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The digital economy, global tax reforms and developing countries: An evaluation of Pillar I and Art. 12B UN Model

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DISCUSSION PAPER

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The Digital Economy, Global Tax Reforms and Developing Countries – An Evaluation of Pillar I and Art. 12B UN Model

The Digital Economy, Global Tax Reforms and Developing Countries – An Evaluation of Pillar I and Art. 12B UN Model

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Abstract:

This paper evaluates the Multilateral Convention to implement Pillar I Amount A, released by the OECD in October 2023, and the alternative proposal of Art. 12B for tax treaties suggested by the UN, with a particular emphasis on the perspective of developing countries. We conduct a comparative analysis of the proposals using an integrated economic and legal approach. Our assessment is based on the two proposals' ability to generate tax revenue and their implications for net-importing countries. Our legal analysis demonstrates significant differences between the two proposals in the implied reallocation of taxing rights, depending on the considered (digital) business model. Interestingly, we find that overall and despite its complexity, Pillar I Amount A addresses the specific interests of developing countries better than Art. 12B UN Model. In particular, Pillar I Amount A will likely outperform the UN's proposal in terms of its tax revenue potential.

JEL: F23, H25, H32, K34

Keywords: Digital Economy, Corporate Tax, Global Tax Reform, OECD Pillar 1, Developing Countries

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1 Introduction

The two pillars, also referred to as “global tax reform”, were brought forward by the Inclusive Framework on Base Erosion and Profit Shifting (BEPS) in response to calls for a fairer tax system, particularly concerning the digital economy. Hosted by the Organisation for Economic Cooperation and Development (OECD) and G20 countries, the Inclusive Framework has grown to 145 countries that agreed on the two-pillar solution to address the tax challenges arising from the digital economy.¹ Both pillars represent major changes to the international tax system, particularly addressing large multinational enterprises (MNEs). Pillar I reallocates taxing rights to “market jurisdictions”, and Pillar II establishes a global minimum tax of 15%. While Pillar II is already being implemented or in force in more than 50 countries², including the European Union (EU) member states, Pillar I remains debated, with some even questioning its future implementation (e.g., Navarro, 2021; Marley, 2022; Báez Moreno & Brauner, 2023; Dourado, 2023). One major concern expressed by politicians of developing countries and researchers is that Pillar I might run counter to the interests and needs of developing countries (Ogutto, 2020; Dourado, 2023; Fedan, 2023). Specifically, they are skeptical about whether Pillar I will establish international equity and generate predictable and stable tax revenues. In addition, they criticize that developing countries cannot contribute to the conception of Pillar I on an equal footing.

As an advocate of the fiscal needs of low- and middle-income countries, the United Nations (UN) has proposed an alternative solution: a new Article 12B for integration into tax treaties, which is also criticized for its weakness with regard to neutrality and its technical deficiencies (Báez Moreno, 2021; Mpoha, 2022). While the UN proposal aims to allocate taxing rights to “market jurisdictions”, too, the underlying legal design and the definition of a market jurisdiction fundamentally differ from the OECD approach. Given the ongoing debates and the recent momentum in the negotiations of Pillar I, it is of very high policy interest to compare these two initiatives with a focus on the consequences for developing countries. In this paper, we study whether these recent supranational reform proposals for reallocating taxing rights effectively address the interests and needs of developing countries.

¹ We recognize that the Inclusive Framework on BEPS comprises – at present – 145 member countries and has the goal of including all members on equal footing. Due to the critique on the fairness in the procedure of negotiating global tax reforms (Codorniz Leite Pereira, 2023; De la Fera, 2023) and for simplicity reasons, we refer to the proposal brought forward by the OECD/G20 Inclusive Framework on BEPS as the “OECD proposal”.

² Own analysis based on PwC, 2024 (accessed 08.03.2024).

Employing an integrated economic and legal approach, our study unfolds in four steps. First, we provide a descriptive analysis of the distinct economic and tax characteristics of developing countries. We not only draw on the existing literature on fiscal capacity and corporate taxation in developing countries (e.g., Bahl & Bird, 2008; Boadway & Sato, 2009; Gordon & Li, 2009; Besley & Persson, 2014; Crivelli et al., 2016; Hearson, 2018; Ali et al., 2021) but additionally provide insightful new country-level descriptive statistics, using both readily available official data sources as well as self-assembled data. Specifically, we document the global network of tax treaties across all 218 countries worldwide and provide details on its patterns. Our findings on the specific characteristics of developing countries feed into the derivation of criteria for evaluating the two reform proposals.

Second, we conduct an in-depth comparison of the latest progress report on Pillar I Amount A³, published by the OECD in October 2023, and the UN's proposal for Art. 12B. Our comparison is focused on the proposed new places of taxation and the extent of redistribution of taxing rights. For this purpose, we normatively analyze differences in the scope of application and the design of the new taxing rights. Using consolidated firm-level data from Bureau van Dijk's Orbis, we estimate the number of MNEs globally affected by Pillar I. The number of MNEs potentially subject to Art. 12B UN Model is much higher but remains hard to estimate. We further assess the impact of specific design features of the new taxing rights on the overall effect of the two proposals by means of formulaic representations. All these design features have direct implications for in-scope MNEs and tax administrations in the countries involved.

Third, we demonstrate the differences in the allocation of taxing rights between the two reform proposals through illustrative case studies. In our assessment, we focus on four (digital) business models that we identify to be the most important for the redistribution of taxing rights or that are central to the debate about taxing the digital economy.

Lastly, we figure out whether existing tax revenue assessments on Pillar I (Starkov & Jin, 2022; Tandon & Rao, 2022; Baraké & Le Pouhaër, 2023; O'Reilly et al., 2023) and Art. 12B UN Model (Starkov & Jin, 2022) adequately take into account the differences in legal design that we identify as particularly relevant for the tax revenue consequences of the two proposals.

³ Next to Amount A, Pillar I also comprises the less prominent Amount B, which aims to create standardized transfer pricing benchmarks to increase tax certainty, simplify the administration of existing transfer pricing rules, and decrease costly transfer pricing disputes. However, Amount B does not seek to allocate new taxing rights (O'Reilly et al., 2023). We thus exclusively focus on Amount A and neglect Amount B from our analyses.

Based on our combined economic and legal analysis, we evaluate which reform proposal is more suitable to address the challenges that the digital economy poses to the current international tax system. We provide policy recommendations, specifically tailored to low- and middle-income countries, on whether to support the UN's or the OECD's proposal. Thereby, our paper contributes to the empirical literature on corporate taxation in developing countries (e.g., Besley & Persson, 2014; Best et al., 2015; Ali et al., 2021) and the literature on tax challenges arising from the digital economy (e.g., Olbert & Spengel, 2017; Devereux & Vella, 2018; Schön, 2018). In the broader context, we contribute to the long-standing discussion on inter-nation equity coined by Peggy Musgrave (e.g., Musgrave & Musgrave, 1972; Jacobs et al., 2004; Cui & Hashimzade, 2019). Prior literature has separately analyzed the reform proposals of the OECD (e.g., Cooper, 2021; Navarro, 2021; Báez Moreno & Brauner, 2023) and the UN (e.g., Báez Moreno, 2021; Mpoha, 2022), with some contrasting the two on a conceptual level (e.g., Bärsch & Keuper, 2021; Collier et al., 2021; Dourado, 2021). However, prior articles on Pillar I do not consider the latest progress reports by the OECD from July 2022 and October 2023, which differ substantially from earlier statements. Moreover, most prior studies neglect the distinct characteristics of developing countries, which can significantly affect the consequences arising from a reallocation of taxing rights. Therefore, our paper adds meaningfully to this strand of literature and the ongoing debate on the legal design and institutional foundation of the global tax reform (e.g., Andrés Aucejo, 2021; de la Feira, 2023)⁴.

This paper is organized as follows. Chapter 2 describes the distinct characteristics that differentiate developing countries from developed ones. Chapter 3 offers a comprehensive analysis contrasting OECD's Pillar I Amount A with the UN's Art. 12B. Subsequently, chapter 4 exemplifies the differences in the reform proposals through case studies of selected digital business models, emphasizing the respective places of taxation and their implications for developing countries. Chapter 5 analyzes existing revenue estimation studies on Pillar I Amount A and Art. 12B UN Model, highlighting their limitations and ramifications for developing countries. Finally, chapter 6 concludes.

⁴ This debate goes beyond the academic literature. Researchers, policymakers, members of non-profit tax organizations, and practitioners elaborate on the "tax tug of war" between the OECD and the UN in articles published in professional journals and newspapers, and in blog posts (e.g., Christensen, 2021; Bunn, 2023; Goulder, 2023; Katz-Pearlman, 2023; Murphy, 2021).

2 Developing Countries

2.1 Definition and Economic Characteristics

Countries are often classified into the broad categories of *developing* and *developed*. While there is no universal agreement on the definition of the two terms, generally, they refer to a country's economic and social advancement. The World Bank refers to Gross National Income (GNI)⁵ per capita to classify countries into four different income groups: low-income, lower-middle-income, upper-middle-income, and high-income.⁶ Following prior literature (e.g., Neumayer, 2007; Crivelli et al., 2016; Hearson, 2018; Janský & Šedivý, 2018), we base our analyses on the World Bank's country classification and refer to countries in the low- and middle-income groups as “developing” and those in the high-income group as “developed”. Of the total of 218 countries, 135 are therefore considered developing countries.⁷ With four exceptions,⁸ all 38 OECD member states are high-income countries, explaining why the OECD is sometimes dubbed the “club of the rich” (e.g., Schmelzer, 2014). Geographically, many developing countries are in Sub-Saharan Africa, Latin America, and Asia, while Europe and North America are highly developed, as displayed in *Appendix Figure 1* and *Appendix Table 2*.

There is, by definition, a large disparity in GDP as well as GDP per capita across World Bank income groups (see *Figure 2* and *Table 3* in the Appendix). Considering the economic dynamics, GDP grows at an average rate of (only) 3.36% in low-income countries, which is comparable to the growth rate of 3.37% observed for high-income countries. Upper-middle-income countries outpace the other income groups slightly, with an average growth rate of 3.94%. Turning to population size (*Appendix Figure 3* and *Table 3*), 89.86% of the global population lives in developing countries. On average, middle-income countries are the largest, with an average of 35.89 and 38.43 million people in the lower- and upper-middle-income

⁵ GNI includes a country's Gross Domestic Product (GDP), which refers to the total gross value added by all resident producers and the net receipts of primary income. The GNI measures are expressed uniformly in US dollars. For further details, refer to Fantom & Serajuddin (2016).

⁶ *Appendix Table 1* lists all 217 countries currently classified by the World Bank by their respective income group. We add Venezuela to the upper-middle-income group as it was consistently classified as an upper-middle-income country until 2021 and lacks any classification in 2022 and 2023 due to data unavailability. We maintain the current income group classification of countries also for time series analyses to ensure intertemporal comparability.

⁷ We acknowledge that this binary classification does not necessarily capture the complexities that arise even within income groups. For instance, larger developing countries such as China, India, and Indonesia substantially differ from smaller ones like Cambodia, Georgia, and Zimbabwe. This may affect their positions on tax matters. For example, even though India and Zimbabwe are both classified as lower-middle-income countries, their positions in negotiations concerning OECD's Pillar I Amount A strongly diverge.

Within the high-income group, tax havens, sometimes also referred to as investment hubs, constitute a special subgroup with distinct economic and tax characteristics. Due to the focus on developing countries, we do not consider low-tax jurisdictions separately.

⁸ Colombia, Costa Rica, Mexico, and Türkiye are considered upper-middle-income countries as of July 2023.

groups, in contrast to the relatively smaller average populations in high-income countries (12.35 million). This reflects a large potential consumer base in developing countries that has implications for the effect of global tax policy reforms. Similarly, populations in low-income countries grow at considerably higher rates (2.55% on average) than in high-income countries (1.37%), possibly indicating a growing consumer base, also for digital businesses.

The trade statistics of countries, as presented in *Appendix Table 4*, report large variations in patterns of external trade across different income groups.⁹ Developing countries are net-importing countries, as indicated by their below-one export-import ratio in *Appendix Figure 5*, with low-income countries featuring the lowest ratios. This suggests that these countries consume more than they produce for global markets. Developed countries, on the other hand, are net exporters. Considering the share of Information and Communication Technology (ICT) goods¹⁰ in the total trade volumes underscores the technological divide between the different country groups (*Appendix Figure 6*). These ICT shares amount to 7.11% of exports and 8.62% of imports of goods for high-income and OECD countries, compared to just 0.39% (exports) and 3.68% (imports) for low-income countries. This suggests that digital goods consumed in developing countries likely originate from the digital economy in high-income countries. However, as displayed in *Appendix Figure 7*, irrespective of the income group, most countries are characterized by an export-import ratio of ICT goods below 1. Only a small share of (mostly high-income) countries exhibit a higher value of ICT exports relative to imports.

