through "standard firms" after the MLI agreement. This shift is consistent with MNEs enhancing their real economic activity in conduit nations to avoid falling within the scope of the new anti-treaty shopping rules.

Our study suggests that, at least for now, anti-treaty shopping provisions have not yet triggered major reductions in treaty shopping activity through conduit nations. In a final set of analyses, we highlight that, even if treaty shopping could effectively be abolished among IF members, firms may still have the option to engage in treaty shopping through nations that have not joined the IF and the BEPS process. To gauge the importance of such concerns, we quantify the tax gains from treaty shopping in a network analysis that determines the tax-minimal country-path of payments from source to residence countries before and after a hypothetical effective and comprehensive MLI adoption.[5] The analysis shows that, conditional on countries' withholding tax choices, the tax gains from engaging in treaty shopping shrink by around 40% from pre- to post-MLI adoption. Firms' incentive to engage in treaty shopping is hence reduced but not eliminated.

Overall, our analysis suggests that constraining treaty shopping is a challenging endeavor. The rules that were implemented through the MLI, so far, have not "killed treaty shopping". There are gaps in take-up, and firms might work around the regulations. Even if treaty shopping among BEPS member countries was abolished, some treaty shopping incentives through non-participating nations may prevail.[6]

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[3]Foreign direct investments are associated with dividend payment streams, and potentially also with withholding and interest payments. Furthermore note that bilateral information on royalty/dividend/interest payments is, contrary to FDI data, not well covered and not yet available for the post-MLI period.

[4]There may be concerns that diversion of FDI from treated to control routes may bias our estimates. Such bias implies that our estimate gives, in absolute terms, an upper bound of the true effect of MLI adoption - the latter is thus even smaller than the ones reported in this paper.

[5]The analysis relies on the adapted Floyd-Warshall algorithm, which calculates the tax distances when profits are repatriated from an investment destination to the parent country, accounting for statutory withholding taxes on the dividend stream, treaty-related reductions in withholding tax rates, double tax relief methods and statutory corporate tax rates.

[6]Our network analysis assumes that non-participating countries keep current treaty provisions in place. They even may have incentives to enhance their attractiveness as treaty shopping hubs by altering treaties and tax provisions. If they do, then prevailing gains from treaty shopping may be larger than the ones

Our paper adds to several strands of the literature. First, we contribute to a flourishing empirical literature on multinational profit shifting to low-tax countries (see e.g. Dharmapala 2014; Heckemeyer and Overesch 2017; Riedel 2018; Torslov et al. 2022 for recent reviews). In that domain, our paper is most closely related to studies on tax treaty shopping. Large levels of pass-through FDI in conduit nations are widely interpreted as evidence for treaty shopping (e.g. Darmgaard et al. 2019; Lejour 2021). A number of recent papers, moreover, quantify firms' incentive to engage in treaty shopping in network analyses as the one undertaken in this paper (Petkova et al. 2019). None of the existing papers studies, however, the effect of the OECD's BEPS process on firms' treaty shopping behavior.

Our paper also relates to previous work that assesses whether governments' countermeasures to combat international tax avoidance behavior are effective in constraining avoidance activities (see e.g. Beer and Loeprick 2015, Riedel et al. 2015, Laudage et al 2022a and 2022b on transfer pricing rules; Büttner et al. 2012 and Bilicka et al. 2022 on deduction limits for interest costs and Egger and Wamser 2015, Clifford 2019 and Hansen et al. 2022 on controlled foreign company rules). Our paper adds to the literature by being the first to assess the role of anti-treaty shopping provisions. Existing studies, moreover, have in common that they focus on anti-profit shifting provisions that countries implemented *unilaterally* over recent decades. Unilateral anti-tax avoidance laws come with the shortcoming that firms may have opportunities to divert from the policy-tightening country to nations with laxer anti-tax avoidance provisions. Internationally *coordinated* rules try to circumvent this. Empirical evidence on the latter provisions is scarce. Exceptions are recent studies on the BEPS project's country-by-country reporting (e.g. Hugger 2019; De Simone and Olbert 2022; Nessa et al. 2022).

Finally, our paper relates to a flourishing literature on the economic and fiscal consequences of double taxation treaties. As tax treaties tend to favor residence-based taxation and reduce source-taxation rights, they may trigger tax revenue losses in source countries in the Global South (Hearson, 2016; Janský et al. 2020). If firms engage in tax treaty shopping, these revenue losses are exacerbated. Prior research assesses the impact of tax treaties on firm investments (e.g. Davies et al. 2009; Egger and Merlo, 2011; Marques and Pinho, 2014; Blonigen et al. 2014; Beer and Loeprick 2018) and on profit shifting activities (e.g. Behrendt and Wamser 2018 and Balabushko et al. 2017). Again, we add to this literature strand by offering a perspective on the fiscal and economic consequences of anti-treaty shopping provisions.

The rest of the paper is structured as follows: Section 2 discusses the institutional background. Section 3 starts with a number of observations on MLI adoption. Sections 4 presents a simple theoretical model to rationalize the observed MLI adoption. Section 5 empirically shows that the MLI has so far hardly constrained treaty shopping.

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determined in this paper.

Section 6 illustrates to what extent treaty shopping incentives would prevail (through non-participating nations) if IF countries effectively constrained treaty shopping within their network. Section 7 closes with a discussion of policy implications.

2 Institutional Background

The BEPS agreement comprises 15 action points against international tax avoidance by multinational firms. Many provisions are best practice regulations for anti-avoidance measures that countries, in part, already had in place before: this includes long-standing anti-profit shifting measures like controlled foreign company regulations that make passive income earned at low-tax subsidiaries taxable in the parent country (Action 3); interest deduction limits that deny deduction of excessive interest costs from the corporate tax base (Action 4); and transfer pricing regulations that aim at constraining tax-motivated mis-pricing of intra-firm trade (Actions 8-10).[7] Other actions relate to disclosure provisions for firms and governments (Actions 12 and 13) and target harmful tax regimes (Action 5).

In this paper, we are concerned with those anti-tax-avoidance-provisions that require changes to double taxation treaties. Double taxation treaties are key instruments of the current worldwide taxation system. They distribute taxing rights between residence and investment countries, with the intention to avoid double taxation of the returns on cross-country investment and to remove obstacles to cross-border trade and factor movement.[8] Up to date, more than 4,000 bilateral tax treaties have been concluded worldwide, of which 3,314 are still in force.[9] In the following, we describe the OECD's BEPS actions that require changes in double taxation treaties (see Appendix A for more details):

Action 2 on hybrid mismatches addresses arrangements through which investors exploit differences across jurisdictions in the tax treatment of entities, instruments, or transfers.[10] These arrangements can lead to double non-taxation, double deduction of the same expenses, or long-term taxation deferral. The tax treaty modifications introduced

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[7]Work on BEPS issues related to the digital economy (Action 1) was postponed in 2015 and eventually cumulated in the Inclusive Framework's Pillar 1 and 2 agreement in October 2021. Pillar 1 regulations reassign some taxing rights from source to market countries. Pillar 2 introduces a global minimum tax on corporate income. Ratification of the provisions is still pending in many countries. Action 11, moreover, aims to identify empirical approaches and suitable measures to track BEPS activities over time (Action 11).

[8]Key elements are reductions in withholding tax rates on cross-border dividend, royalty and interest payments. Furthermore, double taxation treaties stipulate under which conditions investors become liable for corporate income tax in the destination country of the investment (i.e. whether their activity has a nexus to the tax system of the host country), and define procedures that apply in case of disputes over tax matters between tax authorities and taxpayers.

[9]The majority of these tax treaties either follows the OECD Model Tax Convention on Income and on Capital or the UN Model Double Taxation Convention.

[10]Examples are: the use of entities that are considered taxable in one country but not in the other, instruments that are treated as debt in one country and as equity in the other, or transactions that are considered a transfer of asset ownership in one country and a collateralised loan in the other.

by the OECD's BEPS action plan attempt to hinder this type of double non-taxation.

Action 6 on tax treaty abuse is concerned with treaty shopping arrangements, in which companies divert foreign direct investment via a conduit country in order to benefit from more favorable tax treaties. Treaty shopping typically involves setting up an intermediate legal entity in a jurisdiction that has signed an advantageous tax treaty with the target jurisdiction. Companies benefit from treaty-related reductions in dividend withholding tax rates - and if royalties and interest are paid from the destination to residence country also from treaty-related reductions in royalty and interest withholding taxes. Action 6 requires participating BEPS nations to add a statement to their tax treaties that the common intention of the treaty partners is to eliminate double taxation without creating opportunities for non-taxation or reduced taxation through tax evasion or tax avoidance, including tax avoidance through treaty-shopping arrangements. The treaty partners are, moreover, required to incorporate anti-treaty shopping provisions, either in the form of a principal purpose test (PPT) - where treaty benefits are denied if the principle purpose of a business arrangement is to obtain access to such benefits - or a limitation on benefit rule (LOB), where treaty benefits are denied under pre-specified conditions, e.g. related to the legal nature of the business and the activity undertaken. If companies are not publicly traded but privately held, the most common test applied is an active business test, where treaty benefits are denied in circumstances with no or little real activity in the conduit country.

Action 7 on permanent establishments is concerned with tax nexus provisions, that is with the provisions that define whether an enterprise has a permanent establishment in that jurisdiction and hence becomes liable for income taxation. The definition of permanent establishments (PEs) included in tax treaties is therefore crucial in determining whether a non-resident enterprise must pay income tax in another jurisdiction. In countries with high corporate income tax rates, multinational firms have incentives to avoid tax nexus, for example by replacing subsidiaries that would traditionally act as distributors by commissionaire arrangements (implying that related income is not taxed in the jurisdiction where the sales take place, see OECD, 2015). Action 7 intends to tighten the permanent establishment definition, among others by restricting exceptions to the PE status.

Action 14 on dispute resolution seeks to improve the resolution of tax-related disputes between jurisdictions that can naturally arise in a world where business activities span several countries. A key element of BEPS Action 14 is that tax treaty partners have 'mutual agreement procedure' (MAP) provisions in place that define a process used to resolve such disputes. Additionally, countries may opt for mandatory binding arbitration procedures, where the treaty partners commit to resolve conflicts in a timely manner.

Actions 6 and 14 are part of BEPS's minimum standard (next to Actions 5 and 13 on harmful tax regimes), that is countries that join the BEPS process through the OECD's

inclusive framework committed to implementing these reforms. All other BEPS provisions remain optional. For Action 6, all of the sketched anti-treaty shopping provisions are part of the minimum standard. For Action 14, the minimum standard only relates to the requirement that MAP procedures are in place. The more far-reaching change of implementing mandatory binding arbitration is, in turn, optional.

To avoid cumbersome and time-consuming renegotiations of bilateral tax treaties, the OECD in BEPS Action 15 developed the so-called multilateral instrument, which allows countries to swiftly integrate BEPS changes in their existing double taxation treaties.[11] The multilateral instrument is a separate document that sits "on top of the treaties" (Martin 2016). BEPS-items that are part of the minimum standard come into effect for a given tax treaty if i) both treaty partners sign and ratify the MLI and ii) if both treaty partners select a treaty to be changed under the MLI. Optional treaty-related BEPS items are adopted if i) and ii) holds and if, additionally, both treaty partners iii) select a given optional treaty item to be changed under the MLI. The implementation of the MLI agreement has been celebrated by policymakers as "ground breaking" (OECD 2017) and "a turning point in tax treaty history" (Financial Times 2017) and has been positively received by the media and the general public. Pascal Saint-Amans, then director of the OECD Centre for Tax Policy and Administration expected the new anti-treaty shopping provisions to "kill" treaty shopping (Financial Time 2017). In the following, we shed light on MLI take-up behavior and its impact on multinational tax avoidance behavior.

3   MLI Take-up: Observations

This section starts out with descriptive evidence on MLI adoption. Did IF members take up the MLI and list their tax treaties under the instrument? One might, a priori, presume that all of them did for all of their treaties: Countries committed to implementing treaty-related BEPS actions by joining the inclusive framework and implementing such changes through the MLI is arguably administratively less costly than bilaterally renegotiating double taxation treaties. Still there is scope for slow, or even no, adoption of the provisions.

Countries did not agree on a fixed time-line until when the BEPS provisions need to be ratified. There is, in general, no international institution with the power to enforce the agreed provisions. And incentives to swiftly implement anti-BEPS measures may not always be high - some observers suggest that numerous, in particular developing countries joined the OECD's BEPS process for side benefits - such as to ensure elevated donor country support in the tax domain (e.g. Fung 2017).

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[11]Note that BEPS-related treaty changes could, in principle, also be implemented through bilateral renegotiations of double taxation treaties. Progress reports by the OECD suggest, however, that countries so far have not engaged in the latter endeavor.

The section relies on rich data on double tax treaties between countries obtained from the International Bureau of Fiscal Documentation (IBFD's) data catalogue and information on MLI signature and ratification of countries as given in the OECD's "Status List of Reservations and Notifications upon Deposit of the Instrument of Ratification" and MLI Matching Database.[12] From the latter data source, we also draw information on which tax treaties are listed under the MLI and which optional treaty-related BEPS-items countries select to be covered under the MLI.