Beyond these macroeconomic patterns, microeconomic data provide further descriptive evidence on the distinct characteristics of developing countries. Specifically, it is helpful to study the allocation of business activity and capital within MNEs to understand the potential implications of global tax reforms. Using aggregated and anonymized CbCR data, we are able to examine the economic footprint of large MNEs. The financials disclosed in CbCRs are linked to an MNE's physical presence, which can be either the residence of a legal entity or the location of a permanent establishment. Importantly, CbCR data does not provide insights into the market presence of an MNE beyond what is captured by a physical nexus. Direct exports and local activities below the minimum threshold for constituting a permanent establishment are not apparent. In *Appendix Figure 8*, we illustrate the geographical dispersion of the physical

⁹ Time series on average exports and imports are depicted in *Figure 4* in the *Appendix*.

¹⁰ ICT goods in the World Bank dataset include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other ICT goods. Software is categorized as a service and, therefore, generally excluded. Embedded software in certain types of ICT goods still might be included. There are no statistics for ICT services (UNCDAT, 2014).

presence of large MNEs. *Panel A* shows that the majority of constituent entities¹¹ belonging to large MNEs are owned and controlled by ultimate parent entities (UPEs) in high-income countries, with the United States dominating by a significant margin. A comparatively small number of constituent entities are owned and controlled by UPEs in middle-income countries. Notably, none of the UPEs are residents of low-income countries, emphasizing the vast disparity in capital accumulation and market control between developing and developed countries.¹² *Panel B* maps the location of all constituent entities belonging to large MNEs, indicating a stark contrast in physical MNE activity across different regions. Highly developed regions, particularly North America and Europe, exhibit the darkest shades, indicating a large number of constituent entities being located there. Developing countries, while hosting MNE constituent entities, exhibit much lighter shades, suggesting a lower number of legal entities and permanent establishments.

Appendix Table 5 displays the number of constituent entities of large MNEs in a jurisdiction by their main business activity¹³, demonstrating that all activities are conducted in countries of all income groups. Across business activities, the majority of the constituent entities is located in high-income countries. However, across income groups, different business activities prevail. In line with the concentration of UPEs in high-income countries, 84% of shareholding entities are located in these countries, comprising 17% of the business activities in the high-income group, a substantially higher share than in other income groups. Conversely, manufacturing and production and marketing, sales and distribution activities are dominant business activities in middle-income countries, constituting 17% and 27% of all business activities within these countries, which may indicate that MNEs take advantage of lower employment costs and a less regulated economic environment. In low-income countries, the provision of services to unrelated parties represents the largest business activity (24%). Remarkably, holding and managing IP accounts for 7%, and internal financing accounts for 11% of business activities in low-income countries. These are substantially higher shares than in all other income groups. Overall, 40% of all value-adding business activities¹⁴ are located in developing countries, reflecting their integration into the global value chains of large MNEs.

¹¹ Constituent entities include both separate entities and permanent establishments that prepare separate financial reports and are included in the consolidated financial statements.

¹² *Appendix Figures 9 and 10* present further descriptive evidence on the disparity of financial indicators and financial ratios of large MNEs across jurisdictions belonging to different income groups.

¹³ A constituent entity may be characterized by more than one main business activity.

¹⁴ We consider all business activities directly linked to the value chain as value-adding activities, including purchasing and procurement, manufacturing and production, sales, marketing and distribution, and the provision of services to unrelated parties.

In *Appendix Table 5*, we further compare various financial variables of large MNEs across income groups. In line with the concentration of MNE entities in high-income countries, 71% of total revenues and pre-tax profits are attributed to entities located in high-income countries. Notably, the number of employees and tangible assets, i.e., real activity, are more evenly distributed across income groups, with 39% of tangible assets and 44% of the employees being located in developing countries. This indicates that while MNEs' revenues and profits are concentrated in high-income countries, their physical economic activities span countries of all income levels.

To dig deeper into this pattern, *Appendix Table 6* displays the country-level distribution of MNE's key financial ratios by World Bank income group, i.e., (1) total revenues per employee, (2) pre-tax profits per employee, (3) total revenues to tangible assets, (4) accrued income taxes¹⁵ to pre-tax profit, and (5) accrued income taxes to total revenues. The wide distribution of the data points indicates significant variation within income groups, suggesting a large disparity in operational efficiency and profitability among countries.¹⁶ Entities in high-income countries exhibit substantially higher revenues per employee (median 0.5 million USD) than in low-income countries (median 0.2 million USD), with the highest ratio observed in the high-income country Bermuda (39.9 million USD). Likewise, profits per employee are substantially higher, with medians of 27 and 10 thousand USD in the high- and low-income groups, respectively. Considering the ratio of revenues to tangible assets, developed countries also exhibit higher values (median 2.26 USD) compared to developing countries, with a median ratio of 1.78 USD in the low-income group. The variations not only indicate differences in capital intensity, capital and worker productivity but could also point to potential BEPS activity, specifically in tax havens (OECD, 2023b). Conversely, the ratio of taxes to pre-tax profits is higher in low- and lower-middle-income groups (median 29% in low-income countries) than in the high-income group (median 15%), which could imply a relatively higher tax burden on MNE profits and revenues in these countries. This pattern is less pronounced for the ratio of taxes to revenues.

Overall, compared to high-income countries, developing countries are characterized by weaker economies, reflected across multiple dimensions such as lower GDPs, reliance on imports, the sparse presence of MNE entities, and relatively lower reported revenues and profits compared to economic real activity. The few MNEs located in developing countries, however, face a

¹⁵ Accrued income taxes refer to the total tax expenses based on taxable profits or losses in the current year, reported by all constituent entities resident for tax purposes in the jurisdiction, excluding deferred taxes and provisions for uncertain tax liabilities.

¹⁶ Thus, and due to some large outliers, we refer to median instead of mean values in the following.

comparably higher tax burden. At the same time, developing countries host 90% of the global population at a growing rate, indicating large and increasing consumer markets, not only for local MNEs but also for importers of goods and services. This imbalance of low economic output and a large (potential) consumer base for goods and services may affect the position of developing countries on tax matters.

2.2 Tax Characteristics

Apart from their economic characteristics, developing countries differ from high-income countries with respect to their tax characteristics. The deviation becomes evident when analyzing the tax-to-GDP ratios, which express a country's total tax revenue as a percentage of its GDP and serve as a valuable tool for evaluating fiscal capacity (Ali et al., 2021). Total tax revenue includes personal and corporate income taxes, consumption taxes, excise duties, social security contributions, and other taxes, as reported by the respective countries. To provide basic state functions such as public safety and infrastructure, a country's tax revenue should amount to at least 15% of its annual GDP (Gaspar et al., 2016; Junquera-Varela et al., 2017; OECD, 2019). In *Appendix Figure 11*, we plot the development of total tax-to-GDP ratios segmented by income groups from 1990 to 2021. With an average tax-to-GDP ratio of 16.7%, developing countries are characterized by lower ratios than developed countries. Low-income countries collect, on average, tax revenues amounting to 10.7% of their GDP, indicating insufficient revenue to cover basic government functions. In contrast, the ratio of developed countries amounts to 31.5%. OECD countries record even higher ratios, with the latest being 34.1% (OECD, 2022a). This is twice the average ratio of developing countries and triple that of low-income countries. This gap should be closed in the long term by aligning the tax-to-GDP ratios of developing countries with those of developed countries (IMF et al., 2011). Although low-income countries recorded the strongest increase in their tax-to-GDP ratios over the past three decades, the gap relative to high-income countries has not been substantially reduced. At the same time, the tax-to-GDP ratios of low-income countries are also the most volatile, indicating an unstable economic and fiscal environment. The lower tax-to-GDP ratios in developing countries do not necessarily imply lower statutory tax rates. *Appendix Figure 12* illustrates historical corporate income tax (CIT) rates by income group and demonstrates constantly higher rates for developing countries. In 2022, the average CIT rate in high-income countries is 20% compared to 28% for low-income countries, with middle-income countries in between. Thus, factors other than income tax rate differentials account for the disparity between developed and developing countries.

The distinct tax characteristics of developing countries are also reflected in the composition of their tax revenues. *Appendix Figure 13* depicts the composition of total government revenues by income group from 1980 to 2022. In developing countries, we observe a stronger reliance on indirect taxes¹⁷. Across all years, developing countries draw, on average, 46.66% of their tax revenues from indirect taxes, compared to 32.13% in developed countries. Direct taxes constitute the second main source of government income across all income groups, with 19.15% and 29.15% of total revenues, respectively, in low-income and high-income countries. Grants appear prominently in low and lower-middle-income groups and indicate their dependency on external assistance and international aid, which may inadvertently discourage the collection of tax revenue. *Appendix Figure 14* shows the composition of tax revenues by income group from 1989 to 2021. In line with their higher CIT rates, on average over all years, developing countries derive a comparatively higher proportion of tax revenues from CIT (16.15%) than developed countries (14.74%). Additionally, the tax revenue compositions over time are less stable in developing countries, highlighting the need for a tax reform that does not further increase the volatility but instead generates stable tax revenues.

The literature on taxation and public finances in developing countries recognizes four reasons for the disparity in tax-to-GDP ratios between developing and developed countries. First, economies in developing countries are characterized by a high degree of informality (Tanzi & Zee, 2000; Boadway & Sato, 2009). On average, one-third of the GDP and 70% of employment belong to the informal sector in developing countries, notwithstanding a declining trend (Elgin et al., 2022). The highest degrees of informality are reported in Sub-Saharan Africa, where in some economies, informal employment accounts for more than 90% of total employment, and informal economic output is equivalent to 62% of official GDP (World Bank, 2019). The informal economy, also known as the shadow economy or hidden economy, is defined as unrecorded but legal economic activities that are hidden from public authorities for monetary, regulatory, or institutional reasons and would contribute to GDP if recorded (Medina & Schneider, 2018; Elgin et al., 2022). Operating in the informal sector can be motivated by avoiding taxes and social security contributions (monetary reasons), reducing regulatory burden and bureaucracy (regulatory reasons), or distrust of political and legal institutions, including corruption (institutional reasons) (Perry et al., 2007; Medina & Schneider, 2018). The pervading informality in developing economies significantly reduces their revenue base, as taxes can only be levied on officially reported payments, income, and assets (Bahl & Bird, 2008). Therefore,

¹⁷ Indirect taxes include sales taxes, value added tax, excise duties, taxes on imports and exports, and other indirect taxes, such as stamp duties.

tax evasion is at the core of informality (Ohnsorge & Yu, 2022). These effects are not limited to business income but include employment income and partly sales that would otherwise be taxed. Some authors argue that the value-added tax (VAT), to some extent, allows governments to extract tax revenues from the informal sector as informal businesses purchase goods including VAT but cannot credit the paid VAT against their own tax liability (Keen, 2008; Boadway & Sato, 2009). This may explain the comparably high share of indirect taxes to total tax revenue.

Second, tax compliance and tax morale are major issues in developing countries (IMF et al., 2011; OECD, 2014; Keen et al., 2015). Tax morale can be defined as the intrinsic, nonpecuniary motivation to pay taxes and is considered a key driver for tax compliance (Luttmer & Singhal, 2014; Dwenger et al., 2016; Slemrod, 2019). However, theoretical and empirical literature suggests that poor provision of public goods and services and (expected) corruption undermine tax morale and tax compliance (Bahl & Bird, 2008; Luttmer & Singhal, 2014; Banerjee et al., 2022). This lack of reciprocity between taxes and government services is a particular problem in developing countries and creates a “vicious circle of low tax morale and compliance” (IMF et al., 2011): Without tax revenue from compliant taxpayers, no government services can be provided; simultaneously, the lack of public goods and services motivates non-compliance.

Third, developing countries have weak tax administration capacities (Boadway & Sato, 2009; Besley & Persson, 2014; Carillo et al., 2017). Given these constraints, taxpayer assistance by the tax administration is poor, and tax compliance procedures are often lengthy and costly for taxpayers, which encourages noncompliance (Alm et al., 2010; Prichard et al., 2019). Although the time required to fulfill tax compliance obligations for firms in developing countries has decreased (Ohnsorge & Li, 2022), tax compliance costs are still higher than in developed countries (Dabla-Norris et al., 2017; World Bank & PwC, 2018). *Appendix Table 7* provides an overview of indicators measuring the compliance tax burden of businesses across countries for the year 2018. The ease of paying taxes, as defined by World Bank (2020), comprises both pre- and post-filing compliance activities and is constructed as a score from 0 to 100, with 100 indicating the best observable performance. It is highest for high-income countries (81.69), particularly OECD member states (83.07), and decreases on average by 13.5% for upper-middle-income countries. With an average score of 57.43 and 62.16, low-income and lower-middle-income countries fall behind. On a more granular level, the annual time to comply with

tax regulations¹⁸ and the number of annual tax payments¹⁹ reflect the differences. On average, businesses in developing countries spend 265 hours per year on tax compliance activities, while businesses in high-income countries need 154 hours. In a similar vein, 13.99 payments for taxes and contributions per year are required for businesses in developed countries, while businesses in low-income countries are subject to 36.41 payments. This is twice the number of payments required in upper-middle-income countries (18.60) and more than three times the number in OECD countries. Overall, tax compliance is more burdensome in developing countries, which may encourage noncompliance.

Fourth, weak tax administration capacity in developing countries is also reflected in weak tax enforcement (Gorden & Li, 2009). Tax enforcement is the primary extrinsic driver of tax compliance (Luttmer & Singhal, 2014). Consequently, lax enforcement facilitates poor compliance and vice versa (Ilzetzi & Lagakos, 2017; Slemrod, 2019).

The outlined economic characteristics and deficits in the domestic tax systems of developing countries imply that these countries are affected differently by the international tax system compared to developed countries. Next, we take a look at the global tax treaty network to investigate these differences along two dimensions: First, we consider the number of tax treaties a country has signed with the respective treaty partner countries, and second, the content of those tax treaties.

Countries conclude tax treaties to foster economic activity and attract foreign direct investment (FDI), irrespective of the income group. In *Appendix Table 8*, we display the patterns of a hand-collected global network of tax treaties by income group. We include all bilateral tax treaties and several multilateral community treaties on corporate income taxation that are in force as of 2023. To the best of our knowledge, our global tax treaty network provides the most comprehensive overview of in-force tax treaties currently available. We manually assemble the network based on data from the Tax Treaty Explorer, provided by the International Centre for Tax and Development, the Worldwide Corporate Tax Guide by EY, and the latest available Country Tax Guides provided by IBFD. *Panel A* of *Appendix Table 8* provides descriptive statistics on the per-country number of in-force tax treaties by income group as of 2023. In total, we identify 3,604 tax treaties between the 218 countries classified by the World Bank. The

¹⁸ The time to comply is an indicator of the tax burden in the pre-filing process and measures the time required to prepare, file, and pay CIT, VAT or sales taxes, and labor taxes (Djankov et al., 2010).

¹⁹ The number of annual tax payments comprises the actual number of taxes paid (tax types), the frequency and method of payment, and the number of agencies involved. Where taxes can be filed and paid electronically, only one payment per year and tax type is considered (Djankov et al., 2010).

extent of the tax treaty network varies significantly by income group. Specifically, we show that a higher income group is associated with an, on average, larger tax treaty network. Low-income countries have concluded, on average, only 11 tax treaties with other countries. The average tax treaty networks of high-income countries comprise 47 tax treaties, however, also with a notably larger standard deviation. Remarkably, the tax treaty network of OECD member countries exceeds the tax treaty networks of high-income countries by far, with an average of 76 tax treaties per country as of 2023.

Panel B of *Annex Table 8* shows for the average country in each income group the percentage ratio of actually existing tax treaties to the total of potential treaty relationships with countries respectively in the same and in other income groups. In line with *Panel A*, our analysis reveals that the tax treaty network is strongest in the high-income group and weakest in the low-income group. While the average developed country has concluded a tax treaty with 21.72% of all countries, the treaty network of a low-income country covers, on average, only 5.07% of all countries. The tax treaty networks of OECD member states cover 35.2% of all countries, on average. In addition, we show in *Panel B* that tax treaty partnerships follow specific patterns. Among all income groups, except for low-income countries, the tax treaty network coverage is best with countries of the high-income group. High-income countries have concluded tax treaties with 31.64% of other high-income countries. Among OECD countries, this share is even higher, with tax treaties covering more than half of the countries in the high-income group on average. In contrast, low-income countries have the weakest tax treaty network, with the high-income group (3.93%) and the strongest one within their own income group (9.53%). With this exception, the treaty network of each other income group is weakest in relation to low-income countries. Low-income countries can, therefore, be regarded as isolated within the international network of tax treaties.

The concluded tax treaties between countries also differ in their content. Historically, most tax treaties are based on the OECD Model Tax Convention (Arnold et al., 2002; Barthel & Neumeyer, 2012). In contrast to the OECD model, the alternative UN Model Tax Treaty provides more taxing rights to source countries, which is of particular interest to net-importing countries, specifically developing countries (Arnold, 2020). The most prominent provisions in the UN model to foster source taxation are an extended definition of a permanent establishment and extended rights to impose withholding taxes (WHTs) on dividends, interests, and royalties (Zolt, 2018). Compared to non-treaty constellations, existing tax treaties, however, can restrict source taxing rights by lowering unilateral WHT rates.

To assess the differences in unilateral and treaty WHT rates and the resulting distribution of taxing rates between developing and developed countries, we summarize the WHT rates for dividends, interest, royalties, technical fees, and management fees of countries by income groups in *Tables 9 and 10 of the Appendix*. While *Appendix Table 9* presents the unilaterally determined standard WHT rates, *Appendix Table 10* contains WHT rates indicated in bilateral tax treaties. In line with theoretical literature that highlights the importance of source taxation for capital-importing (developing) countries (Braun & Zagler, 2014; Daurer, 2014a), our descriptive statistics confirm that developing countries generally levy WHTs on more income categories and impose higher standard rates than developed countries. WHTs on technical and management fees are observed more frequently in developing countries. Regarding the standard WHT rates, for example, on dividends, low-income countries unilaterally levy a mean (median) tax rate of 15.83% (15%), while high-income countries impose mean (median) tax rates of 13% (10%), respectively. However, with a notably higher standard deviation, developed countries exhibit higher variation in WHT rates than developing countries. The ranges of the observed WHT rates reflect not only diverse economic structures and tax policies within income groups but may also be rooted in asymmetric data coverage across income groups. While the new OECD database covers only 11.5% and 24.1% of the low- and lower-middle-income countries, 73.9% of high-income countries are included.

When comparing treaty-based country-pair WHT rates in *Appendix Table 10*, it becomes evident that developing countries conclude higher WHT rates with other developing countries than with developed countries. Tax treaties concluded between low-income countries reduce the dividend WHT rate to 10%, on average, in contrast to an average tax rate of only 3.33% in tax treaties between low- and high-income countries. We show similar patterns for WHT rates in other income categories. This indicates that developing countries give up a larger part of their taxing rights when negotiating bilateral tax treaties with developed countries. According to the empirical literature, for developing countries, the reduced treaty WHT rates are one major reason for tax revenue loss when entering into tax treaties (Janský & Šedivý, 2018). Thus, the risk of tax revenue losses associated with the conclusion of a tax treaty tends to be more important for developing countries than for developed countries (Barthel & Neumayer, 2012). Therefore, despite the undisputed positive effects of a tax treaty (Neumayer, 2007), its net

benefit is a priori unclear, especially for low- and middle-income countries (Daurer, 2014a; Braun & Fuentes, 2016).²⁰

In sum, developing countries are characterized by poor fiscal capacity, resulting from a high degree of informality in the economy, issues with tax compliance and tax morale among taxpayers, and weak tax administration capacities. In contrast, the CIT rates are comparably higher in these countries. In the context of international taxation, developing countries are more reliant on source taxation, which is considered to a greater extent in the Model Tax Treaty of the UN. WHT rates in tax treaties, however, tend to be lower in tax treaties of developing countries that are concluded with developed countries compared to tax treaties with other developing countries. Overall, the network of tax treaties is sparse for low- and middle-income countries. Low-income countries can even be regarded as isolated from the international tax treaty network. The existing international tax system and, in particular, tax treaties, therefore, do not capture the needs of developing countries, which increases the need for a tax reform that redistributes taxing rights in favor of these countries even further.

2.3 Derivation of Evaluation Criteria

Based on the distinct economic and tax characteristics of developing countries, we derive three criteria for evaluating the OECD's and the UN's reform proposals for taxing the digital economy. The criteria go beyond the generally recognized criteria, such as the taxation principles set out in the landmark Ottawa Taxation Framework (OECD, 1998), and reflect the perspective of developing countries. Following these evaluation criteria, low- and middle-income countries may decide which of the two proposals, if any, they should follow. First, the reform proposals should increase fiscal capacity in developing countries, that is, generate tax revenues and contribute to stable government revenue. Due to the high volatility in tax-to-GDP ratios of low- and middle-income countries, the revenue generated by the reform should not further increase the volatility but remain stable and predictable across multiple periods. Given the low tax-to-GDP ratios in developing countries, any additional revenue fosters the provision of basic state functions such as public safety and infrastructure. For low-income countries, building fiscal capacity may decrease the reliance on externally provided grants. An increase in tax revenues and, subsequently, in public goods and services may, in turn, contribute to reducing informality induced by institutional reasons and increase tax morale. Although the reform proposals should not be seen as a panacea for challenges faced by developing countries,

²⁰ For a comprehensive overview of the empirical evidence on the ambiguous effects of tax treaties for developing countries, see Daurer (2014b).

they may contribute to their fiscal capacity and, to some extent, the development of their domestic economies. To achieve this goal, the new taxing rights assigned by the reform proposals must not be offset by a simultaneous restriction of existing taxing rights. Instead, an integration into the current tax system is crucial.

Second, the reform proposals must not discriminate against net-importing countries and account for the inequality in the international tax system. As net-importing countries, developing countries heavily rely on source taxation. The international tax system and tax treaties, specifically, exhibit a tendency towards residence taxation in favor of developed countries. Existing tax treaties between developing and developed countries even restrict the rights of source taxation by lowering applicable WHT rates. To compensate for the current imbalance, any reform proposal should promote source or destination-based taxation. This is particularly important given the even higher trade imbalance for ICT goods between developing and developed countries. Digital goods consumed in developing countries are likely to originate from developed countries. With high population growth rates, which means growing consumer markets, and a comparably low number of digital MNEs headquartered in low- and middle-income countries, the trade imbalance will likely persist. Eliminating or mitigating existing disadvantages for net-importing countries in the international tax system and fostering their taxing rights is, therefore, pivotal. A further reallocation of taxing rights from developing countries to developed countries or a mere reallocation between developed countries would not comply with the interests and needs of developing countries and contradict their understanding of fairness in the international tax system. Simultaneously, the reallocation of taxing rights intended by the OECD's and UN's proposals will become effective only if developed countries are also willing to accept the proposal. Given the unequal coverage of the current network of tax treaties across country income groups, any reform proposal must not be implemented via bilateral tax treaties and independently of existing tax treaties. Acceptance at a global level and multilateral implementation are, therefore, equally important.

Third, the reform proposals must be administrable for both tax administration and affected businesses in developing countries. Developing countries are characterized by weak tax administrations, resulting in lengthy and costly compliance procedures and low enforcement capacities. Without the capacity to enforce the taxing rights assigned by the reform proposals, the reform will remain ineffective in generating tax revenue. To ensure enforcement, international cooperation of tax authorities is required. Established practices, such as the mutual exchange of information and robust mechanisms to prevent and solve disputes, may support the

implementation of the reform proposals. Thereby, the costs of enforcement should be kept at a minimum level, considering the available personal capacities and existing technological infrastructure in developing countries. Simultaneously, the compliance burden for businesses in developing countries affected by the reform proposals should be kept at a minimum level. Compared to developed countries, businesses located in low- and middle-income countries face higher tax compliance costs. Given this difference, administrative procedures to comply with the reform proposals should be designed in a way that does not further increase this inequality. Overall, the administrability of the reform proposals relies on their thorough integration into the existing international tax system and its established procedures. However, a comprehensive evaluation of the administrability of the reform proposals is beyond the scope of this report.