Observation 1: Not all IF countries have signed up for the MLI

As depicted in Figure 1, not all countries worldwide, in particular in the developing world, have joined the IF and hence the BEPS agreement (indicated in white). Among the 141 inclusive-framework member countries, every third member has not signed the MLI agreement (indicated in light purple); 21 further countries have signed but not ratified the instrument under domestic law (indicated in light blue).[13] And among the countries, which ratified the agreement, several delayed entry into effect (Article 35(7) of the MLI; indicated in blue). Non-participation in the IF and the MLI naturally reduces the number of treaties, for which the new anti-BEPS measures become active, see Figure 3.
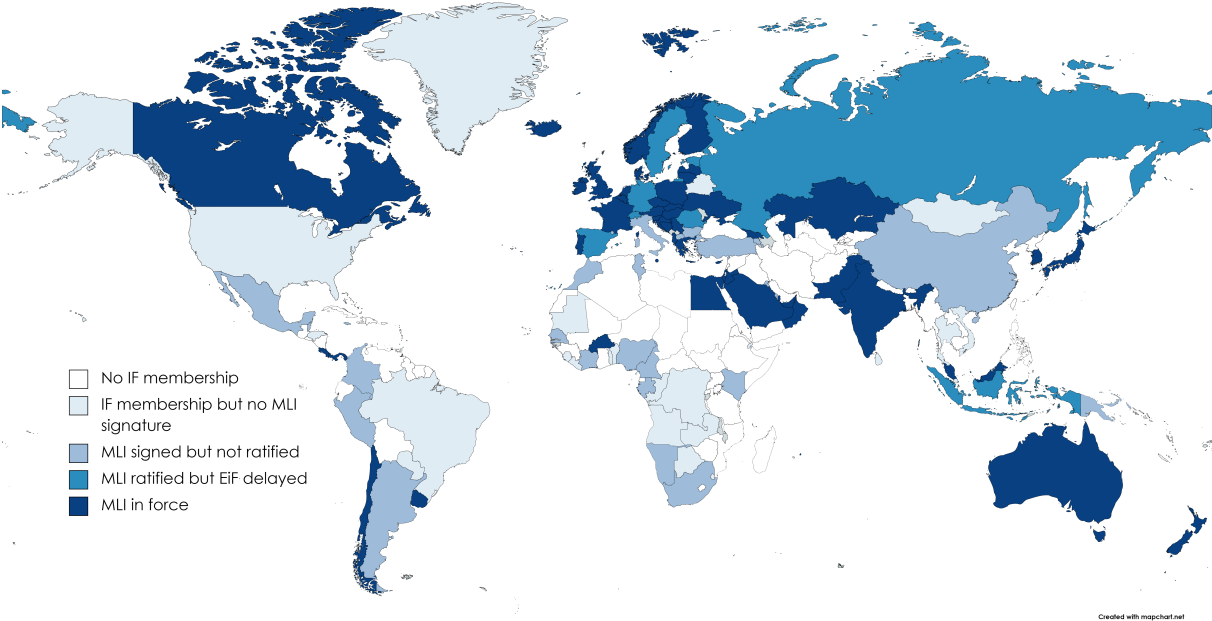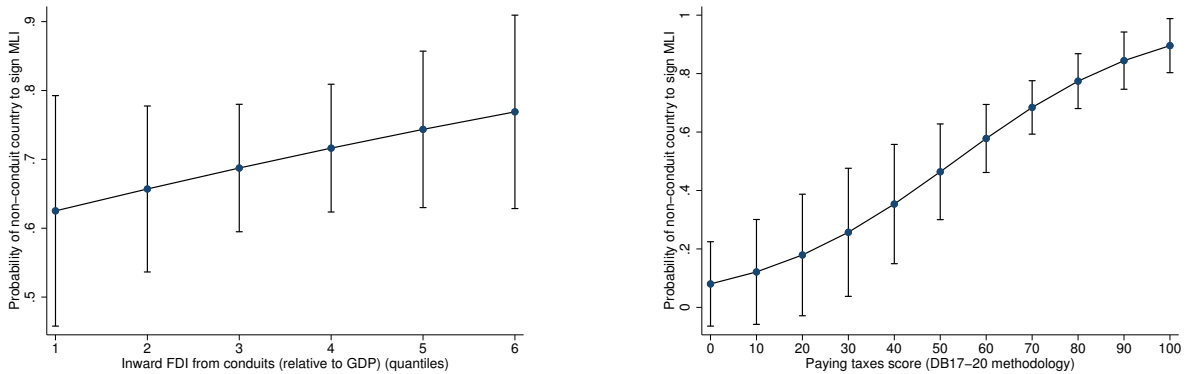

Figure 1: MLI take-up

Note: Worldmap showing the MLI take-up of IF countries. The position of the countries are extracted from the OECD's "Status List of Signatories and Parties to the MLI" as of 30 Sept 2021 (https://www.oecd.org/tax/treaties/beps-mli-signatories-and-parties.pdf).

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[12]https://www.oecd.org/tax/treaties/beps-mli-signatories-and-parties.pdf   and https://www.oecd.org/tax/treaties/mli-matching-database.htm

[13]Note that three countries that are not members of the OECD's Inclusive Framework joined the agreement: Cyprus, Fiji and Kuwait.

Figures 2*a* and 2*b* present correlates of countries' decision to join the MLI agreement (measured by MLI signature before December 2021). Figure 2a shows that, intuitively, non-conduit countries' exposure to treaty shopping - measured by FDI inflows from conduit countries relative to GDP - correlates positively with countries' propensity to join the MLI.[14] Less intuitively, Figure 2b shows a *positive* correlation between countries' tax capacity and MLI take-up. Tax capacity is proxied by the ease of doing business index, which (contrary to other measures for tax authority capacity) is available for countries worldwide.[15] In Appendix C, we show that similar results emerge, when we use an alternative proxy for tax administrative capacity and condition on the year in which countries entered the MLI agreement (cf. Figures C.1 and C.2).

(a) MLI take-up and treaty shopping exposure

(b) MLI take-up and tax capacity

Figure 2: Correlates of non-conduit countries' decision to sign the MLI

Note: The figure depicts correlates of non-conduit countries' decision to sign the MLI. Information on MLI signature is obtained from the OECD's "Status List of Signatories and Parties to the MLI"; exposure to treaty shopping is measured by the inward FDI position from conduit countries relative to GDP in 2017; and tax capacity is measured by the paying taxes index of the Doing Business records in 2017.

Observation 2: Conditional on MLI signature, countries do not list their entire treaty network

Among treaties between IF members, every third treaty (in total 723 treaties) has not been covered under the MLI in the sense that both treaty partners have signed the MLI and listed the treaty under the MLI provisions. The fraction of treaties where both sides

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[14]The figure accounts for all IF member countries, which are not conduit countries themselves. Information on bilateral inward FDI and countries' GDP are for the year 2017 and are taken from the IMF's Coordinated Direct Investment Survey (CDIS) and the World Development Indicator database. The definition of conduit nations follows the broad definition in Lejour (2021), which comprises the countries of: Austria, Belgium, Hong Kong, Cyprus, Hungary, Ireland, Luxembourg, Malta, the Netherlands, Singapore, Switzerland and the United Kingdom. A similar result picture as the one in presented in Figure 2a emerges when we rely on a narrower definition of conduit nations (comprising Hong Kong, Ireland, Luxembourg, the Netherlands, Singapore and Switzerland, cf. Lejour 2021) or define MLI take-up by MLI-ratification rather than MLI signature (results are available upon request).

[15]The underlying notion is that weak tax administrative capacity is associated with poor tax authority communication, weak administrative systems and high taxpayer compliance burdens, all of which results in a low ease of paying taxes score.

have ratified the MLI is even lower. One interesting feature is that many countries that sign the MLI do not list all of their tax treaties under the MLI. On average around 80% of the tax treaties are covered under the agreement (conditional on joining the MLI), but the fraction can be as low as 10%. Figure $C.4$ in the Appendix shows that treaty shopping routes are more likely to be covered than others (conditional on MLI signature).
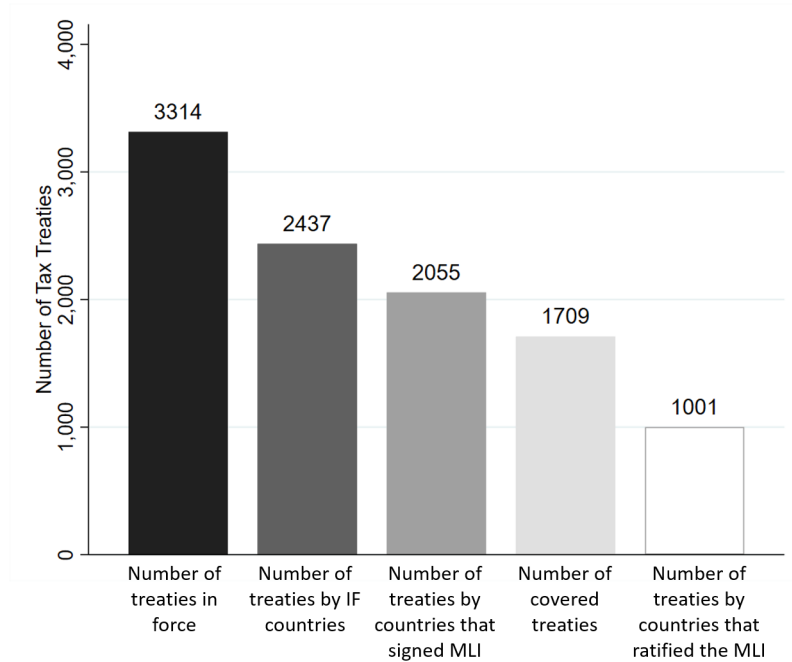

Figure 3: Routes Covered by the MLI

Note: The figure depicts the number of tax treaties which are worldwide in force (3314) broken down into number of treaties by Inclusive Framework countries, by countries that signed the MLI, by treaties of MLI signees where both partner countries listed the respective treaty (covered treaties) and by countries that ratified the MLI. Information on the treaty network is obtained from the IBFD's data catalogue and information on MLI positions is obtained from the MLI Matching Database and the OECD's "Status List of Signatories and Parties to the MLI" as of 30 Sept 2021.

Observation 3: All conduit countries signed MLI and listed most treaties

Another interesting feature of our data is that all conduit countries signed and ratified the MLI. Figure 4 depicts conduit countries, as defined in Lejour (2021), and shows that most of them list the large majority of tax treaties under the MLI (with Austria and Switzerland being notable exceptions). This also holds for the Netherlands and Luxembourg, which are the leading conduit countries worldwide. This may seem surprising given that conduit nations are the beneficiaries of treaty shopping activity, which by non-participation in the MLI, could prevent the OECD's new anti-treaty shopping rules from becoming active on their routes.[16] Below, we present theoretical considerations, which suggest that, given the design of BEPS's anti-treaty shopping rules, it can be in the best

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[16]See e.g. Lejour (2021) who suggests that countries benefit from a conduit function as it increases the demand for business services, such as juridical and tax advice within their borders.

interest of conduit nations to join the agreement.
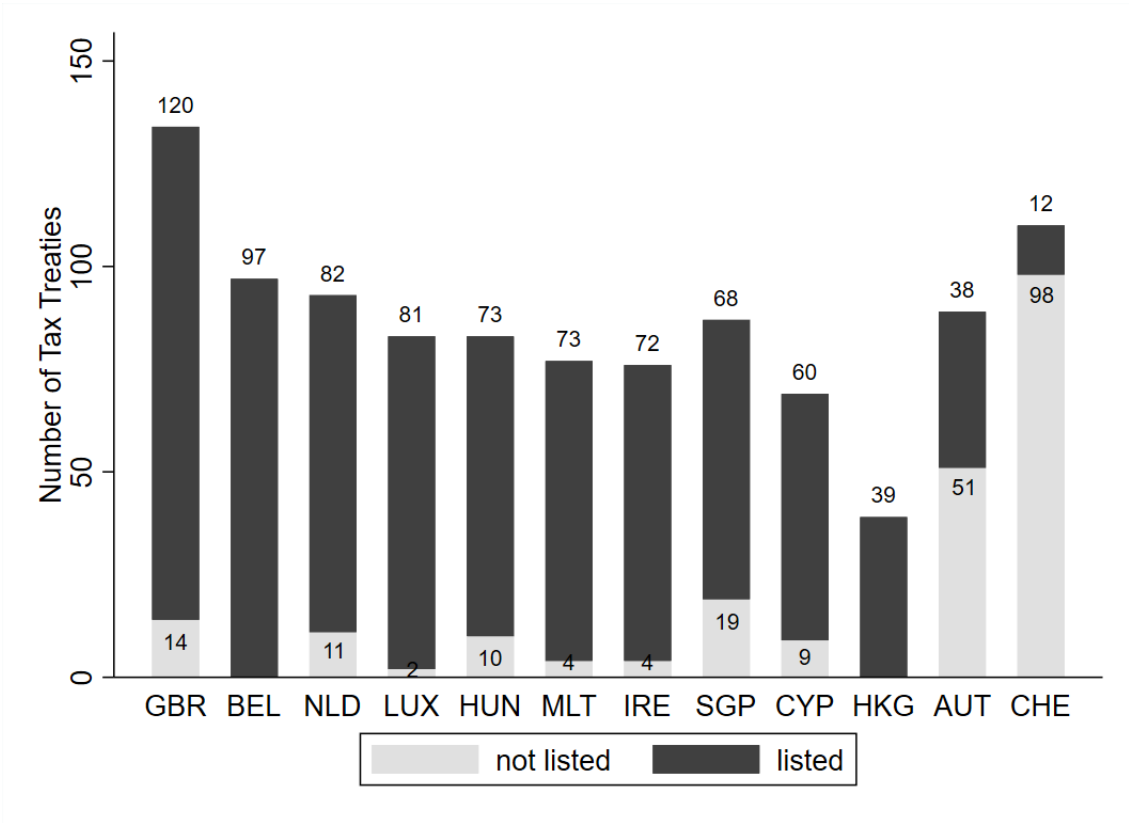
Figure 4: Conduit Countries' Take-up of MLI

Observation 4: Optional treaty-related items are hardly taken up

Appendix B illustrates that optional BEPS items, which are not part of the minimum standards, were hardly adopted under the MLI. Few countries opted for these provisions and, even if they did, treaty partners often did not, and the treaty change then failed to become effective. This outcome is consistent with countries' behavioral incentives. Take Action 7 on permanent establishments as an example: Action 7 shifts taxing rights from residence to source countries. Capital importing countries of the Global South are significantly more likely to opt for the PE provisions than capital-exporting countries in the Global North. On North-North and North-South routes, BEPS Action 7 items hence rarely became active. This highlights a general weakness of the BEPS agreement: Countries left the adoption of many BEPS action items as optional. Obstacles that prevented binary agreements on treaty changes in the pre-BEPS periods hence prevailed in the post-BEPS world. If before the BEPS process, shifts in taxation rights were not incorporated because they benefited one treaty partner at the expense of the other, the

same holds true in the post-BEPS world.[17]

Furthermore note that, while Action 14 on dispute resolution is also part of the BEPS's minimum standard, the minimum provision of Action 14 only requires countries to have well-defined mutual agreement procedures in place and ensure that taxpayers can rely on these procedures. Inclusive-framework member countries largely already had such provisions in place before the BEPS agreement.[18] The more ambitious intervention would have been to adopt mandatory binary arbitration, where tax authorities commit to resolving conflicts within a given time frame. This provision is administratively challenging to implement, however, and was made optional under the Action 14 agreement. As illustrated in the appendix, only very few countries - all being located in the Global North and characterized by a high level of tax-administrative capacity - opted for mandatory binding arbitration. As several high-tax countries, namely in Europe, had mandatory arbitration schemes in place before (and those newly opting in often did so under reservations, see Bravo, 2019), there were little material changes.