3 Reform Proposals to Taxing the Digital Economy

3.1 Pillar I Amount A

3.1.1 Taxing Right, Scope and Application

In 2021, 137 members of the OECD/G20 Inclusive Framework on BEPS agreed on a two-pillar solution to address the tax challenges arising from the digitalization of the economy. The two-pillar solution introduces significant changes to the prevailing tax system. Traditionally, companies are taxed solely in jurisdictions where they have a legal seat or physically operate. However, with the rise of digital business models, MNEs increasingly conduct business and generate revenues in countries without having a physical presence there. Amount A of Pillar I was designed to mitigate this disparity by establishing a new taxing right for market jurisdictions where goods or services are supplied, or consumers or users are located. While in the OECD Blueprint from 2020, the scope of Amount A is limited to automated digital services (ADS) and consumer-facing businesses (OECD Blueprint 2020), subsequent progress reports are no longer exclusively targeted at digital businesses. According to the Progress Report on Pillar I from July 2022, the new taxing right is allocated to jurisdictions where the MNE has a market presence, i.e., consumers or users, irrespective of the nature of the business model and regardless of a physical presence in the country. Whether a country is a market jurisdiction of an MNE is defined based on revenue sourcing principles (Art. 7 MLC). The identified market jurisdictions receive the right to tax a portion of the excess profit, the so-called Amount A profit, of large and highly profitable MNEs. Thereby, Amount A profit is apportioned among all market jurisdictions of the MNE using a predetermined formula based on revenue.

To implement the taxing right on Amount A, countries must sign the Multilateral Convention (MLC) released by the OECD in October 2023, covering 212 pages, including 53 articles and

122 Appendix pages (OECD, 2023a).²¹ Initially, ratification by at least thirty jurisdictions, including the residence countries of at least 60% of the UPEs of MNEs in scope, is required (Art. 48 MLC). For this purpose, the MLC attributes points to all UPE residence countries indicating the proportion of UPEs residing in a country relative to the total number of UPEs of in-scope MNEs (Annex I MLC). In total, 999 points are attributed to 18 countries, of which the United States is granted 486 points, and China and Hong Kong are granted 94 and 88 points, respectively. All other listed countries have lower counts. China, India, and Mexico are the only developing countries that can contribute to the required minimum of 600 points. *Appendix Table 11* summarizes the potential impact of all 18 countries listed by the OECD based on their attributed points, thereby distinguishing between two scenarios: The required minimum of thirty countries is only met if the respective listed country signs the MLC (scenario 1) versus at least thirty other countries have ratified the MLC (scenario 2). In both scenarios, the United States are decisive for the implementation of Pillar I, accounting for 81% of the required points. Effectively, this provides the United States with sole veto power on the global implementation of Pillar I.²² The individual impact of all other countries is significantly lower and varies between 0% and 15.66%. Developing countries collectively achieve a maximum impact of 22.32% (scenario 1) or 18.5% (scenario 2) and, in both scenarios, depend on the agreement of the United States and at least one other listed developed country. Reversely, developed countries can decide on the implementation of Pillar I without requiring the commitment of any developing country.²³ If the minimum conditions are met, the signing jurisdictions collectively decide on the date of the initial entry into force of the MLC. Besides the right to tax Amount A of profits, the MLC mandates the removal of unilateral digital services taxes and similar measures (Art. 38, Annex A MLC). Among the countries required to meet the threshold of 600 points, three apply a unilateral measure subject to removal and, thus, might be hesitant to sign the MLC.²⁴

Provided that the MLC will be implemented, Pillar I Amount A applies to MNEs with global annual revenues²⁵ exceeding 20 billion EUR (revenue test) and a pre-tax profit margin above

²¹ As of February 2024, the MLC is not yet open for signature as certain aspects require further clarification (Art. 41 MLC).

²² We recognize that the United States is decisive in implementing Pillar I Amount A due to the majority of MNEs being located there. If the United States refuses to agree on Pillar I Amount A, the goal of the proposal, which is the redistribution of taxing rights, cannot be achieved due to a collective action problem.

²³ For instance, if the United States and the EU agree on the implementation of Pillar I, three other arbitrary jurisdictions are needed for the MLC to enter into force.

²⁴ France, Spain, and India apply unilateral measures.

²⁵ The OECD defines the revenues, so-called adjusted revenues, as net of taxes on consumption, such as VAT or sales taxes, and modified by excluding revenues related to predefined items (Art. 2 (c) MLC).

10% (profitability test) within the same year. After seven years of application, the threshold for the revenue test will be reduced to 10 billion EUR (Art. 3 par. 9 and Art. 43 par. 1 MLC). Additionally, if the MNE did not meet these criteria in the preceding two years, its profitability must have been greater than 10% in at least two of the four prior years and, on average, across the current year and the last four years (Art. 3 par. 2 MLC). The rules under Amount A apply to separate reported segments if an MNE as a whole does not meet the thresholds but one of its reported segments does on a standalone basis. Extractive or defense activities, regulated financial services, and entities of MNE groups operating almost exclusively domestically are generally excluded from the scope (Annex C MLC).

Due to the high revenue and profitability thresholds, only a small number of MNEs are within the scope of Amount A.²⁶ Using consolidated firm-level data from Bureau van Dijk's Orbis, we estimate that as of 2022, 120 MNEs worldwide satisfy these requirements.²⁷ Notably, the number of in-scope MNEs more than doubles when the reduced revenue threshold of 10 billion EUR is applied. To ensure that only in-scope sectors are considered, we exclude MNEs operating in the NACE Rev. 2 main industry sections "A – Agriculture, forestry and fishing", "B – Mining and quarrying", "K – Financial and insurance activities", and "O – Public administration and defense; compulsory social security" as well as MNEs with missing industry classifications. We manually review the annual reports of the remaining in-scope firms and drop additional MNEs that operate (almost) exclusively in the defense sector but are classified in the manufacturing sector in Orbis.²⁸ We further drop those located in non-Inclusive Framework member states, as these countries likely will not implement Amount A. To accurately calculate all the above-mentioned measures, we drop firms with missing revenues or pre-tax profits in any of the years 2018 to 2022. To be in scope for the year 2022, firms must meet both the revenue and profitability thresholds as defined in Art. 3 par. 1 MLC. We further require MNEs to either (1) meet these thresholds also in 2021 and 2020 or (2) meet these thresholds in at least two years within the period 2018-2021 and, on average, over the period 2018-2022 (Art. 3 par. 2 MLC). While the number of in-scope MNEs seems relatively stable over the two years 2021 and 2022, the assessment of whether a firm close to the thresholds is

²⁶ We acknowledge that the Orbis database is incomplete and does not include all subsidiaries and profits of MNEs (Tørsløv et al., 2023). However, compared to unconsolidated data, consolidated data is of better quality (Blouin & Robinson, 2020).

²⁷ This number does not include MNEs, which are subject to Amount A with only one or more segments. We do not account for exclusions based on purely domestic activities.

²⁸ According to Annex C, Section 6 MLC, defense revenues are excluded from the scope of Amount A. 17 additional firms in our sample generate defense revenues to a (very) minor extent. We keep these firms in the sample and recognize that their in-scope revenues are reduced to their non-defense revenues.

in the scope of Amount A may vary from year to year. For example, in Germany, nine MNEs meet the thresholds in some years but not in others and, thus, are in scope or out of scope, depending on the considered year.²⁹ Overall, the in-scope MNEs are the largest firms worldwide, given that 61% are listed on the Fortune Global 500 in 2023.³⁰ Potentially, as with every arbitrary threshold, small changes in accounting, tax planning, or business strategies, as well as economic environments, may determine whether a firm is in the scope of Pillar I or not.

For in-scope MNEs, a market jurisdiction may only tax a portion of the MNE's Amount A profit if the MNE satisfies the nexus test in the respective period (Art. 4 MLC). That is, the MNE must generate revenues of at least 1 million EUR in the market jurisdiction (Art. 8 MLC). In smaller countries with a GDP of less than 40 billion EUR, revenues of 250 thousand EUR are sufficient to satisfy the nexus test. This adjustment of the nexus requirement is particularly relevant for developing countries since, on average, their GDP is lower (*Appendix Figure 2*). 84% of all low-income countries with available GDP data and 53.8% and 50.9% of the lower- and upper-middle-income countries, respectively, fall within the scope of the reduced nexus-threshold in 2023. To determine where revenues are sourced and, thus, the new taxing right is allocated, the OECD has defined sourcing principles (Art. 7 MLC) that determine the market jurisdiction based on an exhaustive list of revenue categories. In *Appendix Table 12*, we systematically summarize the revenue categories and the corresponding market jurisdiction(s). For most revenue categories, the sourcing principles determine the market jurisdiction as the place where the final customer uses the final good or service. Services for online intermediation and cargo transport are attributed to two market jurisdictions each, recognizing the equal importance of the different locations for the covered transactions.

If revenue is identified to be sourced in a country based on the sourcing principles and the nexus test is fulfilled, this country is entitled to tax a portion of the Amount A profit (Art. 4 par. 1 MLC). In general, the Amount A profit is defined as 25% of the MNE's adjusted profit before tax that exceeds a profitability threshold of 10% for a specific period (Art. 2(d) MLC). The following formula determines the portion of the Amount A profit (A_m) of an MNE that is allocated to a given market jurisdiction m in a specific period (Art. 5 par. 1(a) MLC):

²⁹ These German MNEs which are potentially in scope, though not consistently, are SAP SE, Merck KGaA, Henkel AG & Co. KGaA, BMW AG, Siemens AG, Audi AG, Hapag-Lloyd AG, Heidelberg Cement AG, and Mercedes-Benz Group AG. Whereas Henkel AG & Co. KGaA, Merck KGaA, and SAP SE are in scope for 2021 (not 2022), BMW AG, Merck KGaA and Siemens AG are in scope for 2022 (not 2021).

³⁰ Additionally, the UPEs of three additional in-scope corporations are listed in the Fortune Global 500.

$$A_m = (P - 0.1R_M) \times 0.25 \times \frac{R_m}{R_M}$$

P refers to the adjusted profit before tax of the MNE group, irrespective of whether it arises in a market jurisdiction or a country that is not a market jurisdiction. It is based on the consolidated financial accounting profit or loss of the MNE group and modified by several book-to-tax adjustments.³¹ 25% of the adjusted profit before tax exceeding the profitability threshold of 10% is allocated among all market jurisdictions M of the MNE. Thereby, each market jurisdiction m is granted the right to tax a portion of the Amount A profit A_m that is equal to the share of revenue sourced in this jurisdiction R_m in total revenue of the MNE generated across all market jurisdictions R_M ³². In other words, the first part of the formula represents the profit exceeding the defined profitability threshold of 10%, while the second coefficient indicates that only 25% of this excess profit is reallocated to the market jurisdictions in proportion to the revenues sourced in each of them as determined by the third coefficient.

In addition to this general allocation of the taxing right on Amount A, the OECD has defined adjustments that cover instances where a market jurisdiction already has a right to tax part of the MNE's profit following the current principles of residence or source taxation. Subsequent chapters cover these adjustments and the mechanism to eliminate double taxation. Only after accounting for all subsequent steps can the portion of the Amount A profit subject to tax in each market jurisdiction be determined.

3.1.2 *Marketing and Distribution Profit Safe Harbor Adjustment*

If an MNE has both a physical nexus, i.e., a legal entity or permanent establishment, and a revenue-based nexus under Pillar I Amount A in a market jurisdiction, there are two competing taxing rights for that country. To account for such cases, a so-called marketing and distribution profits safe harbor adjustment (MDSH) is employed. The MDSH is deducted from the Amount A profit allocated to the market jurisdiction, and thus, the corresponding taxing right is reduced. Unlike the name of the safe harbor adjustment suggests, it is not targeted at marketing and distribution activities. Instead, it comprehensively applies if the legal entities and permanent establishments of an MNE group in a market jurisdiction jointly generate so-

³¹ According to Annex B Sec. 2 MLC, current and deferred income tax expense (or income), received dividends, gains and losses from the disposition of corporate shares, fair value changes of corporate shares, illegal payments, and penalties exceeding 50 thousand EUR are excluded from the adjusted profit before tax. Furthermore, adjustments on the recognition of gains and losses from fair value or impairment accounting, from the disposal of assets and liabilities, and on the valuation of assets and liabilities of new group entities are mandated. In addition, adjustments with respect to prior periods and losses are taken into account. Financial accounting profit or loss from group entities that are excluded from the scope of Pillar I Amount A are disregarded.

³² With $M = \sum_{m=1}^n m$.

called adjusted elimination profits³³ of at least 50 million EUR (Art. 5 par. 1(b) MLC) after accounting for WHTs of the MNE in that jurisdiction (Art. 5 par. 2(f) MLC)³⁴. The extent of the MDSH depends primarily on profits, revenues, and economic substance, measured as the sum of depreciation and payroll, of the MNE in the respective market jurisdiction m and is determined as follows (Art. 5 par. 2 OECD):

$$MDSH_m = \min([JEP_m \times JOP_m], A_m)$$

In general, the MDSH is determined by the adjusted jurisdictional excess profit of the MNE in a market country (JEP_m) and a jurisdictional offset percentage (JOP_m). While the adjusted jurisdictional excess profit reflects the profit that is already largely subject to tax in the market jurisdiction under the current tax system, the jurisdictional offset percentage determines the share of the adjusted jurisdictional excess profit that reduces the Amount A profit in the respective country. At a maximum, the $MDSH_m$ equals A_m , the amount A profit in the market jurisdiction, which effectively reduces the jurisdiction's taxing right on Amount A to 0.

The adjusted jurisdictional excess profit of an MNE depends on the profit (or loss), depreciation, and payroll allocated in the market jurisdiction, as well as the revenue sourced there, and is calculated as follows³⁵:

$$JEP_m = \begin{cases} P_m - 0.1R_m \times \frac{(d+p)_m}{(d+p)}, & 0.3R_m < R_m \times \frac{(d+p)_m}{(d+p)} \wedge P_m - 0.1R_m \times \frac{(d+p)_m}{(d+p)} > 0 \\ P_m - 0.03R_m, & 0.3R_m \geq R_m \times \frac{(d+p)_m}{(d+p)} \wedge P_m - 0.03R_m > 0 \\ 0, & \text{else} \end{cases}$$

Overall, the adjusted jurisdictional excess profit must not be negative and is otherwise deemed 0. In general, the jurisdictional excess profit is determined by subtracting from the adjusted elimination profit (P_m) a deemed normal profit, again corresponding to a 10% group

³³ An MNE's elimination profit (or loss) in a market jurisdiction is based on the sum of the financial accounting profits or losses of its legal entities and permanent establishments in that jurisdiction, modified by several book-to-tax adjustments. The adjustments largely correspond to the modifications made in determining the adjusted profits before tax but take into account that the elimination profit is based on individual financial accounting profits as opposed to the adjusted profits before tax, which are based on consolidated group profits. According to Annex B Sec. 4 MLC, current and deferred income tax expense (or income), received dividends, gains and losses from the disposition of corporate shares, fair value changes of corporate shares, illegal payments, and penalties exceeding 50 thousand EUR are excluded from the elimination profit. Furthermore, adjustments on the recognition of gains and losses from fair value or impairment accounting, from the disposal of assets and liabilities, and on the valuation of assets and liabilities of new group entities are mandated. In addition, adjustments with respect to prior periods and losses are taken into account. Specific intra-group income or expenses, e.g., from insurance and annuity contracts, are disregarded.

³⁴ The adjusted elimination profit (or loss) is derived by adding back a WHT upward adjustment to the elimination profit. The calculation and effect of the WHT adjustments are explained in chapter 3.1.3.

³⁵ The following term neglects the influence of WHTs on the jurisdictional excess profit. The implications of WHTs are considered in the subsequent chapter.

sales margin, which is allocated according to economic substance weights. Economic substance is measured as an MNE's depreciation and payroll $(d+p)_m$ in subsidiaries and permanent establishments in the market jurisdiction m relative to the overall depreciation and payroll of the MNE group $(d+p)$. However, this formula only applies if the substance-proportional allocation of group revenue in the respective market jurisdiction explains more than 30% of locally sourced revenue (R_m). Where this is not the case, normal profit is presumed to represent a sales margin of (only) 3% of local revenue, independent of local substance in the respective market jurisdiction. Note that in both computations of the jurisdictional excess profit, the adjusted elimination profit (P_m) must meet the de minimis threshold of 50 million EUR.

The jurisdictional offset percentage (JOP_m) determines the degree to which the adjusted jurisdictional excess profits (JEP_m) actually feed into the MDSH, thus potentially limiting the market jurisdiction's taxing rights on Amount A profits. It depends not only on the characteristics of the MNE group in the market jurisdiction but also on the income group of the market jurisdiction. Generally, the offset percentage amounts to 35%. If the market jurisdiction is a low or lower-middle-income country, it is decreased to 25%. Irrespective of the country income group, the jurisdictional offset percentage is 90% for an MNE if its ratio of depreciation and payroll to adjusted revenue within the market jurisdiction is less than 75% of its global ratio of depreciation and payroll to the adjusted revenue (Art. 5 par. 2(d) and (e) MLC). That is, the highest offset percentage applies for market countries where an MNE generates revenue with significantly less economic substance than the average revenue of the group, so-called low depreciation and payroll jurisdictions.

Overall, the effects of the MDSH and its components on the Amount A taxing right of a market jurisdiction becomes apparent in the following formula and are discussed below:³⁶

$$A_m - MDSH_m = \begin{cases} 0, & A_m \leq MDSH_m \\ (P - 0.1R_M) \times \frac{R_m}{4R_M}, & A_m > MDSH_m \wedge JEP_m = 0 \\ (P - 0.1R_M) \times \frac{R_m}{4R_M} - P_m \times JOP_m + 0.03R_m \times JOP_m, & A_m > MDSH_m \wedge JEP_m > 0 \wedge R_m \times \frac{(d+p)_m}{(d+p)} \leq 0.3R_m \\ (P - 0.1R_M) \times \frac{R_m}{4R_M} - P_m \times JOP_m + 0.1R_m \times \frac{(d+p)_m}{(d+p)} \times JOP_m, & A_m > MDSH_m \wedge JEP_m > 0 \wedge R_m \times \frac{(d+p)_m}{(d+p)} > 0.3R_m \end{cases}$$

³⁶ The following term neglects the influence of WHTs on the jurisdictional excess profit. The implications of WHTs are considered in the subsequent chapter.

First, the MDSH must not be greater than Amount A. That is, the MDSH only decreases Amount A to 0 but does not restrict existing taxing rights other than Pillar I Amount A taxing rights.

Second, the MDSH never increases the Amount A profits allocated to a market jurisdiction. If the adjusted jurisdictional excess profit (JEP_m) – computed according to the applicable formula – is negative, MDSH is set to 0. A possible scenario here would be losses incurred in legal entities and permanent establishments of the MNE in the market jurisdiction. However, even with a positive but sufficiently low elimination profit in a market jurisdiction, the MDSH might be reduced to 0.

Third, the MDSH recognizes that profits linked to a legal entity or permanent establishment (P_m) are already taxed in the market jurisdiction under the current tax system. *Ceteris paribus*, a higher adjusted elimination profit of an MNE in a market jurisdiction (P_m) results in a higher MDSH and, thus, a lower Amount A in this country. Considering that Amount A taxing rights per se extend to only those MNE group profits that exceed a normal profitability of 10%, the MDSH, however, cannot compensate for the full jurisdictional elimination profits P_m but only for the jurisdictional excess profits (JEP_m), i.e., its effect is mitigated by one of the two alternative terms that describe local normal profit.

Fourth, if the de minimis threshold is met, the MDSH ultimately exempts only a share (JOP_m) of jurisdictional excess profits from the reallocation under Amount A. *Ceteris paribus*, a higher jurisdictional offset percentage (JOP_m) results in a higher MDSH and, consequently, a lower Amount A. The extent of the MDSH for a low-income or lower-middle-income country is smaller than for an upper-middle-income or a high-income country, as the MLC applies lower jurisdictional offsetting percentages to these countries. Jurisdictions where MNEs source revenues with significantly less economic substance (measured as depreciation and payroll) than on group average, witness the strongest MDSH impact on their Amount A profits, thus limiting their taxing rights under Pillar I.³⁷

In sum, market countries that already tax a substantial part of an MNE's profit under the current tax system, namely where at least 50 million EUR adjusted elimination profits are located, benefit to a lower extent from Amount A as the MDSH reduces it. Given the limited physical

³⁷ These countries may either be investment hubs with high residual profits or market jurisdictions with light distribution presence but significant sales. While the MDSH is designed to apply to investment hubs and decrease the herein allocated Amount A taxing rights, we expect it to only apply to market jurisdictions with little economic substance in rare cases due to lower return on revenue in MNE entities located there and the thresholds of the jurisdictional excess profits (JEP_m).

presence of MNEs in developing countries and only minor profits there (*Appendix Figures 8 and 9*), we expect the MDSH to apply mainly in high-income countries. Especially low- and lower-middle-income market countries that currently do not receive a taxing right on MNE's profits benefit from the Amount A allocation rule and, additionally, if applicable, from the comparably lower effect of the MDSH due to the reduced jurisdictional offset percentage. If the threshold of 50 million EUR adjusted elimination profits is met, jurisdictions where MNEs locate only little economic substance, however, see their Amount A taxing rights considerably reduced through the MDSH because normal profits in the computation of (JEP_m) are deemed small, and the jurisdictional offset percentage (JOP_m) can be as high as 90%.

3.1.3 *Withholding Tax Adjustments*

Besides the right to tax due to a physical nexus of an MNE, a country may also be entitled to levy WHTs on domestically sourced payments to a foreign MNE entity. Again, the MLC includes rules for WHT adjustments in order to account for cases where a market jurisdiction has two interfering taxing rights, one under an existing WHT regime and a second revenue-based taxing right under Pillar I Amount A. The WHT adjustments cover cross-border WHTs on payment to in-scope entities withheld by an entity of an in-scope MNE or a third party.³⁸ Thus, they include the WHT levied on cross-border deductible payments, such as interests, royalties, and technical and management fees. WHTs on dividends and capital gains are excluded (Art. 2(j) and (k) MLC), as neither dividends nor capital gains are part of the profit variables relevant for computing Amount A.

WHT regimes are robust collection methods to ensure taxation in the source country. To avoid double taxation of the MNE's income, WHTs are usually credited against the MNE's CIT liabilities in the residence country (worldwide tax system), or the corresponding income is exempt from the domestic tax base (territorial tax system). To address these cross-border implications, the MLC provides for adjustments in both countries involved. The source country that levies the WHTs applies a WHT upward adjustment, while the residence country that avoids double taxation applies a WHT downward adjustment.³⁹

³⁸ It is irrelevant whether the payor is an entity of the MNE or a third party not subject to the MLC, as the WHT adjustments respectively capture the residence and source taxation of the receiving MNE entity.

³⁹ In general, both WHT adjustments consist of two components: a current WHT adjustment, which considers WHTs of the current period, and a WHT spreading adjustment, which serves as a correction factor for taxes withheld in prior periods (Appendix B Sec. 4 par. 12(a) and Sec. 6 MLC). The correction factor is necessary because the current WHT adjustments only include WHTs that have arisen at least 60 days before the deadline for filing the Amount A tax return. Thus, any taxes withheld in these 60 days and any other changes in the determination of WHT liabilities in prior periods must be considered in subsequent periods under the WHT

The WHT upward adjustment is added to the MNE's elimination profits in the market jurisdiction to determine the adjusted elimination profits of the group (Art. 5 par. 2(f)(ii) MLC). These are, in turn, relevant for the computation of the MDSH. The WHT upward adjustment⁴⁰ is determined as follows (Annex B Sec. 6 MLC):

$$WHTUA_m = \frac{WHT_m}{CIT \%_m} \times (1 - RF_m)$$

The first part of the formula for the WHT upward adjustment ($WHTUA_m$) is the WHT upward amount. It converts the taxes withheld in the market jurisdiction (WHT_m) into a profit equivalent, which would yield the same amount of tax revenue for the market jurisdiction if the CIT rate ($CIT_m \%$) was applied instead of the WHT rate. This transformation into a profit variable is necessary as the WHT upward adjustment is added to the MNE's elimination profits. The WHT upward amount is then corrected by a reduction factor (RF_m). According to the OECD, this factor reflects the "normal profit associated with the [...] WHT" (OECD, 2023d). However, counterintuitive to that purported notion, the reduction factor is indeed inversely related to physical presence and economic substance.⁴¹ Instead, it seems to be fiscally motivated. Specifically, in jurisdictions where the MNE has a physical presence and substantial economic substance, the reduction factor amounts to 15%. It is increased to 30% and 60%, respectively, if the market jurisdiction is a low depreciation and payroll jurisdiction or a low depreciation and payroll jurisdiction where the MNE has less than 50 thousand EUR depreciation and payroll and no revenues with third parties. For low- and lower-middle-income jurisdictions, the higher reduction factors are further increased to 40% and 70%, respectively (Annex B Sec. par. 6 MLC). Note that a higher (lower) reduction factor results in a lower (higher) WHT upward adjustment of elimination profits and ultimately a higher (lower) Amount A. Thus, the WHT upward adjustment is lower in market countries where the MNE subject to WHT lacks a minimum level of economic substance and the lowest if, in addition, the respective country is classified as a low-income and lower-middle-income country. This

spreading adjustment. If the corresponding change in the WHT base is at least 5 million EUR, the WHT spreading adjustment is spread over at least three periods. The computation of the WHT spreading adjustment follows the computation of the current WHT adjustment, with the only difference being the tax base. The spreading adjustment only considers changes in the WHT base of prior periods or previously unrecognized WHTs (Appendix B Sec. 4 par. 12(c) and Sec. 6 par. 3 MLC). For simplicity, we neglect the WHT spreading adjustment in the subsequent elaborations on the two WHT adjustments.