Given that optional treaty-related BEPS items were hardly taken up and that the mandatory part of Action 14 were widely in place prior to the BEPS agreement, we will, in the following, discuss MLI take-up through the lens of its changes to anti-treaty shopping rules. This is consistent with commentators' assessment of the MLI, which focused on its impact on tax-treaty shopping (e.g. Financial Times 2017).

4 Theoretical model

We proceed by presenting a simple theoretical model that serves two purposes: The first is to rationalize countries' take-up of the MLI, in particular against the background of the partly puzzling take-up patterns sketched in the prior section. Following our argumentation above, the model focuses on changes in anti-treaty shopping rules and abstracts from other treaty-related BEPS items. Second, the model illustrates how firms respond to anti-treaty shopping provisions - and thus offers guidance for further empirical analyses to come, where we evaluate the impact of the MLI and its anti-treaty shopping provisions on firms' tax avoidance behavior.

We consider that there is a set of N symmetric non-conduit countries and one conduit country. Each non-conduit country hosts a total mass of K multinational subsidiaries. The parent firms associated with these subsidiaries are located in a foreign country H. Each MNE can choose to repatriate income directly from the subsidiary to the parent country or to use a conduit structure, where income is repatriated through an intermediate parent in the conduit country C. The latter scheme allows the MNE to reduce the

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[17]The in many aspects non-binding nature of the OECD's agreement may, however, have ensured that many countries were willing to join the agreement in first place.

[18]See the outcome of the first peer review on Action 14.

withholding tax burden t on the repatriated dividend stream by Δt.

4.1 Firms' decision to use conduit structures

We first model the firms' choice whether or not to engage in treaty shopping by channeling payments through the conduit country. While we allow for within country heterogeneity across firms, we, for simplicity reasons, assume that non-conduit countries are symmetric, allowing us to ignore country indices.

Each firm decides whether to set up a conduit structure to reduce the dividend withholding tax upon profit repatriation to the parent. The total 'treaty shopping gain' for a firm k is $\Delta t \times r_k$, where r_k denotes the firms' repatriated profits. Setting up a conduit structure also entails costs, which are denoted by $C(\ell)$. These costs are assumed to be fixed in nature.[19] They depend on whether legal provisions are in place that constrain treaty shopping. The parameter ℓ takes on the value 1 if anti-treaty shopping regulations are in place and zero otherwise. The costs of using conduit structures are plausibly larger in the presence of legal regulations ($C(1) > C(0)$), reflecting that firms are required to place some real activity into conduit countries to pass the LOB or PPT. The net gain of firm k from engaging in treaty shopping reads:

$$\pi_k = \Delta t \cdot r_k - C(\ell) \tag{1}$$

The firm will use a conduit if the net gain is larger than zero ($\pi_k > 0$). In consequence, firms with higher dividend repatriations r_k, are more likely to rely on treaty shopping arrangements:

$$\frac{\partial \pi_k}{\partial r_k} = \Delta t > 0 \tag{2}$$

If we assume that repatriated dividends are distributed according to G ($r_k^i \sim G$), we can define a cut-off value $\bar{r}$ for which it is profitable to use a conduit structure.

$$\bar{r} : \pi_k \geq 0 \Longleftrightarrow r_k \geq \frac{C}{\Delta t} = \bar{r} \tag{3}$$

It follows that the mass of firms, which uses conduits is $\left[1 - G\left(\frac{C}{\Delta t}\right)\right] K$. Intuitively, the fraction of firms, which engage in treaty shopping, shrinks in the costs of setting up the conduit structures (C) and increases in the tax reduction achieved by using the conduit setup (Δt). Anti-treaty shopping regulations enhance the costs of treaty shopping constructs, thereby lowering the fraction of firms that engage in treaty shopping. The fixed nature of the $C(\ell)-$costs implies that it is large firms with significant dividend repatriations, for whom it remains attractive to keep treaty shopping structures in place,

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[19]We consider it plausible that legal and economic costs to set up and maintain conduit structures are largely unrelated to the volume of payments channeled through the conduit.

despite the legally induced increase of the costs of treaty shopping.

4.2 Countries' choice to participate in MLI

When countries decide whether or not to participate in the MLI, and hence to implement anti-treaty shopping provisions, they account for firms' responses to the MLI and for their own optimal behavior after joining the MLI agreement. There are two decision stages: First, countries decide whether to join the MLI or not; then, conditional on joining the MLI, they choose which tax treaties to list. Following the argumentation above, we assume that countries' decision on MLI-adoption is guided by considerations on the adoption of BEPS actions against treaty shopping. The model is solved from the back.

Stage 2: Countries' decision to list a tax treaty under the MLI

We first model the *non-conduit country's* choice to adopt the MLI on a route to the conduit country (conditional on joining the MLI agreement). We model the decision of a representative non-conduit country and thus, as before, abstract from using a country-index for the non-conduit nation. If anti-treaty shopping provisions apply for a tax treaty between a non-conduit and a conduit country, the non-conduit nation yields a non-zero revenue gain as some firms stop engaging in treaty shopping behavior. Formally, the cutoff $\bar{r}$ increases from $\bar{r}_0$ to $\bar{r}_1$. Assume that the per-entity revenue gain for the non-conduit nation is denoted by $h(r_k)$; then its overall gain from less treaty shopping activity reads: $\int_{\bar{r}_0}^{\bar{r}_1} h(r_k)dG(r_k)$.

The enforcement of treaty shopping rules, once in place, entails costs of $\Phi_{NC}(\gamma)$ to the non-conduit nation. Countries with a lower enforcement capacity γ face larger costs to enforce the provisions: $\frac{\partial \Phi_{NC}}{\partial \gamma} < 0$. The alternative to implementing anti-treaty shopping rules through the MLI is to engage in bilateral renegotiations of double taxation treaties. Such renegotiations take time and are assumed to delay implementation of the provisions. This diminishes discounted realized revenue gains $\int_{\bar{r}_0}^{\bar{r}_1} h(r_k)dG(r_k)$ and discounted enforcement costs $\Phi_{NC}(\gamma)$, where the discount factor is denoted by δ. Costs to renegotiate a bilateral tax treaty are μ, while costs for implementing treaty changes through the MLI on a given route are assumed to be negligible (conditional on participating in the MLI).[20]

Note again that the MLI only comes into effect on a given route if *both* treaty partners join the MLI and select a given treaty to be covered by the MLI agreement. In the following, we assume that i) countries simultaneously choose whether to join the MLI and whether to select a given treaty to be covered; ii) in doing so, they observe the partner countries' payoff function, but iii) the net-costs of implementing the BEPS-related treaty provisions through bilateral renegotiations, μ_{NC}, are a random component and

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[20]As illustrated below, we allow for non-zero costs of countries to join the MLI agreement; but we then assume that covering treaties under the MLI, conditional on joining, has no additional costs (it corresponds to ticking a box).

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the realization of countries' μ_{NC}-draw is only observable to the country itself, not to the partner nation. The partner country hence forms expectations on μ and on the propensity that the other country joins the MLI agreement and selects a given route under the MLI. The resulting propensity, with which a non-conduit country expects the conduit to join the agreement is denoted by $p_{C,NC}$ and corresponds to the joint propensity that the partner joins the MLI and opts for coverage of the considered treaty under the MLI.

The non-conduit country selects the route to the conduit country for the MLI if the net benefit $DIFF_{C,NC}$ is positive, where

$$DIFF_{C,NC} = p_{C,NC}\left((1-\delta)\left[\int_{\bar{r}_0}^{\bar{r}_1} h(r_k)dG(r_k) - \Phi_{NC}(\gamma)\right] + \mu_{NC}\right) \qquad (4)$$

The first term in round brackets reflects the net benefit from implementing anti-treaty shopping laws through the MLI, without any delay. If the difference between revenue gains and enforcement costs is positive (negative), countries benefit (lose) from early implementation of anti-treaty shopping laws.[21] The second term (μ_{NC}) reflects the additional costs that countries incur through bilateral negotiations. If benefits from constraining treaty shopping tend to be small and costs to administer the rules tend to be large, countries may find it attractive to not cover routes under the MLI agreement to postpone implementation.

Two notes are in place: First, $p_{C,NC}$ acts as a pre-factor and does not determine countries' choice whether to list a treaty under the MLI or not.[22] Second, we assume that countries, if they do not opt for the MLI, engage in bilateral negotiations in the future (μ_{NC}). If countries instead would have the option to join the MLI at a later point in time, $DIFF_{C,NC}$ and hence the propensity to opt for the MLI declines.[23]

Let's now turn to the *conduit country*'s choice whether to apply the MLI on a given route. A naive presumption may be that conduit countries never find it optimal to agree to anti-treaty shopping provisions as they are the beneficiaries of treaty shopping activities. Our model makes a more nuanced prediction. Specifically, conduit countries

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[21]For some countries, the costs to administer and enforce treaty shopping provisions $\Phi_{NC}(\gamma)$ might be larger than the potential revenue gains from restricting treaty shopping activities. They may have joined the inclusive framework and the BEPS agreement because of benefits that their countries obtain from other BEPS provisions (outweighing the net costs of being forced to implement anti-treaty shopping provisions) or because of benefits not related to the BEPS process, e.g. from additional tax administrative support and technical assistance given to inclusive-framework members by the OECD and its member countries (e.g. Burgers and Mosquera 2017; Esteban and Caleroni 2021).

[22]If $DIFF_{C,NC} > 0$, it is optimal to cover a route under the MLI irrespective of the expected propensity that the other country joins the agreement and covers the route under the MLI. Also note that, if the treaty partner does not join and cover the route under the MLI (which is the case with expected propensity $(1 - p_{C,NC})$, the treaty needs to be bilaterally renegotiated irrespective of the considered country's decision. $DIFF_{C,NC}$ and the decision to cover the route hence remain unaffected by considerations related to this scenario.

[23]This is consistent with some observers arguing that countries might "refuge in mock-compliance" of the BEPS provisions (Fung 2017).

decide on whether to list a treaty under the MLI, comparing the benefits and costs of the involved anti-treaty shopping rules. If we assume that the per-entity gains from conduit structures to the conduit country are denoted by $\rho(r_k)$, then the conduit country, in the aggregate, loses $\int_{\bar{r}_0}^{\bar{r}_1} \rho(r_k)dG(r_k)$ because less firms set up conduits within its borders when anti-treaty shopping provisions apply. This is not the only effect at work, however. As illustrated in Equation (3), some firms may find it attractive to keep their conduit structures in place; in order to still access reduced withholding tax rates offered by the tax treaty, firms are then required, however, to pass the activity threshold of the LOB and PPT respectively. Benefits from this additional real activity in the conduit nation are, in per-entity terms, in the following denoted as $\tilde{\rho}(r_k) - \rho(r_k)$ and may relate to additional employment opportunities and income earned by local residents. In aggregate terms, the gain reads $\int_0^{\bar{r}_1}(\tilde{\rho}(r_k) - \rho(r_k))dG(r_k)$. The conduit country hence opts for the MLI on a route if $DIFF_{NC,C} > 0$, where $DIFF_{NC,C}$ reads:

$$p_{NC,C}\left((1-\delta)\left[\int_{\bar{r}_0}^{\bar{r}_1} \rho(r_k)dG(r_k) + \int_0^{\bar{r}_1}(\tilde{\rho}(r_k) - \rho(r_k))dG(r_k) - \Phi_C(\gamma)\right] + \mu_C\right) \quad (5)$$

$\Phi_C(\gamma)$ denotes the costs to administer the anti-treaty shopping regulations on a particular route, again depending inversely on country's enforcement capacity, $\frac{\partial \Phi_C}{\partial \gamma} < 0$, and μ_C are the costs that countries incur if they renegotiate double taxation treaties bilaterally. Conduit countries may hence find it attractive to implement anti-treaty shopping provisions if only relatively few (smaller) firms canceled their conduit activity (meaning that the first term in Equ. (5) is, in absolute terms, small) and the remaining businesses engaged in significant expansion of their real activity in the conduit country (meaning that the second term in Equ. (5) is large). Ceteris paribus, opting for the MLI also becomes more likely if the costs of enforcing anti-treaty shopping provisions ($\Phi_C(\gamma)$) tend to be small and the costs of bilaterally renegotiating double taxation agreements (μ_C) tend to be large.

Further note that implementing anti-treaty shopping rules on routes between non-conduits only causes costs: there is no scope for treaty shopping reductions. Whether countries opt for implementation of regulations through the MLI or through bilateral negotiations depends on treaty renegotiation and enforcement costs (and the benefits from delaying the latter). Formally, countries opt for the MLI if

$$DIFF_{NC,NC} = p_{NC,NC}\left(-(1-\delta)\Phi_{NC}(\gamma) + \mu_{NMLI}\right) > 0 \quad (6)$$

Stage 1: Non-conduit and conduit countries' choice to join MLI

On the first stage the conduit country and the non-conduit countries choose whether to join the MLI agreement or not. Countries join if their aggregate net-benefit from doing so is positive. *Per* route, the net benefit from joining the MLI agreement, is that the

individual route can be covered under the MLI. The aggregate benefit for a non-conduit nation to join the MLI agreement reads:

$$\Gamma_{NC} = max(DIFF_{C,NC}, 0) + (N-1)max(DIFF_{NC,NC}, 0) - F_{MLI}(\gamma) \qquad (7)$$

$F_{MLI}(\gamma)$ reflects the costs from joining the MLI, which depend inversely on countries' tax capacity $\frac{\partial F_{MLI}}{\partial \gamma} < 0$. If $\Gamma_{NC} > 0$, non-conduits join the MLI. Analogously, the net gain from joining the MLI for the conduit country is

$$\Gamma_C = N \cdot max(DIFF_{NC,C}, 0) - F_{MLI} \qquad (8)$$

The conduit country joins if $\Gamma_C > 0$.

The model predictions are consistent with the empirical observations of the prior section. Equation (7) suggests that non-conduit countries are more likely to join the MLI if they are strongly exposed to treaty shopping activity and if that treaty shopping can be constrained by anti-treaty shopping rules (i.e. if $max(DIFF_{C,NC}, 0)$ is large), cf. Figures 2a.

Our model also offers a rationalization for the pattern presented in Figure 3, showing that the propensity of non-conduit countries to take up the MLI can *increase* in their tax capacity. While a low tax capacity γ increases the costs to bilaterally renegotiate double taxation treaties and, by that, make MLI take-up more attractive ($max(DIFF_{C,NC}, 0)$ and $max(DIFF_{NC,NC}, 0)$ are large), our model also illustrates that a lower tax capacity raises the opportunity costs of enforcing anti-treaty shopping provisions, once they are in place ($max(DIFF_{C,NC}, 0)$ and $max(DIFF_{NC,NC}, 0)$ are small). Moreover, joining the MLI itself involves administrative costs ($F_{MLI}(\gamma)$), which may inversely depend on countries' tax capacity. The latter effects may make low capacity countries reluctant to take-up the MLI - consistent with observed behavior.