⁴⁰ The equation relates to the current WHT upward adjustment. The computation of the WHT spreading adjustment is similar. Instead of the WHT in the market jurisdiction for the period, the change in the WHT base of prior periods and previously unrecognized WHT are considered (Appendix B Sec. 4 par. 12(c) and Sec. 6 par. 3 MLC).

⁴¹ Given the substance-based correction term in the computation of the MDSH, which also applies to the WHT upward adjustments, the reduction factor is relevant in countries without economic substance.

protects the Amount A taxing rights in lower-income countries that currently only rely on source taxation.

The WHT downward adjustment applies to a taxable MNE entity in a market jurisdiction that receives a cross-border payment subject to WHT, provided that the jurisdiction has a mechanism to relieve double taxation in respect of the WHT (Appendix B Sec. 4 par. 12 MLC). The WHT downward adjustment is subtracted from the entity elimination profit (Annex B Sec. 4 par. 2(j) MLC), as opposed to the upward adjustment, which is added to the group elimination profit.⁴² Contrary to the WHT upward adjustment, the WHT downward adjustment is calculated without accounting for a reduction factor (Annex B Sec. 4 par. 13(i) MLC):

$$WHTDA_m = MIN\left(\frac{WHT_n}{MAX(15\%; CIT_m\%)}; 0.7 \times WHT\ base_m\right)$$

The WHT downward adjustment ($WHTDA_m$) equals the WHT downward amount, which is, in principle, calculated in the same way as the WHT upward amount. The foreign WHTs in country n (WHT_n) are divided by the local CIT rate in the market jurisdiction m to convert the WHT into a profit equivalent. However, if the market jurisdiction is a low-tax jurisdiction with a CIT rate below 15%, a rate of 15% is applied instead of the actual rate. This effectively limits the profit equivalent in the case of critically low CIT rates. At the same time, the WHT downward amount is limited to 70% of the WHT base ($WHT\ base_m$). This limitation of the downward adjustments turns binding in countries where the WHT rate for which double taxation is relieved is greater than 70% of the local CIT rate.

Ultimately, both WHT adjustments indirectly influence the Amount A profit allocated to a market jurisdiction through the MDSH, more specifically, the jurisdictional excess profit. The following formula depicts the direct effect of the WHT adjustments on the jurisdictional excess profit. A discussion of key insights follows below.

$$JEP_m = \begin{cases} P_m - WHTDA_m + WHTUA_m - 0.1R_M \times \frac{(d+p)_m}{(d+p)}, & 0.3R_m < R_M \times \frac{(d+p)_m}{(d+p)} \wedge P_m - 0.1R_M \times \frac{(d+p)_m}{(d+p)} > 0 \\ P_m - WHTDA_m + WHTUA_m - 0.03R_m, & 0.3R_m \geq R_M \times \frac{(d+p)_m}{(d+p)} \wedge P_m - 0.03R_m > 0 \\ 0, & else \end{cases}$$

First, the WHT upward adjustment increases the adjusted jurisdictional excess profit in the market jurisdiction m , while the WHT downward adjustment decreases it. In countries where

⁴² That the WHT downward adjustment is recognized at the entity level, and the WHT upward adjustment at the group level should not have any impact, as both adjustments only apply at the level of the MDSH.

an MNE primarily earns income rather than residing there, the overall effect of the two WHT adjustments on the adjusted jurisdictional excess profit is positive due to the higher impact of the WHT upward adjustment ($WHTUA_m$). This is a situation we see particularly in developing countries, as they rely more often on source taxation than developed countries. In contrast, in a residence country of an MNE entity, which tends to be mostly developed, the WHT downward adjustment ($WHTDA_m$) comes into play and diminishes the jurisdictional excess profit. For these developed countries that levy WHTs on cross-border payments to foreign in-scope MNE entities but simultaneously grant relief for foreign WHTs for MNE entities, the overall effect depends on the applicable tax rates and the amount of the reduction factor for the WHT upward adjustment.

Second, the WHT adjustments may be more important for the adjusted jurisdictional excess profit than the elimination profits of the legal entities and permanent establishments within the market jurisdiction. This holds true particularly for source countries where the MNE has no physical presence and an adjusted jurisdictional excess profit may entirely be based on a source taxing right and the corresponding WHT upward adjustment. Especially developing countries could be exposed to this effect. However, in such low-substance scenarios in lower-income countries, the effect from $WHTUA_m$ might be somewhat slowed down by the high reduction factors RF_m of up to 40% or 70%. On the contrary, a WHT downward adjustment may fully absorb a jurisdictional excess profit and, ultimately, the MDSH if the profit equivalent for which the market jurisdiction grants a double taxation relief is sufficiently high. This scenario may apply to a residence country of an MNE entity with high cross-border cash inflows subject to WHT and should be more likely for high-income than for low-income countries.

Third, the concept of the reduction factor RF_m applied in the calculation of the WHT upward adjustments is crude. If it was supposed to reflect a normal profit share in the WHT profit equivalent, as the OECD (2023d) purports, then it would be redundant to the substance-based or revenue-based correction terms for normal profits in the JEP_m -formula. Moreover, it is increased for low depreciation and low payroll jurisdictions, thus inversely related to economic substance. After all, the reduction factor RF_m rather seems a fiscally motivated factor to protect Amount A taxing rights of source countries, as it limits the MDSH in pure source countries, i.e., developing countries. Especially for low-income, low-substance countries that might otherwise lose their grip on Amount A due to their interfering withholding taxation, the reduction factor is of particular importance.

Overall, these effects of the WHT adjustments on the adjusted jurisdictional excess profit impact the MDSH and, ultimately, the Amount A allocated to a market jurisdiction. They become apparent in the following formula:

$$A_m - MDSH_m = \begin{cases} 0, & A_m \leq MDSH_m \\ (P - 0.1R_M) \times \frac{R_m}{4R_M}, & A_m > MDSH_m \wedge JEP_m = 0 \\ (P - 0.1R_M) \times \frac{R_m}{4R_M} - (P_m + WHTUA_m - WHTDA_m) \times JOP_m + 0.03R_m \times JOP_m, & A_m > MDSH_m \wedge JEP_m > 0 \wedge R_M \times \frac{(d+p)_m}{(d+p)} \leq 0.3R_m \\ (P - 0.1R_M) \times \frac{R_m}{4R_M} - (P_m + WHTUA_m - WHTDA_m) \times JOP_m + (0.1R_M \times \frac{(d+p)_m}{(d+p)}) \times JOP_m, & A_m > MDSH_m \wedge JEP_m > 0 \wedge R_M \times \frac{(d+p)_m}{(d+p)} > 0.3R_m \end{cases}$$

The WHT upward adjustment increases the probability of reaching the required MDSH minimum threshold. If the MDSH threshold is met, the WHT upward adjustment increases the MDSH, resulting in a negative effect on the allocated Amount A in the market country. Consequently, the negative effect of the MDSH is higher for market countries that levy WHT than for market countries without a source taxing right on the profits of in-scope MNEs, and the attributed Amount A profit is accordingly lower. Similar to taxing rights based on physical presence, WHT taxing rights on interest, royalties, management and technical fees, or other deductible payments to in-scope MNEs negatively influence the Amount A taxing right proposed by the MLC. The magnitude of the effect depends on the individual components of the WHT upward adjustment as described above and is mitigated by the jurisdictional offsetting percentage. Since market countries that are source countries without any physical presence of the in-scope MNE qualify as low depreciation and payroll jurisdictions, the mitigating effect of the offsetting percentage remains small.

The WHT downward adjustment has opposing effects. It decreases the probability of reaching the MDSH threshold and, if the threshold is met, decreases the MDSH itself. This results in a higher Amount A profit attributed to the market jurisdiction. Residence countries of MNE entities that grant double taxation relief with respect to foreign WHTs benefit most from the effects of the WHT downward adjustment.

Compared to former OECD proposals on the definition of Amount A taxing rights (e.g., OECD, 2022b), the MLC increases fairness by considering withholding taxation rights alongside taxing rights based on an MNE's physical presence. Both taxing rights equally reduce the Amount A profit allocated to a market. Simultaneously, the MLC takes into account granting double taxation relief with respect to WHTs. Only the reduction factor RF_m in the WHT upward adjustment remains questionable from an economic rationale as it is hard to interpret and somewhat arbitrarily set. However, its fiscal intention for lower-income countries and other

countries that rely on source taxation may justify its application. Overall, the simultaneous application of both WHT adjustments and the non-parallel computation of the two WHT adjustments complicates any predictions beyond the described effects of the individual parameters and their overall implications.

3.1.4 Elimination of Double Taxation under Pillar I

Along with profit reallocation provisions, Pillar I Amount A requires mechanisms to eliminate double taxation. The MDSH and the WHT adjustments mitigate double taxation with respect to Amount A and existing taxing rights to some extent but do not fully eliminate it. Therefore, Part IV of the MLC provides rules to eliminate double taxation caused by Pillar I Amount A.

In line with the objective of reallocating taxing rights, only jurisdictions that receive a substantial part of nexus-based taxing rights are responsible for eliminating double taxation. Effectively, these countries relinquish some of their nexus-based taxing rights in favor of market jurisdictions under Pillar I Amount A. The so-called specified jurisdictions are countries in which the MNE physically operates and generates the highest elimination profits that cumulatively account for at least 95% of the MNE's total elimination profits (Art. 10(a) MLC). In addition, any country in which the MNE generates elimination profits of at least 50 million EUR⁴³ or 10 million EUR, combined with high profitability compared to economic substance and a low effective income tax rate, is considered a specified jurisdiction (Art. 10(b) and c) MLC). This results in developing countries being less likely to be identified as specified jurisdictions. Second, it ensures that only nexus-based taxing rights are replaced by the revenue-based taxing right under Pillar I Amount A, while WHT rights, which are more important for developing countries, remain unaffected. In addition, low-tax countries with nexus-based taxing rights on profits that are not backed by economic substance have lower minimum requirements to qualify as specified jurisdictions. This implies the potential of shifting more tax revenue from these countries to market jurisdictions than from other countries.

The extent to which a specified jurisdiction is obliged to eliminate double taxation and, therefore, is considered a relieving jurisdiction, is determined by a tiered approach (Art. 11 par. 5 MLC). Based on the (recalculated) adjusted jurisdictional return on depreciation and

⁴³ Note that this threshold is similar to de minimis threshold for the application of the MDSH. While the MDSH threshold is based on the adjusted jurisdictional excess profit, which includes the WHT upward adjustment, the threshold for double taxation relief relies on the jurisdictional excess profit, without accounting for existing WHT taxing rights.

payroll of the MNE,⁴⁴ this mechanism iteratively allocates a share of the so-called Amount A relief amount to the relieving countries until the obligation to eliminate double taxation has been fully allocated or all iterative steps provided in Art. 11 MLC have been applied (Art. 9, Art. 11 par. 3 and 4 MLC). *Appendix Table 13* summarizes the definitions of the four tiers (Tier 1, Tier 2, Tier 3A, Tier 3B) based on thresholds for the (recalculated) adjusted jurisdictional return on depreciation and payroll according to Art. 11 par. 5 MLC. In general, jurisdictions in which the MNE has a higher return on depreciation and payroll are within a lower tier and, therefore, are allocated an Amount A relief amount first. This procedure ensures that taxing rights on deemed excess profits are shifted from the countries to which they are currently allocated based on a physical nexus to the revenue-sourcing market country. Within Tier 1, the country with the highest adjusted return on depreciation and payroll is allocated an Amount A relief amount until its recalculated adjusted jurisdictional return on depreciation and payroll equals the one in the jurisdiction with the second highest return. Then, both countries jointly grant double taxation relief until their recalculated adjusted returns on depreciation and payroll reach the one in the third country. This iteration continues until the recalculated adjusted jurisdictional returns are at the level of the threshold for Tier 2 (Art. 11 par. 6 MLC). Within Tier 2 and the subsequent tiers, the obligation to eliminate double taxation is allocated to the respective jurisdictions in proportion to the excess profits in each country until either the recalculated adjusted jurisdictional returns are at the level of the threshold of the next tier or the Amount A relief amount is fully allocated (Art. 11 par. 9-14 MLC).