The model also offers a rationalization for the fact that virtually all conduit countries adopted the MLI on all routes. We illustrate that anti-treaty shopping provisions may bring benefits to conduit countries by expanding local real activity ($max(DIFF_{NC,C}, 0)$ is large) and may make MLI take-up attractive.

5   The Effect of MLI on Treaty Shopping

While MLI take-up is incomplete, several changes have been enacted. Did treaty shopping respond to these adjustments? If it did, we would expect less FDI to be channeled through conduit countries after the MLI agreement (on affected routes). We will first exploit aggregate FDI data and then turn to information on bilateral FDI flows to assess this question.[24]

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[24]Channeling FDI through conduit countries allows for reductions in dividend withholding taxes on profit repatriation - and if royalty and interest is paid from affiliates to the parent firm - also lowers

5.1 Aggregate FDI in Conduit Countries

We firstly rely on country-level data on aggregate FDI positions. While treaty shopping implies that firms route dividend, royalty and interest streams through conduit nations, data on such flows is available for a limited set of countries only and provided with a substantial time lag, which makes it unsuitable for our analysis. FDI data, in turn, is available for most countries worldwide up to 2021, thus covering several years after the implementation of the MLI agreement. As modelled in the theoretical analysis, firms may have incentives to channel foreign direct investments through countries with attractive tax treaty networks that allow them to reduce dividend withholding tax rates upon repatriation. Conduit countries are hence characterized by high levels of inward and outward FDI positions. The Netherlands and Luxembourg in particular stand out. When the MLI was agreed, observers expected that the agreement would in "particular impact [...] Luxembourg and the Netherlands, where treaty shopping has raised the stock of foreign direct investment far beyond the size of countries' economies" (Financial Times, 2017). We draw on information on the inward FDI positions into the Netherlands, Luxembourg and other common conduit countries and assess how these positions changed around the time when the MLI was implemented. As sketched above, most conduit nations signed up for the MLI and listed the majority of their double tax agreements under the MLI.

The FDI data at hand also allows us to distinguish between 'real' FDI and 'phantom' FDI.[25] Phantom FDI reflects pass-through investment that presumably serves treaty-shopping purposes and leaves little traces in the real economy (Damgaard et al., 2019). In several conduit countries, official statistics started to report FDI separately for so called special purpose entities (SPEs) and non-SPEs. SPEs are legal entities that are formally registered with a national authority and subject to fiscal and other legal obligations in the economy in which they are resident; but they are ultimately controlled by a non-resident parent, either directly or indirectly and are characterized by very little real activity in the host country.[26] While there is no direct link between the official definition of SPEs and

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withholding taxes on royalty and interest streams.

[25]We download FDI positions from the OECD main aggregates BMD4 statistics. To consider the increasingly complex financing structures of MNEs which involve the use of special purpose entities (SPEs) to channel investments through several countries before reaching their final destination, the OECD developed the 4th edition of its Benchmark Definition of Foreign Direct Investment (BMD4) in which it recommends that countries should compile FDI statistics separately for SPEs. Not all countries follow this recommendation. However, 18 out of 48 countries report their FDI Statistics separately.

[26]Moreover, almost all the assets and liabilities of the enterprise represent investment in or from other countries; and the core business of the enterprise is group-financing and holding activities while managing and directing play only a minor role. The country-specific definitions for the identification of SPEs thus mostly rely on industry classification, number of employees, share of foreign assets (liabilities) in total assets (liabilities), turnover, and foreign control. Some countries also have a separate business register such as Denmark, Estonia or Hungary. However, a clear international definition of SPEs has been lacking for a long time. In 2018, the IMF published their "Final report of the Task Force on Special Purpose Entities" which proposes an international definition of SPEs and a data collection framework for cross-country comparable SPE data. The Task Force proposes an SPE definition including an upper limit of up to five employees, while no specific numerical threshold is recommended to account for physical

treaty shopping activity, there is a strong notion that treaty shopping is mainly organized through SPEs (Damgaard et al. 2019) In line with Damgaard et al. (2019), all FDI related to SPEs is in the following labeled as 'phantom FDI'; all FDI in non-SPEs is labeled as 'real FDI'. Figure 5 depicts the evolution of total, real and phantom FDI around the time when the MLI was signed and ratified in a number of conduit nations.

The figure conveys several insights. First, it suggests that the high FDI positions in conduit countries largely prevailed in the years after the MLI agreement. In the Netherlands and Luxembourg, the inward FDI to GDP ratio remains a multiple of the inward FDI positions in other countries, suggesting that treaty shopping activity remained at high levels also after the BEPS process and the introduction of the MLI.

Our data points to a major drop in FDI flows through SPEs after the ratification of the MLI, however. Simultaneously, there has been a major increase in real (non-SPE) FDI. This reclassification of FDI flows is consistent with our theoretical considerations: firms largely seem to keep their treaty shopping structures in place, while enhancing real activity in conduit nations in order to avoid falling within the scope of anti-treaty shopping regulations (which deny treaty benefits if the sole purpose of the structure is to avoid taxes). Note in that context that there is no fixed activity threshold from which countries' FDI statistics require firms to classify entities as SPEs. Most countries, in line with IMF (2018), account for an upper limit of five employees for firms to be defined as SPEs, while no specific numerical threshold is given for physical presence and/or physical production. Still, all countries require that only companies with little local real activity are tabbed as SPEs. While the data thus does not allow us to make statements about the precise quantitative expansion of firms' real economic activity in conduit nations, it is consistent with such a real activity expansion. One obvious threat to this interpretation is that the FDI position in conduit nations may have changed for reasons other than adjustments in treaty shopping in response to BEPS Action 6. We address this concern by relying on synthetic control estimation (see Abadie, Diamond and Hainmueller, 2010, and Abadie, 2021). The idea of synthetic control methods is to pick untreated control units to model underlying trends in the outcome variable unrelated to the treatment. The approach builds on the notion that a combination of unaffected entities provides a better fit than a single unaffected unit, especially if researchers, as in our setting, can draw only on a small number of unaffected units.

Our synthetic control group selection accounts for typical determinants of foreign direct investment positions such as log of GDP per capita, trade openness, GDP growth, population and inflation. We also include the outcome itself, countries' inward FDI position, prior to treatment to exploit comovement of the outcome variable of interest across the countries in our data. As the pre-intervention period, we use 2010-2016 since the Nether-

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presence and/or physical production. Further, SPEs are defined to be directly or indirectly controlled by nonresidents (IMF, 2018).
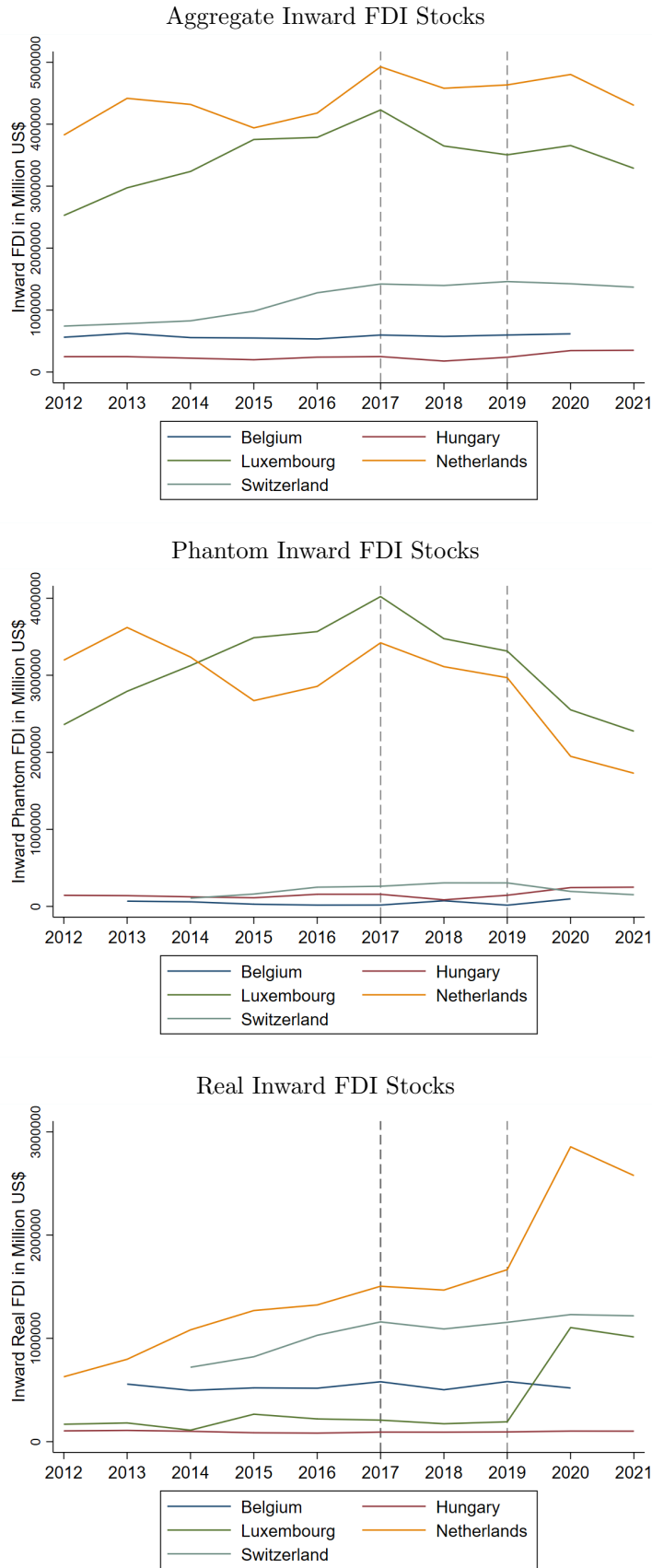
Figure 5: Inward FDI stocks in million USD for treaty shopping hubs

Note: The figure depicts inward FDI stocks into conduit countries. Data is obtained from the OECD main aggregates BMD4 database. Phantom FDI refers to FDI from special purpose entities (SPEs) and Real FDI refers to FDI from non-SPE entities, both are separately reported in the BMD4 database for some countries. Above we show conduit countries for which data is reported.

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lands signed the MLI on the 7th June 2017. The Dutch MLI entered into force on the first July 2019. In the base analysis, we set treatment to the signature date.

The aim of this analysis is to filter out a common trend in inward FDI positions into conduit nations. We focus on the Netherlands and on real inward FDI. The analysis then determines a synthetic Netherlands that allows us to filter out this common time trend. One challenge is that foreign direct investments into the Netherlands (relative to GDP) vastly exceeds that into any other country worldwide. As we only need to model counterfactual FDI *trends* through the control group, however, we define an FDI inflow index (for real FDI), which is normalized for all countries at the outset of our sample frame. Our donor pool comprises countries worldwide which are no conduit nations and therefore unlikely to be used for treaty-shopping, and for which all predictor variables are available in our sample frame. The results are presented in Figure 6. The estimated weights are given in Table D.1 of the Appendix.
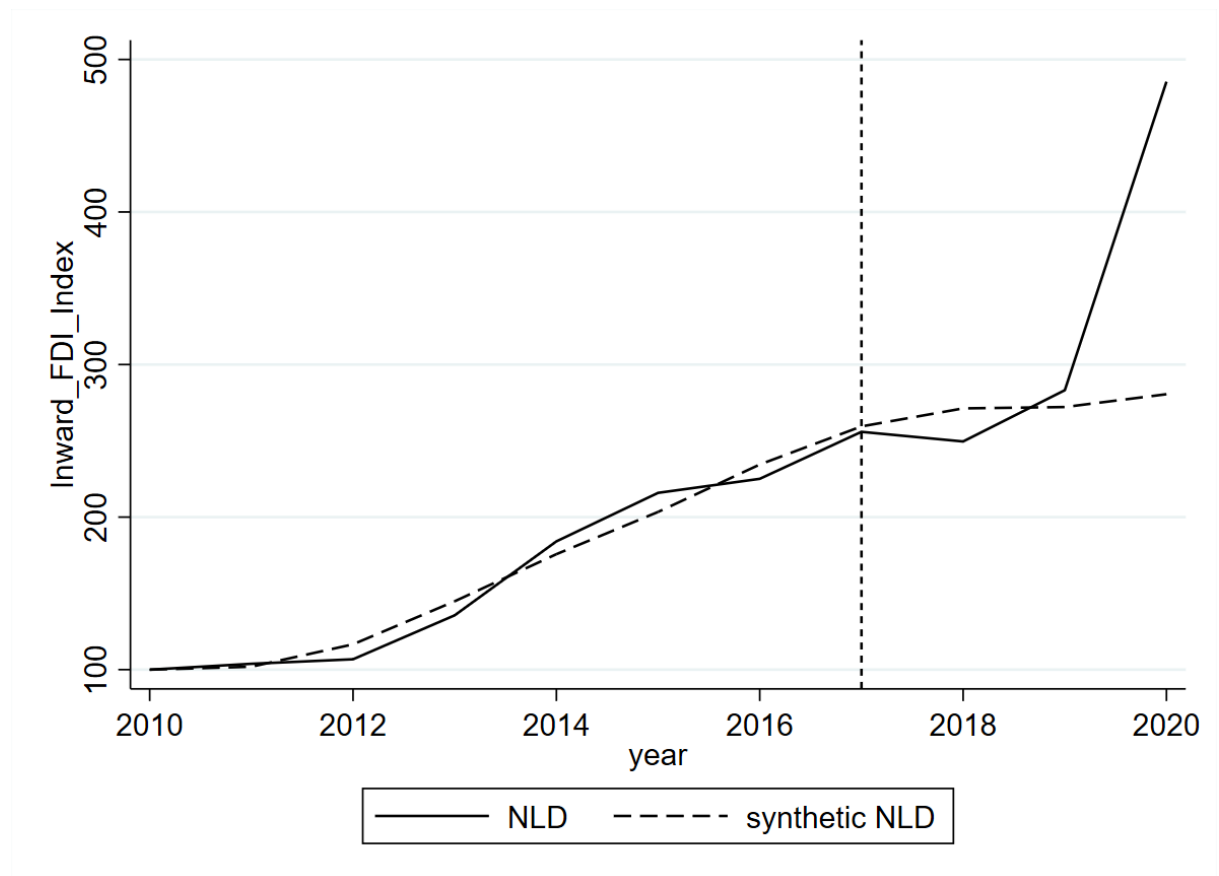
Figure 6: Trends in Inward FDI Index - Netherlands vs. synthetic Netherlands.