The Amount A relief amount for all specified jurisdictions S of an MNE (AR_S) is determined by the following formula (Art. 11 par. 2(a) MLC):

$$AR_S = MIN \left(A_M; \sum_{s=1}^n (d + p)_s \times MAX \left[0; \left(\frac{rP_s}{(d + p)_s} - \frac{0.1R_M}{(d + p)} \right) \right] \right)$$

In general, the Amount A relief amount (AR_S) equals the sum of all Amount A profits allocated to the market jurisdictions of an MNE (A_M).⁴⁵ Only under these circumstances can double taxation with respect to Amount A profits be fully eliminated.⁴⁶ If only a small share of adjusted

⁴⁴ The (recalculated) adjusted jurisdictional return on depreciation and payroll is determined by dividing an MNE's (recalculated) elimination profit in that specified jurisdiction s (rP_s) by the depreciation and payroll of subsidiaries and permanent establishments in the respective jurisdiction $(d+p)_s$ (Annex B Sec. 5 par. 2, 4 and Art. 11 par. 2(c) MLC).

⁴⁵ With $A_M = \sum_{m=1}^n A_m$.

⁴⁶ To account for priorly unallocated Amount A relief amounts, a correction term is added to the sum of the Amount A profits, which we neglect in the equation for simplicity. The effect of the correction term is applied for

elimination profits is generated in the specified jurisdictions of the MNE or a comparably high share of the economic substance of the MNE, measured as depreciation and payroll, is allocated across all specified jurisdictions, the Amount A relief amount is lower. It is then determined by the excess of the adjusted jurisdictional returns on depreciation and payroll⁴⁷ $(\frac{rP_s}{(d+p)_s})$ prior to any allocation of the Amount A relief amount over the deemed normal return on depreciation and payroll of the MNE group $(\frac{0.1R_M}{(d+p)})$, multiplied by the jurisdictional depreciation and payroll per country $((d+p)_s)$. To ensure that only excess return on economic substance is captured, only specified jurisdictions with positive values are considered. This specification of the Amount A relief amount does not grant full elimination of double taxation for the MNE. Instead, it considers that the taxable profit in the specified countries is either comparably low, which corresponds to a low elimination profit (P_s), or that the taxable profit in these countries is backed with a substantial share of the MNE's economic substance $((d+p)_s)$. From the perspective of the specified jurisdictions, these economic circumstances of the MNE justify a reduced double taxation relief and an overall reduced shift of taxing rights from these countries. However, for the MNE, this is accompanied by some degree of double taxation.

The share of the Amount A relief amount that is allocated to a specified jurisdiction may differ considerably. Primarily, its magnitude depends on the tier of the respective country and on the number of specified countries within this tier. *Appendix Table 14* summarizes the range of the Amount A relief amount per tier. It demonstrates that, in proportion to the economic substance of an MNE in a specified jurisdiction, a lower-tier jurisdiction is allocated a higher Amount A relief amount than a jurisdiction in the subsequent tier. Consequently, the jurisdictions in which the MNE has a higher return on depreciation and payroll are obliged to relieve more double taxation and, therefore, are allocated a higher Amount A relief amount. In particular, Tier 1 countries, in which an MNE is highly profitable compared to the economic substance, must grant a substantial double taxation relief. These might encompass countries where mainly intellectual property (IP)-holding entities with high profits are located.

Technically, the iterative allocation of the Amount A relief amount requires a recalculation of the adjusted jurisdictional return on depreciation and payroll $(\frac{rP_s}{(d+p)_s})$, i.e., the amended

the previous four periods. Assuming that a four-year period is sufficient to account for all yet unallocated Amount A relief amounts, the term has a mere timing effect. Over the total period, it is irrelevant whether an Amount A relief amount is recognized in the current year or within a four-year time lag.

⁴⁷ The adjusted jurisdictional return on depreciation and payroll uses an adapted measure of the elimination profits in the specified jurisdictions (rP_s). The amendments are explained in the subsequent part of this chapter.

elimination profit (rP_s), after a share of the Amount A relief amount has been allocated to a jurisdiction within Tier 1 or to all jurisdictions of subsequent tiers, respectively. The amended and iteratively recalculated elimination profit is determined as follows (Art. 11 par. 2(c) MLC):

$$rP_s = P_s - MDSH_s \times \left(1 - \frac{WHTUA_s}{P_s + WHTUA_s}\right) - aAR_s$$

If the specified jurisdiction is a market jurisdiction of the MNE, the respective MDSH ($MDSH_s$), including the reversal of the WHT upward adjustment ($WHTUA_s$), is deducted from the elimination profits of the MNE in that jurisdiction (P_s), as both adjustments already partly relieve double taxation with respect to existing taxing rights. Technically, reversing the WHT upward adjustment requires a reduction of the MDSH in the amount of the corresponding WHT profit equivalent ($\frac{WHTUA_s}{P_s + WHTUA_s}$). As part of the iterative recalculation, the elimination profit is further reduced by the Amount A relief amount that is allocated to the respective specified jurisdiction (aAR_s) under the tiered approach. Consequently, the recalculated adjusted jurisdictional return on depreciation and payroll of an MNE for a specified jurisdiction equals the threshold of the next tier or, within Tier 1, the adjusted jurisdictional return on depreciation and payroll of the MNE in the subsequent relieving jurisdiction.

If the tiered approach allocates an Amount A relief amount to a specified jurisdiction, the jurisdiction grants double taxation relief to the entities of the MNE with the highest profits⁴⁸ located in the respective country, including permanent establishments (Art. 13 MLC). If there is more than one entity of the MNE in the country, double taxation relief is granted iteratively, starting with the entity with the highest profit until either the obligation to relieve double taxation has been fully satisfied or the profit of all entities and permanent establishments in the country has been exhausted (Art. 13 par. 2-4 MLC). As a method for double taxation relief, the MLC suggests either a payment to the respective entity, a tax credit on CIT, or the deduction of an Amount A profit equivalent from the CIT base (Art. 12 par. 1 MLC). Thereby, the amount of the relief is determined by the share of the Amount A relief amount of the respective jurisdiction to the total Amount A relief amount of the MNE in all relieving jurisdictions.

Overall, the double taxation relief under Pillar I Amount A supports the reallocation of taxing rights from countries in which an MNE has high profits relative to economic substance to market jurisdictions. However, with an increasing number of jurisdictions involved, both within

⁴⁸ A jurisdiction may use excess profit, taxable profit, or accounting profit to determine the respective entities (Art. 13 par. 1 MLC).

and across different tiers, the complexity of double taxation relief for the MNE increases.⁴⁹ From the perspective of a relieving jurisdiction that is simultaneously a market jurisdiction, the Amount A profit allocation and the double taxation relief mechanism may result in a zero-sum game. Instead of shifting tax revenue, only administrative costs are increased. For the majority of developing countries, this scenario is highly unlikely as they are less likely to be identified as specified jurisdiction due to the very limited physical presence of MNEs (*Appendix Figure 8*) and, therefore, cannot relieve double taxation with respect to existing nexus-based taxing rights. In the opposite case, double taxation relief is granted by countries with nexus-based taxing rights that are not market countries, i.e., small countries that attract IP ownership. These countries lose tax revenue under Pillar I.

After considering double taxation relief as well as the MDSH, including both WHT adjustments, the initially calculated Amount A profit in a market jurisdiction (A_m) is further amended to derive the share of Amount A profit that is subject to tax in that given jurisdiction (Art. 4 par. 2 MLC):

$$taxableA_m = (A_m - MDSH_m) \times \left(1 - \frac{AR_{S(nonMLC \wedge TT)}}{AR_{S=\sum_{r=1}^n s}}\right)$$

The Amount A profit, after deducting the MDSH in a market jurisdiction ($A_m - MDSH_m$), is reduced proportionally to the share of the Amount A relief amount that is allocated to specified jurisdictions $S_{(nonMLC \wedge TT)}$ that have not signed the MLC (*nonMLC*) and provided that they have concluded a tax treaty (*TT*) with the market jurisdiction that covers business profits. While the reduction of the taxable Amount A profit decreases the taxing right for the market country, it prevents double taxation (only) between two countries that have signed an agreement to eliminate double taxation. As a result, bilateral tax treaties on corporate taxation between a market jurisdiction and a non-MLC jurisdiction take precedence over Amount A. This mitigates the overall effect of Pillar I Amount A but provides certainty for affected MNEs at the same time. If the two countries have not signed a tax treaty, the taxable Amount A is not reduced, and the MLC accepts double taxation resulting from the Amount A taxing right. For developing countries, this pro-rata reduction has three implications. First, for developing countries, which are more frequently market countries, it is crucial that a critical mass of developed countries, which are more likely to be a specified jurisdiction, signs the MLC. Otherwise, the taxable

⁴⁹ The 95% feature (Art. 10(a) MLC) and the de minimis threshold (Art. 10(b) and (c) MLC), which are applied in identifying specified jurisdictions, and the four-tier approach (Art. 11 par. 5 MLC) should limit the number of jurisdictions involved in double taxation relief and guarantee that only countries which grant substantial relief are involved.

Amount A profit is significantly reduced. Second, the taxable Amount A profit is not lower for jurisdictions with a poor tax treaty network, which are particularly low-income countries. Third, if a market jurisdiction taxes a share of the Amount A profit, but the identified specified jurisdiction has not signed the MLC, and no tax treaty exists, double taxation occurs and may trigger behavioral responses of the affected MNE, such as exiting a market. This may be relevant for less important market jurisdictions and, potentially, for low-income countries.

3.2 Art. 12B UN Model

Besides the Task Force on the Digital Economy of the OECD, the UN Subcommittee on Tax Challenges Related to the Digitalization of the Economy also developed an approach to address the tax challenges of the digital economy. In April 2021, the UN Committee of Experts on International Cooperation in Tax Matters (UN Tax Committee) introduced Article 12B to the UN Model Tax Convention, which aims at granting more taxing rights to market jurisdictions for digital services (UN, 2021). Given the current debate about the leadership on global tax coordination and the increasing support of the UN, particularly from developing countries (Goulder, 2023; Katz-Pearlman, 2023), we also subject the UN proposal to thorough evaluation.

Art. 12B UN Model complements Art. 12 and 12A UN Model, which determine the taxation of royalties and technical fees, respectively. Collectively, these three articles strengthen source country taxation, which is a distinct feature of the UN Model compared to the OECD Model. For instance, Art. 12 UN Model opens leeway for source taxation of royalties, which is not foreseen in the corresponding Art. 12 OECD Model (UN Model Commentary, 2017). Art. 12A, which was added to the UN Model only in 2017, entitles countries to tax fees for managerial, technical, or consultancy services paid to non-residents on a gross basis (UN Model Commentary, 2017). The addition of Art. 12B, which mandates source taxation from automated digital services (ADSs), therefore aligns with the development of the UN Model towards increasing source taxation. Also, from a conceptual perspective, the newly designed Art. 12B UN Model relies on the structure and legal architecture of Art. 12 and 12A (Báez Moreno, 2021). In contrast to the OECD proposal on Pillar I Amount A, the proposal of the UN on Art. 12B only encompasses four pages.

To implement the newly conceived taxing right, countries must insert a corresponding provision into their tax treaties. This obviously restricts the potential impact of the proposal to bilateral tax treaty relationships. For existing tax treaties, renegotiations are required and for tax treaties that are currently under negotiation, a potential Art. 12B-equivalent adds to the negotiable points. In both cases, the implementation of the Art. 12B taxing right is therefore subject to

knowledge and bargaining power asymmetries in treaty (re-)negotiations between the involved countries, which may be considered a caveat, especially in the context of tax treaties involving developing and developed countries (e.g., Hearson, 2018). In addition, our evidence (*Appendix Table 8*) on existing tax treaties per income group implies that low-income countries are mainly excluded from the application of Art. 12B UN Model due to their comparably small tax treaty network, which covers, on average, only 5% of all countries globally.