Note: The figure depicts results from a synthetic control analysis. For a description of the synthetic control method, see App.D. Inward FDI positions are obtained from CDIS. Our synthetic control group selection accounts for log of GDP per capita, trade openness, GDP growth, population and inflation obtained from the World Bank. The donor pool includes countries worldwide which are no conduit nations and for which all predictor variables are available in our sample frame from 2010-2016 (see D.2).

Prior to treatment, the real FDI index for the real and the synthetic Netherlands emerge in a parallel way. After the ratification date, we find indication for a significant increase in

real FDI in the Netherlands. The pattern is thus comparable to the descriptive analysis.

In order to test whether this is indeed a significant increase, we run placebo tests. The idea is to apply the synthetic control method to every country in the donor pool allowing to assess whether the treatment effect is large relative to the effect estimated for any random country. Following Abadie, Diamond and Hainmueller (2010), we only keep those observations for which the fit in the pre-treatment period looks reasonably good. Figure 7 plots the results. The red line plots the gap in the inward FDI index between the Netherlands and its synthetic counterpart (i.e. the difference between the solid and the dashed lines of Figure 6). Again, we see a large effect. The grey lines plot the placebo gaps for other countries. As can be seen, the effect for the Netherlands strikes out, especially after the ratification date in 2019.

In robustness checks, we also follow Abadie (2021) and rerun our baseline model correcting for size differences across countries by using FDI positions relative to GDP as outcome variable. This yields estimates that resemble our baseline results (see Appendix D - Figure D.1). One conceptual challenge is that anti-treaty shopping provisions may also impact the FDI positions of non-conduit countries: If treaty shopping is abolished, companies face higher withholding tax rates on dividend payments and may lower foreign investment activity. We address this problem by restricting the donor pool in the synthetic control analysis to countries that did not join the MLI agreement and are therefore unaffected by the treatment. This yields results comparable to the ones presented in Figure 6 (available upon request).[27]

5.2 Bilateral FDI Flows Between Conduit and Non-Conduit Countries

Complementary, we rely on data on *bilateral* FDI flows to conduit countries to study the impact of the OECD's MLI and anti-treaty shopping rules on treaty shopping activity. Using bilateral information offers the advantage that it allows for a precise link between a given FDI stream and treatment, accounting for the fact that the MLI has not become active on all routes. If the tax treaties on a given route are covered by the MLI, we define them as treated in our empirical analysis. Bilateral flows to conduit countries, where tax

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[27]Since many large firms stopped using the Double-Dutch-Irish-Sandwich in 2020, we also look at the investment position of the Netherlands without investment from Ireland. Results do not change. Furthermore note that the Netherlands revised its SPE definition within our sample frame. After the publication of the "Final report of the Task Force on Special Purpose Entities" publishing a new SPE definition, the central bank of the Netherlands used this definition to revise their data leading to a "break in series" between 2014 and 2015 of around 700 bln euros as they only revised their figures back to 2015. The break in series is a result of a shift of around 250 businesses from the SPE-sector to the non-financial companies (Non-SPE) sector as these entities have more than 5 employees. For the other countries, no such break is indicated by the OECD data. In order to see whether our results are robust to this "break in series", we move 15% of total inward FDI from SPEs to non-SPEs following Damgaard et al. (2019). Results for the corrected FDI positions look similar (see Appendix D - Figure D.1).
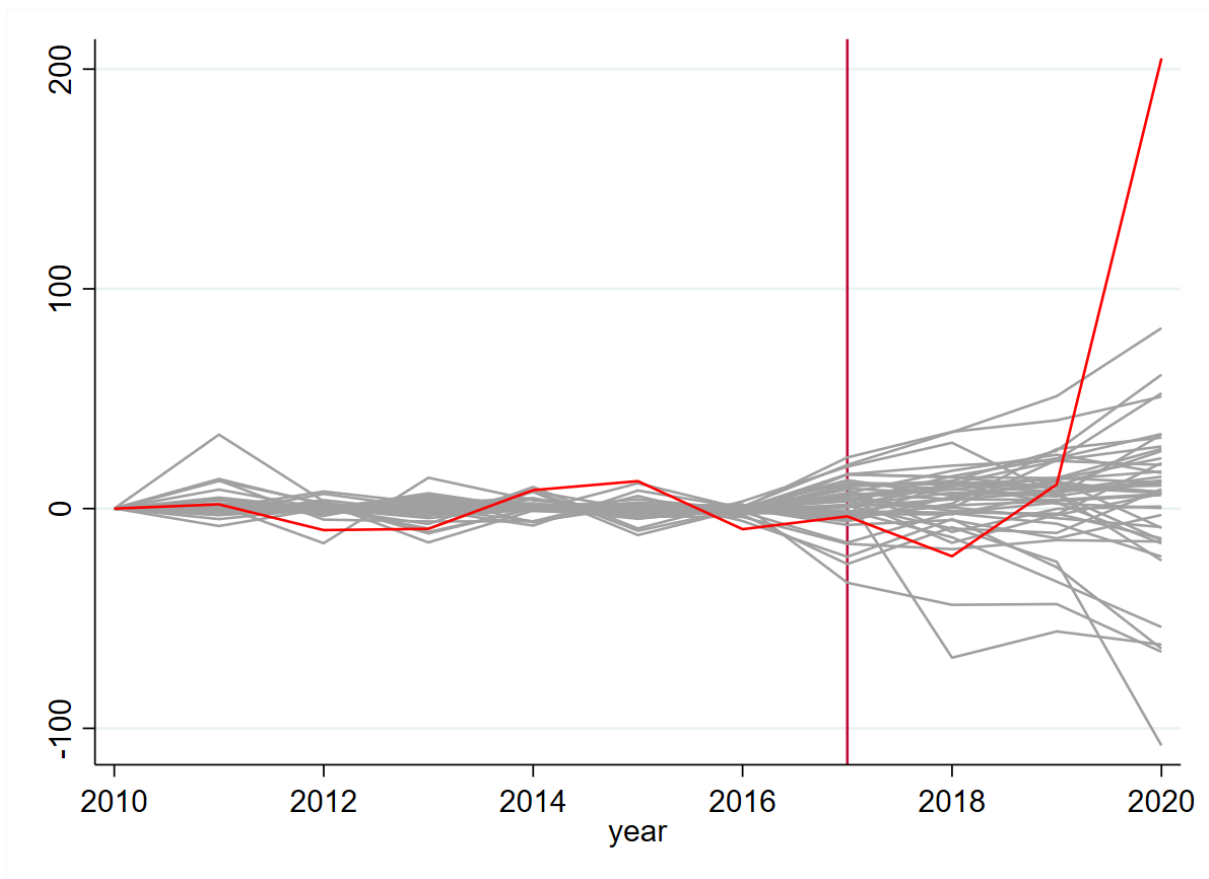
Figure 7: Inward FDI Index gap in the Netherlands and placebo gaps in donor pool countries

Note: The figure depicts the difference between the inward FDI index of the Netherlands and its synthetic counterpart as well as the results from placebo tests. We only use countries for which the fit in the pre-treatment period looks reasonably good.

treaties are not covered by the MLI, serve as control group in turn. This control group allows us to filter out shocks to FDI evolution unrelated to the treatment - i.e. MLI signature or ratification. [28]

We, furthermore, rely on data from IMF's Coordinated Direct Investment Survey (CDIS) which reports FDI on direct investor level. It has a large country coverage (126 countries) and is available from 2009 onwards. The analysis draws on data for the inward

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[28]We apply keyword search to assess whether country pairs had included anti-treaty shopping rules, that is PPT/LOB articles in their treaties before the BEPS process. We use natural language processing and search all 3,300 tax treaties in force downloaded from IBFD for keywords describing the articles introduced via the MLI. Keywords for a PPT clause include "entitlement to (treaty) benefits", "limitation on benefits", "principle/principal purposes", "if the main purpose", "that the main purpose", "mainly for the purpose". Keywords for a S-LOB clause include "simplified limitations on benefits", "restricts treaty benefits", "shall not be entitled", "only if such person is a qualified person", "if the following conditions are met". The keyword search represents our baseline, defining which treaties have already implemented anti-treaty shopping rules. Complementarily, we collect data from the Fourth Peer Review Report on Treaty Shopping published by the OECD in 2022 in which countries indicate whether they comply with the Action 6 minimum standard (OECD, 2022b). They indicate whether the treaty complies as originally signed, because an amending instrument was signed or because the relevant MLI provisions have started to take effect. Hence, we can extract for which treaties a PPT/LOB was in place before the implementation of the MLI.

FDI stock data - for missing entries, we use mirror FDI data. Note that the data only includes information on total FDI stocks, separate information on real and phantom FDI is unavailable at the bilateral level.[29]

We rely on a standard FDI gravity model.[30] To account for excess zeros in the FDI data, we use the pseudo poission maximum likelihood estimator following Santos Silva and Tenreyro (2006).[31] Formally, the model reads

$$FDI_{ijt} = \alpha + \beta_1 \cdot MLI_{ijt} + \delta \cdot X_{ijt} + \gamma_t + \gamma_{ij} + \epsilon_{ijt} \tag{9}$$

where the dependent variable is the bilateral inward FDI stock into host country i from source country j in year t. MLI_{ijt} is an indicator reflecting if the considered treaty is covered under the MLI, that is if PPT or LOB rules apply. In the base analysis, we include a full set of country-pair-fixed effects (γ_{ij}) and a full set of year fixed effects (γ_t). The model compares the development of FDI stocks on covered and non-covered routes. The specifications account for various country-specific and time-varying control variables: regional trade agreements (RTAs) and bilateral investment treaties (BITs) at the bilateral level and GDP and population at the level of the source and destination countries. In additional analyses, we rerun the baseline model but include full sets of source country (γ_{jt}) and host country (γ_{it}) time-fixed effects. This absorbs all common shocks at the host and destination country level: when countries, for example, join the MLI and then cover all of their routes, this common country-level shock would be absorbed in the empirical analysis. In these specifications, the variation used for empirical identification stems from idiosyncratic choices of countries to list or not list certain routes under the MLI. Further, we only include FDI routes from and to conduit nations (as these are the relevant routes where adjustments in treaty shopping behavior could emerge).

The results are presented in Table 1. Specifications (1) and (2) estimate Equation (9) assuming treatment at the time of MLI signature and ratification, respectively. The specification controls for country-pair-fixed and year fixed effects. The coefficient estimates point to a negative and statistically significant effect of MLI on FDI flows on conduit routes - consistent with the notion that anti-treaty shopping clauses implemented under the MLI diminish treaty shopping behavior. The effect is quantitatively moderate, however. Specifications (1) and (2) suggest that after signature/ratification, FDI on routes covered by the MLI drop by 4.6% and 9.2% respectively. The coefficients turn insignifi-

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[29]The total FDI position comprises the sum of real and phantom FDI. We exclude Serbia and Montenegro as FDI data is only available for separate countries whereas treaties are negotiated as one country. Also note that there are a considerable number of missing entries in the database. These entries are likely zeros. We nevertheless disregard these data fields in the base analysis. Setting missings to zero does not change our findings, however.

[30]The similarities between the structural FDI gravity system and the structural gravity equation of trade suggest that the well-established empirical application from the trade literature can be used in the FDI context as well (Anderson, Larch and Yotov, 2019).

[31]Note that, following convention in the literature, negative FDI stocks are replaced by zero.

Table 1: MLI-effect on FDI Flows on Conduit Routes (2010-2021).

VARIABLES	(1)	(2)	(3)	(4)
MLI_{ijt} (signature)	-0.0480*		0.0174	
	(0.0287)		(0.0289)	
MLI_{ijt} (ratification)		-0.0963**		0.0103
		(0.0287)		(0.0348)
Observations	24,002	24,002	25,857	25,857
Host country-Year FE	No	No	Yes	Yes
Source country-Year FE	No	No	Yes	Yes
Control Var.	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Countrypair FE	Yes	Yes	Yes	Yes

Note: The table presents the estimates for the FDI gravity model in Equ. (9). Robust standard errors are presented in parentheses. */** indicates p<0.1/p<0.05. The dependent variable is the bilateral inward FDI stock, which is taken from CDIS. The MLI indicator is taken from the MLI Matching Database in addition to a keyword search of all tax treaties downloaded from IBFD. Next to fixed effects, we, in Specification (1) and (2), control for regional trade agreements taken from the CEPII Gravity Database and bilateral investment treaties taken from UNCTAD's International Investment Agreements (IIA) Navigator as well as GDP and population at the level of the source and destination country taken from the CEPII Gravity Database. In Specifications (3) and (4), we control for full sets of home and destination country-year fixed effects.

cant when standard errors are clustered at the country pair level.[32] Specifications (3) and (4) indicate, in turn, that the effect vanishes when full sets of country-year fixed effects are included.[33] But the general picture is consistent in the sense that the MLI provisions do not appear to have led to a major reduction in treaty shopping activity.

6 Changes in Treaty Shopping Gains

The analysis in the previous subsection rejects that treaty shopping has been eradicated by the OECD's anti-treaty shopping rules. However, even if inclusive framework member countries were successful in abolishing treaty shopping within their network, challenges would remain: Even then, firms can still engage in treaty shopping through non-participating countries that did not join the IF and the BEPS process.

How large are firms' incentives to divert treaty shopping to other countries if routes between IF members are closed? To answer that question, we implement a network analysis, where we, for each investment-destination-home-country-pair, quantify the optimal path of dividend payments through the country network that minimizes the dividend withholding tax burden. We do the analysis twice: once for the pre-BEPS world; and once for the hypothetical case that inclusive-framework members effectively constrained

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[32]The standard error in Specification (1) changes from 0.0287 to 0.0523 and in Specification (2) from 0.0399 to 0.0608.

[33]As there is less variation to be exploited for identification, part of the latter drop may also relate to a loss of statistical power.

all treaty shopping within their network. Methodologically, we follow Van't Riet and Lejour (2018) and rely on the adapted Floyd-Warshall algorithm, which calculates the tax distances when profits are repatriated from an investment destination to the parent country, accounting for withholding taxes on dividends, double tax relief methods and statutory corporate tax rates.[34]

We apply the algorithm for each pair of 184 source and 195 residence countries. Similar to determining the shortest path in a transportation network, the algorithm searches for the shortest "tax distance" between two countries. If the tax-minimizing distance is the direct connection, there is no incentive for treaty shopping. If the shortest path involves conduits, firms have an incentive to use treaty shopping in order to minimize their overall tax burden (if treaty shopping costs do not exceed gains from the tax reduction). In the pre-BEPS world, for the destination-home-country-pairs in our sample, the gain from engaging in treaty shopping relative to direct repatriation amounts to 7.81 percentage points on average (grey bar on the left panel of Figure 8). If dividend streams are only routed through countries with sufficiently high governance standards (above the median and mean of the World Bank's regulatory quality index respectively), the average treaty shopping gain slightly drops. See the striped bar in the left hand panel of Figure 8.
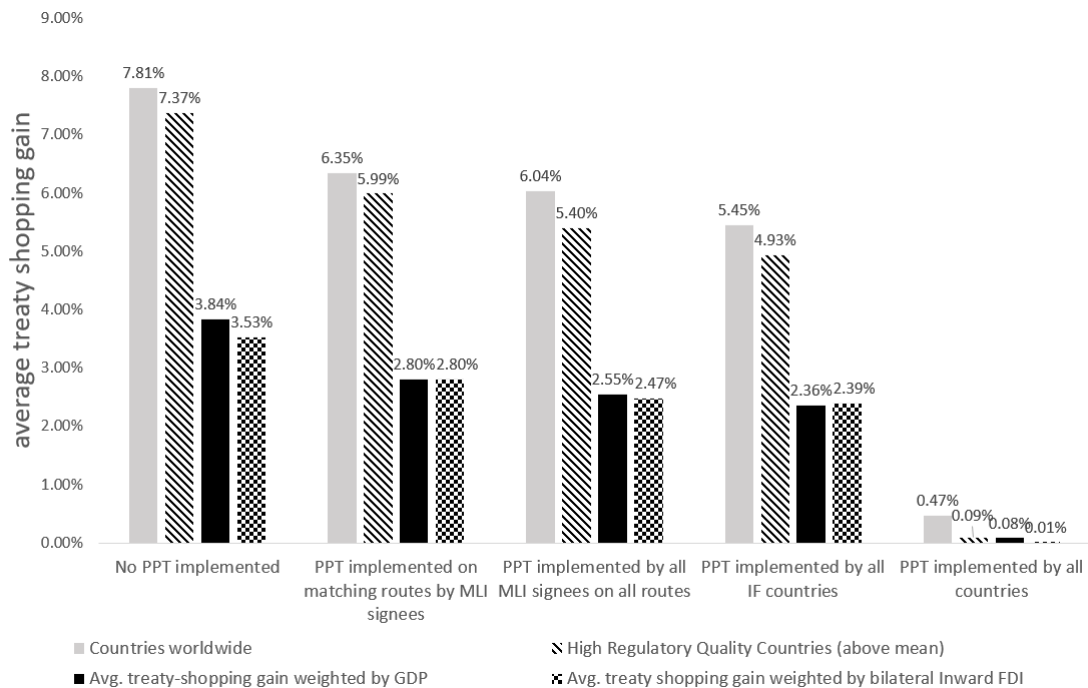
Figure 8: Treaty Shopping Gains

Note: We estimate the average treaty shopping gain using an adapted Floyd-Warshall algorithm following van't Riet and Lejour (2018), which calculates the shortest tax distance when profits are repatriated from an investment destination to the parent country, accounting for withholding taxes on dividends, double tax relief methods and statutory corporate tax rates obtained from the International Tax Institutions (ITI) database provided by the RSIT.

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[34]As Hong (2018) and Van't Riet and Lejour (2018), we concentrate on dividend streams and ignore interest and royalty payments.

In a second step, we rerun the analysis assuming that the MLI binds and bans any treaty shopping activity through MLI routes, i.e. country pairs where both countries have - to date - signed up for the MLI. The underlying notion is that the anti-treaty shopping regulations make treaty shopping prohibitively costly on these routes. Firms may still engage in treaty shopping through non-participating nations though. This lowers the average treaty shopping gain per country-pair to 6.35 percentage points if all routes through non-participating nations are assumed to be feasible and 5.99 percentage points if only routes through countries with a sufficiently good governance quality can be chosen (see second panel in Figure 8). If all countries that signed up for the MLI agreement effectively implemented the MLI and the associated anti-treaty shopping provisions, these gains shrink to 6.04 and 5.4 percentage points respectively – if all routes are feasible and only routes through countries with high governance standards work respectively (see third panel of Figure 8).[35] If in a next step, all IF countries implemented the MLI, the treaty shopping gain would be reduced further to 5.45 and 4.93 percentage points (see fourth panel of Figure 8). The results thus suggest that, with strict regulations, treaty shopping gains can be reduced, but not fully abolished.[36] If all countries, in turn, effectively implemented anti-treaty shopping regulations, then treaty shopping would indeed "be killed" (see fifth panel in Figure 8). Note that similar insights emerge when we weigh routes according to their economic importance - either by bilateral inward FDI into the source country or by the aggregate GDP of both countries: the average treaty shopping gains are consistently smaller, see the black and dotted bars in Figure 8, but feature a similar relative drop when moving from the pre to the post-BEPS world.

7 Conclusion

The aim of this paper was to contribute to our understanding whether the OECD's BEPS process - countries' first internationally coordinated attempt to constrain multinational tax avoidance - was successful in limiting tax avoidance behavior. The analysis focuses on BEPS actions that require changes to double taxation treaties, in particular new regulations against treaty shopping practices, and the MLI, that is the OECD's instrument

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[35]Note that we assume that countries which are not part of BEPS but have nevertheless signed the MLI (Cyprus, Kuwait and Fiji) are not part of the MLI signees. If we include them, the treaty shopping gain already drops to 5.61% (4.63%) on matching routes and 4.81% (3.32%) for all MLI signees. The treaty shopping gains are smaller as Cyprus is a well known treaty shopping hub.

[36]Consider for example a company that repatriates profits from Tunisia to Germany. Without the anti-treaty shopping rules, firms investing in Tunisia have several options to circumvent the bilateral treaty withholding tax rate applied to repatriated dividends from Tunisia to Germany of 15%. One possibility is to set up an intermediate holding company in Mauritius, since the treaty, Tunisia-Mauritius, reduces withholding taxes to 0% and Mauritius does not levy withholding taxes on dividends. All three countries, Tunisia, Germany and Mauritius signed the MLI. However, since Tunisia did not list the treaty with Mauritius as a covered tax agreement, the channel remains open even after the introduction of the anti-treaty shopping rules.

to ensure a swift implementation of anti-shifting rules into double taxation treaties. While the OECD's BEPS process and the commitment of 141 countries to enact internationally harmonized anti-profit shifting laws have been celebrated as a major step towards the end of international tax-avoidance by policy makers and the media, there is to date little systematic evidence on the effectiveness of the regulations. We help closing this gap.

Our findings highlight that constraining profit shifting can be a challenging endeavor. We find that the take-up of the MLI - and with it the take-up of anti-treaty shopping rules - is imperfect among IF member countries. We present a theoretical model to rationalize patterns in take-up behavior. We show that the rules might eventually mainly benefit conduit countries: Firms have incentives to enhance their real economic activity in conduit nations to circumvent the application of the new anti-treaty shopping provisions (which only apply if arrangements serve the sole purpose to save taxes). If they do, treaty shopping activities - and related tax revenue losses in non-conduit countries - prevail and conduit nations might benefit from the additional economic activity. This is consistent with the observation that conduit countries unanimously joined the MLI and covered most of their tax treaties under the agreement.

Further empirical analyses indeed reject major changes in treaty shopping behavior after the implementation of the MLI and anti-treaty shopping clauses - suggesting that the measures have so far not yet been able to eradicate treaty shopping practices as envisaged by the OECD. FDI flows through conduit countries declined moderately at best. This finding is robust to a number of different empirical specifications. There is also indication that firms indeed enhance their real economic activity in conduit nations. In a final set of analyses, we highlight that even if BEPS countries will eventually be successful in effectively constraining treaty shopping within their network, some incentives for treaty shopping through non-participating nations prevail. Notwithstanding that the OECD's BEPS agreement has been a major diplomatic achievement, our paper highlights that the path to a world without international tax avoidance is thorny. We are not there yet.

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A MLI Articles

Table A.1: Overview of MLI Articles: In the following, we describe the articles of the multilateral instrument. They are organized by the BEPS action item they refer to.

Action 2: Neutralising the effect of hybrid mismatch arrangements	
MLI Article	Description
Article 3: Transparent Entities (optional)	Treaty benefits for income derived through fiscally transparent entities, such as partnerships or trusts, will only be granted where one of the two countries treats the income as income of one of its residents under its domestic law.
Article 4: Dual resident entities (optional)	Most treaties use an entity's place of effective management (POEM) as the key tiebreaker test to determine a dual resident's country of tax residence for treaty purposes. Under Article 4, the tiebreaker will instead be determined pursuant to mutual agreement of both countries, having regard to POEM but also the place of incorporation and any other relevant factors.
Article 5: Application of methods for elimination of double taxation (optional)	Three options will ensure that countries relieve double taxation by crediting foreign tax against domestic tax rather than by exempting foreign income from domestic tax.
Action 6: Prevention of tax treaty abuse	
MLI Article	Description
Article 6: Purpose of CTA (minimum standard)	Introduces preamble text in CTA stating that the jurisdictions intend to avoid creation of opportunities for non-taxation or reduced taxation through tax evasion or avoidance, and through treaty shopping arrangements.
Article 7: Prevention of treaty abuse (minimum standard)	Introduces new anti-abuse rules that will enable tax administrations to deny treaty benefits in certain circumstances. Countries may choose between three options: the principal purpose test (PPT), the simplified limitation on benefits (LOB) provisions plus PPT, or the detailed LOB plus anti-conduit mechanism.
Article 8: Dividend transfer transactions (optional)	Introduces additional criteria of "365 days minimum holding period" for the shareholder to avail concessional tax rates under CTA.
Article 9: Capital gains from alienation of shares or interest of entities deriving their value principally from immovable property (optional)	Introduces additional criteria of "365 days minimum holding period" in case of gains arising from alienation of shares or other participation rights if such shares or rights derive more than a specified percentage of their value from immovable property situated in the source jurisdiction. Optional provision of inserting a minimum value derivation criterion of 50 percent of their value directly or indirectly from immovable property.
Article 10: Anti-abuse rule for PE situated in third jurisdictions (optional)	Under Article 10 treaty benefits will be denied if an item of income is attributable to a PE in a third jurisdiction where the tax burden is less than 60 % of the tax that would be imposed in the residence state.
Article 11: Application of tax agreements to restrict a party's right to tax its own residents (optional)	Preserves the right of jurisdiction to tax its own residents.

(continued)

Table A.1: Overview of MLI Articles *(continued)*

Action 7: Permanent establishment status

MLI Article	Description
Article 12: Artificial avoidance of PE status through commissionaire arrangements and similar strategies (optional)	This provision lowers the threshold at which a PE arises through broadening the scope of dependent agent PEs and including further activities.
Article 13: Artificial avoidance of PE through the specific activity exemptions (optional)	Most tax treaties include a list of exceptions to the definition of permanent establishment where a place of business is used solely for specifically listed activities such as warehousing or purchasing goods. Only genuine preparatory or auxiliary activities will be excluded from the definition of PE (Article 13(1) of the MLI). In addition, related entities will be prevented from fragmenting their activities in order to qualify for this exclusion (Article 13(4) of the MLI).
Article 14: Splitting-up of contracts (optional)	Counters "contract splitting" avoidance where long-duration contracts are split into a series of shorter contracts.
Article 15: Definition of a person closely related to an enterprise (optional)	Defines the term "person closely related", in the context of MLI Articles 12,14 and 14.

Action 14: Mutual agreement procedure

| MLI Article	Description
Article 16: Mutual agreement procedure (minimum standard)	Provides that all CTAs will now include a minimum standard for MAPs. If a treaty-related case qualifies to be considered under the MAP, upon the request of a taxpayer, the competent authorities should endeavour to agree between themselves how double tax agreements should apply, and implement any agreement. This will provide taxpayers with a more effective tax treaty-based dispute resolution procedure.
Article 17: Corresponding adjustments (optional)	Requires jurisdictions to make appropriate corresponding adjustments in transfer pricing cases.
Article 18-26: Arbitration (optional)	Part VI of the MLI allows countries to adopt an arbitration regime that allows taxpayers to request arbitration where a case has been subject to a MAP for at least two years, without resolution. Two different types of decisionmaking processes are facilitated: "final offer" approach (or "baseball" arbitration) or the "independent opinion" approach.

B   The Optional Provisions

In this appendix, we describe the take-up of the optional treaty-related BEPS action items on hybrid mismatches (Action 2), PE status (Action 7) and dispute resolution (Action 14). As sketched below, all of these regulations have hardly been adopted.

Regarding BEPS Action 2 on hybrid mismatch arrangements (Articles 3-5 of the MLI), 65 countries decided against the entire Article 3, 58 decided against the entire Article 4 and 41 decided against the entire Article 5. Hence, out of the 1,708 treaties modified by the MLI, only 377 include the BEPS Action 2 regulations of Article 3 (transparent entities), 318 of Article 4 (dual resident entities) and 119 of Article 5 (application methods for elimination of double taxation).

The upper part of Figure B.1, moreover, shows that many countries did not opt in favor of MLI articles that tighten the PE definition and hence the tax nexus (BEPS Action 7 on permanent establishments, Articles 12/14 of the MLI). As these articles shift taxing rights from residence to source countries, the figure intuitively shows that those countries that opted for modifications under BEPS actions 7 are capital-importing countries of the Global South, while capital-exporting countries of the Global North hardly opted for the provisions. As treaties are only modified if both treaty partners opt for a change under the MLI, a relatively small fraction of tax treaties is changed, in particular on North-North and North-South routes (see the lower panel of Figure B.1).

The picture looks similar for the non-mandatory provisions concerning BEPS Action 14 on mutual agreement procedures. The upper panel of Fig. B.2 shows that only a very small number of countries opted for mandatory binding arbitration and practically all those which did are located in the Global North. This is consistent with the notion that global mandatory binding arbitration is challenging to administer for tax administrations in less developed countries. In consequence, only 14.58% of the treaties are modified such as to incorporate mandatory binding aribitration (see lower panel of Fig. B.2).

MLI countries that opted for PE provisions
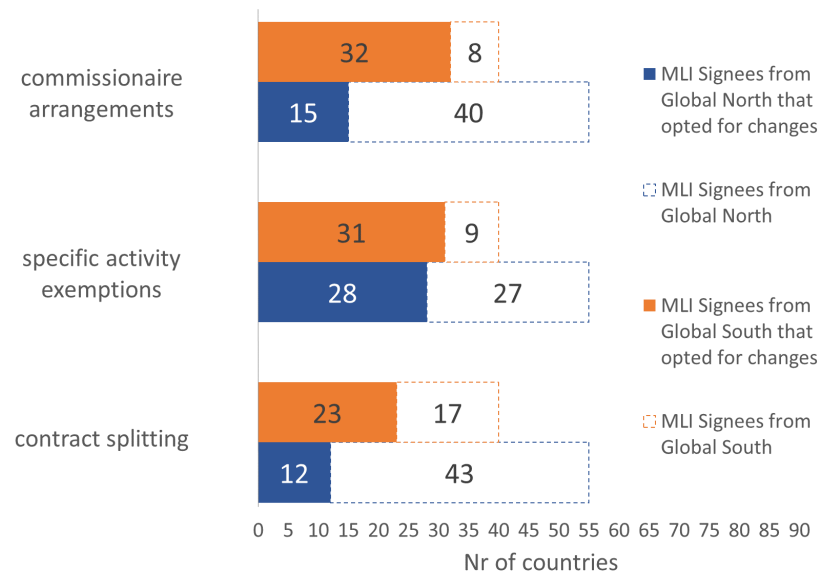
Treaties augmented by PE provisions
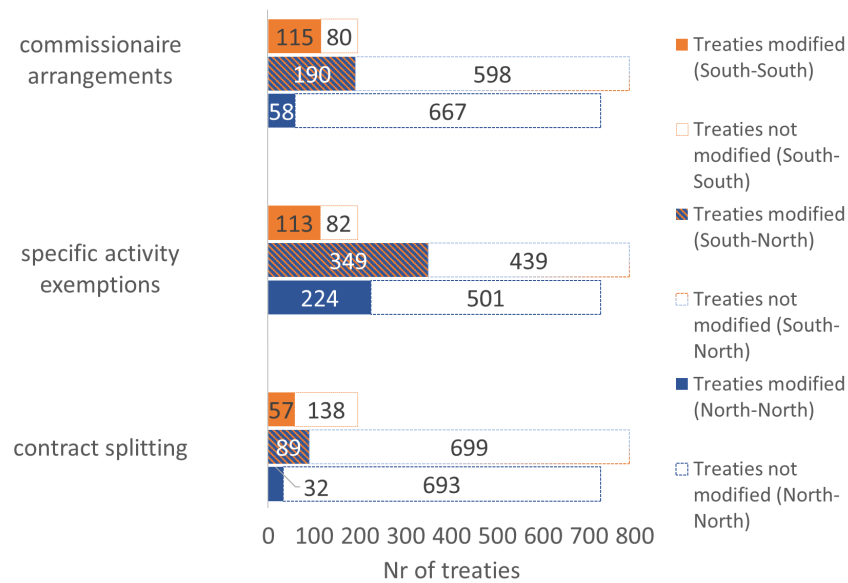
Figure B.1: Take-up of Measures Against Avoidance of Permanent Establishment Status

Notes: The graph shows how many countries opted out of Article 12/13/14 concerning BEPS Action 7 (permanent establishment status) and how many treaties were in consequence modified by the MLI Articles 12/13 and 14. MLI positions are obtained from the MLI Matching Database as of 30 Sept 2021. Countries are divided into Global North and Global South according to the income classification of the World Bank. Global North refers to countries with high income and Global South to countries with upper middle income, lower middle income and low income.

MLI countries that opted for mandatory binding arbitration
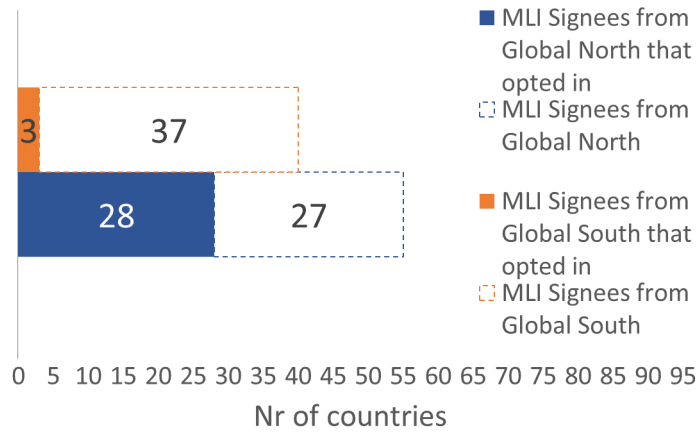
Treaties augmented by mandatory binding arbitration
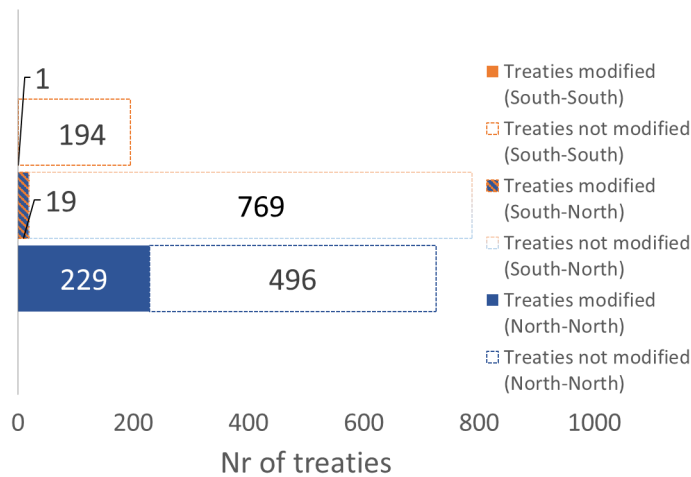
Figure B.2: Take-up of Mandatory Binding Arbitration

Note: The graph shows how many countries opted out of Part VI (Article 19: mandatory binding arbitration) concerning BEPS Action 14 (mutual agreement procedure) and how many treaties were in consequence modified by MLI Part VI. MLI positions are obtained from the MLI Matching Database as of 30 Sept 2021. Countries are divided into Global North and Global South according to the income classification of the World Bank. Global North refers to countries with high income and Global South to countries with upper middle income, lower middle income and low income.

C Additional Figures - Observations on MLI Take-up

This section presents several robustness checks on section 3 (observations). Figure C.1 reruns the analysis presented in Figure 2b in the main text but controls for a full set of year fixed effects. This leaves our estimates largely unchanged, thereby mitigating concerns that tax capacity correlates with the date when countries join the IF and the latter may thus act as a confounder. Figure C.2, moreover, reruns the analysis in Figure 2b of the main text, using GDPpC as an alternative measure for countries' tax capacity. This follows the observation that tax administrative capacity strongly correlates with countries' development level. Finally Figure C.3 (Figure C.4) shows that non-conduit countries, conditional on both countries signing the MLI, are more likely to list routes to non-conduit countries under the agreement at signature (ratification).
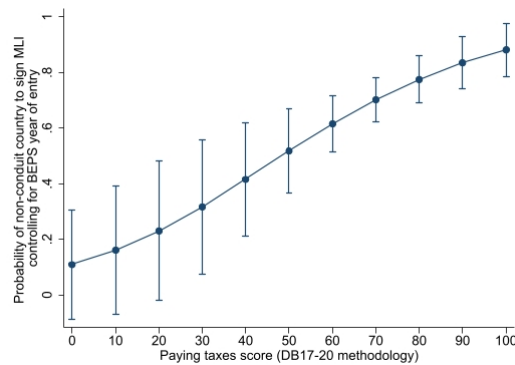
Figure C.1: Probability to Join MLI and Countries' Tax Capacity, Conditional on Year of BEPS Entry

Note: The figure depicts correlates of non-conduit countries' decision to sign the MLI which is taken from the OECD's "Status List of Signatories and Parties to the MLI". Tax capacity is measured by the paying taxes measures of the Doing Business records in 2017. In addition, we control for the year the country committed to BEPS and became part of the IF.
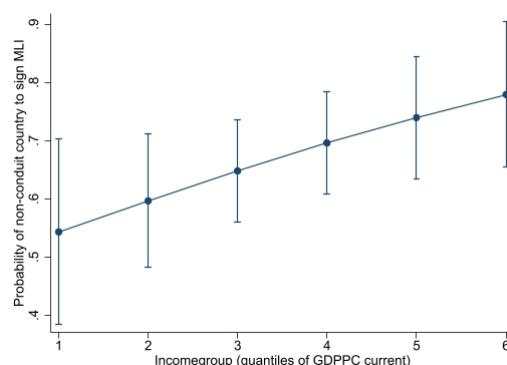
Figure C.2: Probability to Join MLI and Countries' Tax Capacity, measured by GDPpC

Note: The figure depicts correlates of non-conduit countries' decision to sign the MLI which is taken from the OECD's "Status List of Signatories and Parties to the MLI". GDP per capita in 2017 is used as a proxy for tax capacity and is obtained from the World Development Indicator database from the World Bank.

Figure C.3: Probability of non-conduit country to list treaty with conduit routes conditional on both countries signing the MLI at signature.

Note: The figure depicts correlates of non-conduit countries' decision to sign the MLI which is taken from the OECD's "Status List of Signatories and Parties to the MLI". We control for both countries signing the MLI. The exposure to treaty shopping is measured by the inward FDI position from conduit countries relative to GDP in 2017 (for which bilateral FDI positions are retrieved from the IMF's Coordinated Direct Investment Survey (CDIS) and GDP from the World Development Indicator database from the World Bank.

Figure C.4: Probability of non-conduit country to list treaty with conduit routes conditional on both countries signing the MLI at ratification.
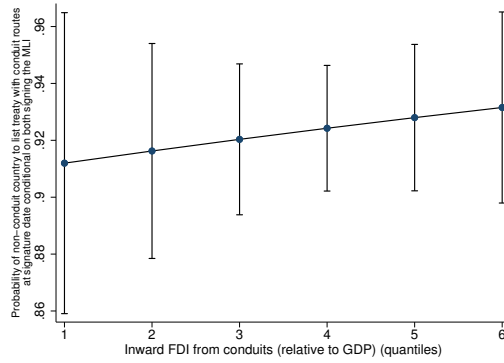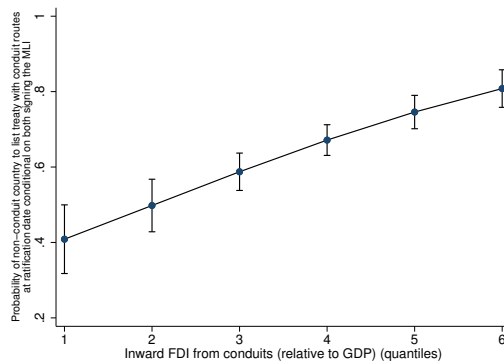
Note: The figure depicts correlates of non-conduit countries' decision to ratify the MLI which is taken from the OECD's "Status List of Signatories and Parties to the MLI". We control for both countries signing the MLI. The exposure to treaty shopping is measured by the inward FDI position from conduit countries relative to GDP in 2017 (for which bilateral FDI positions are retrieved from the IMF's Coordinated Direct Investment Survey (CDIS) and GDP from the World Development Indicator database from the World Bank.

D Synthetic control method

In the following, we will briefly outline the estimation strategy related to synthetic controls, highlight advantages and outline why the design is suitable in our analysis. For a more detailed discussion of synthetic control estimation, see Abadie, Diamond and Hainmueller (2010) and Abadie (2021). Synthetic control methods are designed to estimate the effect of interventions affecting only a small number of large units, in our case countries. They address the great challenge of estimating how the outcome would have evolved in

the absence of treatment and are thus closely linked to comparative case studies such as the well known studies by Card (1990) or Card and Krueger (1994) which use unaffected cities or states as control groups. The general idea of synthetic controls is that the combination of unaffected entities might provide a better fit than a single unaffected unit, especially if one has only a small number of unaffected units available. The advantage of synthetic controls is therefore flexibility, as one is not bound by the existing units, and it formalizes the selection of the comparison units which allows for quantitative inference. In a setting where we observe $J + 1$ units: $j = 1, 2, ...J + 1$, we assume that $j = 1$ is the treated unit whereas all other units are unaffected by the policy intervention $(j = 2, ..., J)$. The unaffected units are also called donor pool. The data spans T periods and for each unit, j, and time, t, we observe the outcome variable of interest, Y_{it}. We are interested in estimating the effect of a policy intervention in a post-intervention period, $t > T_0$. Y_{1t}^I is the outcome under treatment and Y_{1t}^N is the outcome under no treatment. Thus, our treatment effect is:

$$\tau_{1t} = Y_{1t}^I - Y_{1t}^N \tag{D.1}$$

Since Y_{1t}^N is unobservable, we need to estimate the potential response of the treated unit without intervention, which we denote $\hat{Y}_{1t}^N$. In order to do so, we rely on our donor pool and use a weighted average of the outcome of interest of the untreated units, a synthetic control, which can be formally defined as

$$\hat{Y}_{1t}^N = \sum_{j=2}^{J+1} w_j Y_{jt} \tag{D.2}$$

The weights, $w_2, ..., w_{J+1}$, are chosen so that the resulting synthetic control best resembles the pre-intervention values for the treated unit of the k predictors of the outcome variable, $X_1, ..., X_{J+1}$. Given a set of nonnegative constants, $(v_1, ..., v_k)$, Abadie et al. (2010) propose to choose the synthetic control $\boldsymbol{W}^* = (w_2^*, ..., w_{J+1}^*)'$ that minimizes

$$||\boldsymbol{X}_1 - \boldsymbol{X}_0 \boldsymbol{W}|| = \left(\sum_{h=1}^{k} v_h (X_{h1} - w_2 X_{h2} - ... - w_{J+1} X_{hJ+1})^2 \right)^{1/2} \tag{D.3}$$

subject to the restriction that $w_2, ..., w_{J+1}$ are nonnegative and sum to one. The k predictors $X_1, ..., X_{J+1}$ can also include pre-intervention values of the outcome variable Y_{jt} and are weighted by $v_1, ..., v_k$. For a given set of weights, $v_1, ..., v_k$ Equation D.3 can be minimized using constrained quadratic optimization. That is, each potential choice of $\boldsymbol{V} = (v_1, ..., v_k)$ produces a synthetic control, $\boldsymbol{W}(\boldsymbol{V}) = (w_2(\boldsymbol{V}, ..., w_{J+1}(\boldsymbol{V}))'$, which can be determined by minimizing equation D.3, subject to the restriction that the weights $\boldsymbol{W}(\boldsymbol{V})$ are positive and sum to one. The question of choosing $V = (v_1, ..., v_k)$ remains and one possibility proposed by Abadie, Diamond, and Hainmueller (2015) is out-of-sample

validation. The weights depend on the relative importance of each $X_{11}, ..., X_{k1}$ as a predictor of Y_{1t}^N. Since Y_{1t}^N is not observed in the post-intervention period, the predictors' fit has to be determined in the pre-intervention period. This can be achieved by splitting the pre-intervention period into a training and validation period. When for every value $\boldsymbol{V}$, $\tilde{w}_2(\boldsymbol{V}), ..., \tilde{w}_{J+1}(\boldsymbol{V})$ are the synthetic control weights computed with training period data on the predictors, a value $\boldsymbol{V^*}$ can be selected such that the mean squared prediction error (MSPE)

$$\sum_{t=t_0+1}^{T_0} (Y_{1t} - \tilde{w}_2(\boldsymbol{V})Y_{2t} - ... - \tilde{w}_{J+1}(\boldsymbol{V})Y_{J+1t})^2 \tag{D.4}$$

is small. The resulting $\boldsymbol{V^*}$ is then used to calculate the $\boldsymbol{W^*} = \boldsymbol{W(V^*)}$.

We use typical determinants of foreign direct investment positions as a potential set for $V*$ such as log of GDP, a measure for trade openness, GDP growth, Population and Inflation. We also include the outcome itself, Inward FDI position to exploit comovement of the outcome variable of interest across the countries in our data. As the pre-intervention period, we use 2010-2016 since the Netherlands signed the MLI on the 7th June 2017. Even though the MLI entered into force on the first July 2019, we prefer to use the signature date since companies could have already anticipated the intervention after signature and in those cases, Abadie et al. (2010) recommend to redefine the treatment time to be the first period in which the outcome may possibly react to the intervention. The FDI statistics of the Netherlands are characterized by lots of Phantom FDI. We are interested in how Real FDI developed after the MLI came in place in order to provide evidence for firms' relabelling. Hence, we use the OECD statistics that reports Investment from non-SPEs for the Netherlands. For our donor pool, we use CDIS FDI positions as most countries do not report their FDI position separately. We use only BEPS countries which have not yet signed the MLI.

Table D.1: Synthetic control weights for the Netherlands

	Outcome						Outcome			
	(1)	(2)	(3)	(4)			(1)	(2)	(3)	(4)
Aruba	-	-	-		Korea		-	-	-	-
Armenia	-	-	-	-	Kuwait		-	-	-	-
Australia	-	-	-	-	Lithuania		-	-	-	-
Azerbaijan	0.541	-	0.312		Latvia		-	-	-	-
Bangladesh	-	-	-	-	Morocco		-	-	-	-
Bulgaria	-	-	-	-	Moldova		-	-	-	-
Bahrain	0.129	0.226	0.382	0.344	Mexico		-	-	-	-
Bosnia Herzeg.	-	-	-	-	North Macedonia		-	-	-	-
Belarus	-	-	-	-	Mongolia		-	-	-	-
Bolivia	-	-	-	-	Mozambique		-	-	-	-
Brazil	-	-	-	-	Mauritius		-	-	-	-
Bhutan	-	-	-	-	Malaysia		-	-	-	-
Botswana	-	-	-	-	Nigeria		-	-	-	-
Canada	-	-	-	-	Norway		-	-	-	-
China	-	-	-	-	Nepal		-	-	-	-
Costa Rica	-	-	-	-	New Zealand		-	-	-	-
Czech Republic	-	-	-	-	Pakistan		-	-	-	-
Germany	-	-	-	-	Panama		-	-	-	-
Denmark	0.022	-	-	-	Philippines		-	-	-	-
Spain	-	-	-	-	Poland		-	-	-	-
Estonia	-	-	-	-	Paraguay		-	-	-	-
Finland	-	0.729	-	-	Romania		-	-	-	-
France	0.308	-	-	-	Russia		-	-	-	-
Georgia	-	-	-	-	El Salvador		-	-	-	-
Greece	-	-	-	-	Slovak Republic		-	-	-	-
Guatemala	-	-	-	-	Slovenia		-	-	-	-
Honduras	-	-	-	-	Sweden		-	-	-	-
Croatia	-	-	-	-	Seychelles		-	-	-	-
Indonesia	-	-	-	-	Thailand		-	-	-	0.447
India	-	-	-	-	Turkey		-	-	-	-
Iceland	-	-	-	-	Ukraine		-	-	-	-
Israel	-	-	-	-	Uruguay		-	0.044	0.306	0.208
Italy	-	-	-	-	United States		-	-	-	-
Japan	-	-	-	-	South Africa		-	-	-	-
Kazakhstan	-	-	-	-	Zambia		-	-	-	-
Kyrgyz Rep.	-	-	-	-						
Cambodia	-	-	-	-						

Outcomes: (1) Real FDI, (2) Corrected Real FDI, (3) Real FDI relative to GDP, (4) Corrected Real FDI relative to GDP.

Table D.2: Outcome (1) - Real FDI Index

	$\boldsymbol{V^*}$	Mean	
		NL	Synthetic NL
Inward FDI Index 2012	.1119	106.8103	116.5967
Inward FDI Index 2014	.3706	184.0784	175.6893
Inward FDI Index 2016	.1075	225.0991	234.4772
log GDP per capita (current US$)	.0037	10.8217	9.5430
Trade openness (percentage of GDP)	.0159	147.0772	83.3845
GDP growth (annual %)	.0683	1.0439	1.9454
log Population	.2936	9.72998	9.4847
Inflation (annual %)	.0282	.7629	3.8783

Note: Normalized variable weights $\boldsymbol{V^*}$ and FDI predictor means before MLI signature (2010-2016).

Table D.3: Outcome (2) - Corrected Real FDI Index

	$\boldsymbol{V^*}$	Mean	
		NL	Synthetic NL
Inward FDI Index 2012	.1230	112.8578	118.9182
Inward FDI Index 2014	.1919	162.5009	142.1898
Inward FDI Index 2016	.5296	124.317	128.916
log GDP per capita (current US$)	.0385	10.8217	10.5420
Trade openness (percentage of GDP)	.0014	147.0772	93.9559
GDP growth (annual %)	.0752	1.0439	1.6701
log Population	.0181	9.72998	8.2518
Inflation (annual %)	.0221	.7629	1.9625

Note: Normalized variable weights $\boldsymbol{V^*}$ and FDI predictor means before MLI signature (2010-2016). Corrected Real FDI Index based on real FDI position from Netherlands corrected according to Damgaard et al. (2019)

**Table D.4:** Outcome (3) - Real FDI relative to GDP

| | | Mean | |
	$\boldsymbol{V}^*$	NL	Synthetic NL
Inward FDI Index 2012	.1119	106.8103	116.5967
Inward FDI Index 2014	.3706	184.0784	175.6893
Inward FDI Index 2016	.1075	225.0991	234.4772
log GDP per capita (current US$)	.0037	10.8217	9.5430
Trade openness (percentage of GDP)	.0159	147.0772	83.3845
GDP growth (annual %)	.0683	1.0439	1.9454
log Population	.2936	9.72998	9.4847
Inflation (annual %)	.0282	.7629	3.8783

Note: Normalized variable weights $\boldsymbol{V}^*$ and FDI predictor means before MLI signature (2010-2016).

Table D.5: Outcome (4) - Corrected Real FDI relative to GDP

| | | Mean | |
	$\boldsymbol{V}^*$	NL	Synthetic NL
Inward FDI Index 2012	.0125	113.8779	118.1546
Inward FDI Index 2014	.0436	154.3982	138.6789
Inward FDI Index 2016	.8975	134.317	136.4162
log GDP per capita (current US$)	.0004	10.8217	9.3302
Trade openness (percentage of GDP)	.0106	147.0772	124.9527
GDP growth (annual %)	.0052	1.0439	3.7062
log Population	.0189	9.7299	9.1378
Inflation (annual %)	.0109	.7629	3.4781

Note: Normalized variable weights $\boldsymbol{V}^*$ and FDI predictor means before MLI signature (2010-2016). Corrected Real FDI based on real FDI position from Netherlands corrected according to Damgaard et al. (2019)

Corrected Real FDI Index (2)

Real FDI relative to GDP (3)

Corrected Real FDI relative to GDP (4)
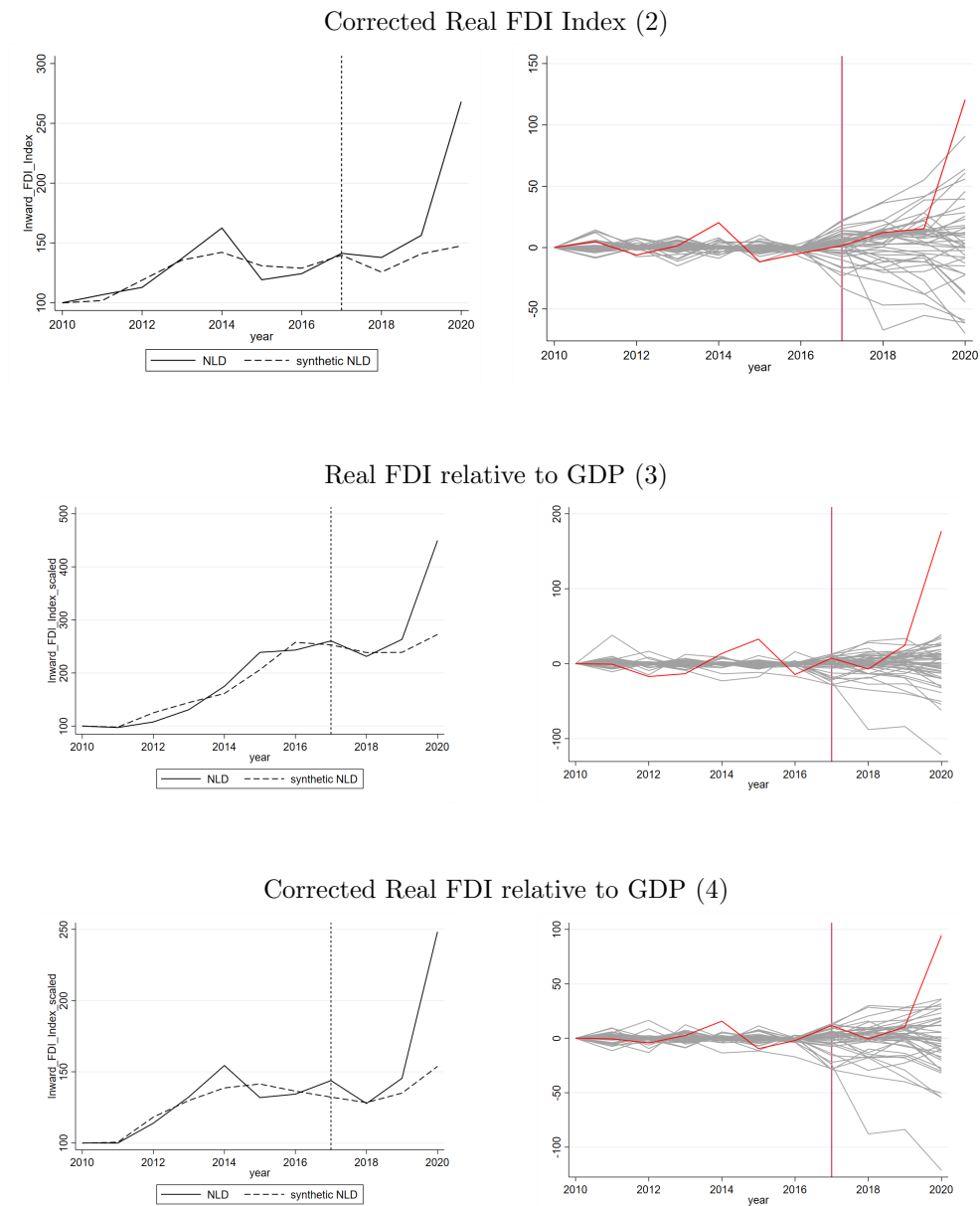
Figure D.1: Synthetic control results - Alternative Outcomes

Note: The figures on the left hand side depict results from a synthetic control analysis for which we use different inward FDI indices. Inward FDI positions come from CDIS. The synthetic control group selection accounts for log of GDP per capita, trade openness, GDP growth, population and inflation obtained from the World Bank. The donor pool includes countries worldwide which are no conduit nations and for which all predictor variables are available in our sample frame from 2010-2016. The figures on the right hand side depict the difference between the respective inward FDI index of the Netherlands and its synthetic counterpart as well as results from placebo tests. We only use countries for which the fit in the pre-treatment period looks reasonably good.

E   Background dividend withholding taxation

Source countries levy taxes on dividend, interest and royalty streams. The withholding tax rate applicable is defined in countries' statutory tax law but it is common practice to lower applicable withholding tax rates in bilateral double taxation treaties.

We collect data on dividend withholding taxes to determine the 'tax distance' between countries that is the withholding tax rate when dividends are repatriated from a country A to a country B. We do this, first, by accounting for the direct route from A to B. And second by using the Floyd-Warshall algorithm to determine the shortest 'tax distance' through the network, that is the route of profit repatriation that minimizes the withholding tax payment on the dividend stream. We thereby account for up to two nodes between the source and the residence country of the investor.

Information on withholding tax rates, double tax relief methods, corporate income taxes and bilateral investment treaties are retrieved from the International Tax Institutions (ITI) database provided by the Research School of International Taxation (RSIT). On average, the source countries in our data, by statutory tax law, levy a dividend withholding tax rate of 14.1%. The statutory withholding tax rate varies strongly across countries, however. Some countries, as for example Portugal, levy dividend withholding tax rates as high as 35%, while 33 countries (in 2020) levy a statutory withholding tax of zero: Brazil, Brunei Darussalam, Curacao, Cyprus, Estonia, Fiji, United Kingdom, Guernsey, China, P.R.: Hong Kong, Hungary, Isle of Man, India, Iran, Islamic Republic of, Jersey, Jordan, Libya, Liechtenstein, China, P.R.: Macao, Monaco, Maldives, Malta, Myanmar, Mauritius, Malaysia, Qatar, Singapore, San Marino, Sint Maarten, St. Vincent and the Grenadines, Vietnam, Samoa, Kosovo, Yemen. Double taxation treaties, generally, lower dividend withholding tax rates below the rate in the statutory tax law. Again treaty rates vary widely across countries however. The average direct withholding tax burden on dividends paid from source to residence countries in our sample is 12.02%. Based on the Floyd-Warshall algorithm, we determine by how much this direct withholding tax levy can be reduced by diverting the funds through another country instead. See main text for details.