If a provision following Art. 12B UN Model is included in a tax treaty, it applies to income from ADSs that are not classified as royalties (Art. 12 UN Model) or fees for technical services (Art. 12A UN Model). Thereby, ADSs refer to services provided on the internet or another electronic network requiring minimal human involvement from the service provider (Art. 12B par. 5 UN Model). This general definition of an ADS is complemented by a non-exhaustive list of services that constitute an ADS (Art. 12B par. 6 UN Model) if they meet the general definition in Art. 12B par. 5 UN Model. Such services include online advertising (e.g., TikTok), supply of user data (e.g., Acxiom), online search engines (e.g., Google), online intermediation platforms (e.g., eBay), social media platforms (e.g., Meta), digital content (e.g., Netflix), online gaming (e.g., Sony Interactive Entertainment), cloud computing (e.g., Amazon Web Services), and standardized online teaching (e.g., Duolingo). Digital services that require a certain degree of human involvement, e.g., due to customization, or the sale of tangible goods or on-side services via the internet, are beyond the scope of Art. 12B (negative delimitation). Besides the focus on ADSs, there are no further scope limitations. Remarkably, Art. 12B UN Model applies to any ADS, regardless of the firm's size and revenue or profitability thresholds.

In line with Art. 10-12A UN Model, taxing rights on income from ADS are granted to the jurisdiction from which the payment for the ADS originates (Art. 12B par. 2 UN Model). If the income is derived by a permanent establishment of the ADS provider in that state of the payor, however, the existing physical nexus-based taxing right for local business profits (Art. 7 UN Model) takes precedence. In this way, Art. 12B UN Model complements the existing framework on international taxation if there is no established nexus in the market country. However, different from the OECD proposal, Art. 12B UN Model does not provide for an independent nexus that is coequal to the current physical nexus but a subordinate one that only applies in the absence of the other. This design of the provision has two main implications, which are especially important for developing countries: First, any MNE with legal entities or permanent establishments in various countries can circumvent the application of Art. 12B by channeling customer payments for ADSs to countries that have not signed a tax treaty

containing an Art. 12B-provision. Despite being consumer countries from which the payment for ADSs originate, developing countries may not receive taxing rights due to these tax planning opportunities of large, profitable MNEs. Second, smaller firms that offer ADSs may lack the resources to channel customer payments to jurisdictions where Art. 12B UN Model is not applicable. Since developing countries more often host small firms than large MNEs, their taxable profits may be subject to Art. 12B and are taxed abroad in a market jurisdiction. Effectively, this may lead to an overall revenue loss for developing countries as they have to grant double taxation relief.

To determine the tax burden under Art. 12B UN Model, the UN suggests either gross or net taxation, with the exact mechanism to be determined by the firm subject to tax. In general, gross taxation applies, and the source country of the ADS-related payment levies WHTs at a low tax rate on the gross amount of the payment (Art. 12B par. 2 UN Model). While the exact tax rate is subject to bilateral agreement in the respective tax treaty, the UN Model Commentary suggests a rate of 3-4%. Alternatively, the firm subject to tax may opt for net taxation of the ADS income in the source country at the local CIT rate (Art. 12B par. 3 UN Model). In this case, the qualified profit of the ADS in the market country q (P_q) is determined as follows:

$$P_q = 0.3R_q \times p\%$$

R_q refers to the annual ADS revenue sourced in the market jurisdiction q . On this revenue, the overall profitability ratio of the ADS provider ($p\%$) is applied, and 30% of the profit is allocated to the market jurisdiction q . If the ADS provider is part of a business group, the ADS segment profitability ratio, if available, or otherwise the total profitability ratio of the group determines $p\%$. If the legal entity has a higher (segment) profitability ratio than the group or if it is a standalone entity, its own ADS segment profitability ratio or overall profitability ratio, respectively, is applied. Importantly, Art. 12B limits the option for net taxation to cases where the market country has information on the overall group profitability. Net taxation is not eligible for group entities if the overall group profitability ratio is not known to the market country. In this case, ADS payments are subject to gross taxation under Art. 12B par. 3 UN Model. Since Art. 12B UN Model only applies if no physical nexus is available in the market jurisdiction, it remains questionable how the tax administration is informed about the group profitability required to apply net taxation. This may be up to the exact specification of Art. 12B in the respective bilateral tax treaty.

Double taxation arising due to the simultaneous application of the existing income taxing right in the residence country and the newly granted Art. 12B-taxing right in the market jurisdiction should be eliminated in the residence country of the ADS provider. While contracting states can agree on either the exemption or credit method (Art. 23A, Art. 23B UN Model), the UN Tax Committee seems to prefer the credit method to avoid double taxation on ADS profits (UN Model Commentary). The bilateral application of the provision, as well as its subordinate character to the established taxing rights based on a physical nexus, simplifies the avoidance of double taxation since the involved countries can rely on established methods.

3.3 Interim Conclusion

Both Pillar I and Art. 12B UN Model were initiated to address the tax challenges arising from the digital economy. However, they significantly differ in their scope of application and applicable mechanisms. While Pillar I no longer targets specifically digital business models, thereby acknowledging that the digital economy cannot be ringfenced, Art. 12B UN Model solely applies to ADS. Further differences in scope result from Pillar I's revenue and profitability tests, which limit its applicability to approximately 120 MNEs worldwide. Art. 12B UN Model does not employ such thresholds. Consequently, it is questionable whether Pillar I can be regarded as a measure targeted at the digital economy (e.g., Bärsch & Keuper, 2021). It is rather designed to redistribute the right to tax profits of the largest and most profitable MNEs globally.

Both approaches reallocate taxing rights from residence countries to market jurisdictions based on newly designed nexus rules independent of physical presence. However, their definition of a "market jurisdiction" is not necessarily congruent. Pillar I employs net taxation on excess profits and allocates taxing rights multilaterally among jurisdictions through revenue-sourcing rules. These rules determine which country is considered a market jurisdiction depending on the MNE's business model and taking into account the place where the final customer uses the final good or service. In contrast, the UN proposal stipulates a bilateral reallocation of taxing rights on ADS profits between two countries via a tax treaty containing a provision in line with Art. 12B UN Model. It redistributes tax revenues from the residence country of the ADS provider to the country where the payment for the ADS originates. The latter is deemed to be the market jurisdiction. Taxes are either levied on a gross basis on ADS-related payments or – upon election of the ADS provider – on a net basis. Net taxation is applied on a simplified calculated profit share and avoids taxation of substance. However, the applicability of net taxation remains unclear as the market jurisdiction requires information on the profitability of

the overall group. In contrast to Pillar I, the place of taxation following Art. 12B UN Model does not depend on the MNE's business model but on the pricing model of the respective ADS provider. For MNEs with physical nexus in various countries, channeling ADS payments to jurisdictions without an Art. 12B-provision in its tax treaties provides a simple tax planning mechanism to circumvent the application of the new taxing right (Chapter 4.3).

Besides establishing a new nexus, both initiatives consider cases where the MNE already has a taxable nexus in the jurisdiction receiving the new taxing right. Pillar I employs an MDSH adjustment, which decreases the excess profit, i.e., the Amount A taxing right, allocated to that jurisdiction. In addition, double taxation is relieved by jurisdictions where the MNE has a physical nexus and substantial accounting profits. Therefore, Pillar I multilaterally reallocates tax revenues from residence countries to revenue-sourcing countries, with the amount of reallocated tax revenue depending on multiple factors. In addition, Pillar I Amount A takes into account existing source taxing rights through WHT adjustments. These adjustments decrease the Amount A taxing rights for countries that levy WHTs and increases it if a country relieves double taxation with respect to WHTs. Overall, the WHT adjustments increase fairness as they equally consider existing nexus-based and WHT-based taxing rights. To protect the taxing rights of low-income, low-substance countries, a high reduction factor limits the Amount A-diminishing effect of the WHT upward adjustment. Conversely, Art. 12B UN Model only applies if no taxing right previously exists, neither through physical nexus nor through WHTs. If the ADS provider has a physical nexus in the jurisdiction where the payment for the ADS originates, the existing taxing right under Art. 7 UN Model (taxation of business profits) takes precedence. Since Art. 12B and Art. 7 UN Model are mutually exclusive in one jurisdiction, the relief of double taxation is always granted by the jurisdiction with the physical nexus. This approach is more pragmatic than Pillar I Amount A and facilitated by the bilateral application of Art. 12B UN Model.

The implementation of both proposals hinges upon their global approval. The initial entry into force of the MLC on Pillar I Amount A requires ratification by at least thirty countries, including the residence countries of at least 60% of the UPEs of MNEs in scope. Therefore, Pillar I Amount A relies on very few, mainly developed countries. Without the agreement of the United States, whose support for Pillar I is uncertain (Agyemang & Tamma, 2024), the initiative is doomed to fail. Developing countries alone or the 200 countries that are not residence countries of MNEs' ultimate parent entities (UPE), including all low- and lower-middle income countries, cannot implement Pillar I Amount A due to the lack of agreement of

the UPE residence countries. Once the minimum conditions for implementation are met, however, a multilateral redistribution of taxing rights is enacted. Art. 12B UN Model is less dependent on individual countries but instead relies on existing tax treaties and their amendments. If countries refrain from concluding tax treaties, i.e., due to potential revenue losses, there is no opportunity to relocate taxing rights in accordance with Art. 12B UN Model. Consequently, the unequal distribution of tax treaties among countries of different income groups restricts the potential impact of the UN proposal, especially for low-income countries. Similarly, any amendment of existing tax treaties depends on bilateral agreements, which can be considered unlikely given the clear redistribution of tax revenues in bilateral cases. Additionally, the flexibility of Art. 12B requires the specification of many features, which further complicates the process of finding consensus.

Overall, Pillar I Amount A provides a much more comprehensive and sophisticated reform proposal with more granular and detailed guidance compared to Art. 12B UN Model. Simultaneously, however, Pillar I is significantly more complex, and the effects of its different elements (revenue sourcing rules, MDSH including WHT adjustments, double taxation relief) are not ex-ante apparent. To investigate and disentangle the effects of the initiatives further, the following chapter analyzes how both Amount A and Art. 12B UN Model affect different business models and, subsequently, the tax revenues of involved jurisdictions.

4 Case Studies on the Taxation of (Digital) Business Models

4.1 Overview of the Business Models

The boundaries between digital and traditional business models are vanishing as firms increasingly digitalize their business models (Casi et al., 2024). Besides the consensus on the fact that ring-fencing the digital economy is not possible, scholars and politicians agree on two defining features of digitalization (Schön, 2018): First, it leads to the global sale of goods and services without requiring a physical presence, i.e., a subsidiary or a permanent establishment, in the market country (e.g., European Commission, 2017; OECD, 2015; Olbert & Spengel, 2017). Second, digital businesses rely on intangible assets, such as patents, (user) data or algorithms, and economies of scale (e.g., Casi et al., 2024; European Commission, 2017; OECD, 2015). As the traditional income tax system links taxing rights mainly to physical nexus, including a legal seat, market jurisdictions do not participate in the taxation of profits derived without such local nexus (Schön, 2018). Given the increasing importance of digital business models and associated profits, the tax policy debate has centered around whether the traditional allocation of taxing rights can stand the test of time.

Both Pillar I Amount A and Art. 12B UN Model aim to respond to this concern. The proposals ultimately aim at redistributing taxing rights to market jurisdictions. Besides the normative and conceptual differences of the proposals, which have been analyzed and compared in depth in Chapter 3, their effects on tax revenue allocation differ fundamentally, also depending on the respective business model.

To further evaluate and compare the implications of Pillar I Amount A and Art. 12B UN Model, we illustrate the reallocation of taxing rights proposed by the two initiatives through a case study approach. Note that the implications of the two alternative approaches may differ substantially depending on the precise business model considered. In *Appendix Table 15*, we compare the places of taxation under both proposals. While it coincides for some business models, it deviates for others. In our case study approach, we therefore focus on those business models that promise to be most important for the redistribution of taxing rights, being strongly impacted by one or both initiatives. To identify these business models, we collect the recent annual reports of all MNEs that, based on current financial data, are affected by Pillar I (Chapter 3.1). Using the annual reports, we analyze statements on their business model, major streams of revenue generation, and pricing strategy. We focus on MNEs affected by Pillar I Amount A because of data availability.⁵⁰ In addition, Pillar I Amount A covers a larger variety of business models in its revenue sourcing rules, including those covered by Art. 12B UN Model. We further include business models in our case study analysis that are at the heart of the debate about taxing the digital economy. These include the OECD’s revenue category “other services”, which covers six out of nine explicitly listed business models under Art. 12B par. 6 UN Model as well as online advertising services (e.g., OECD, 2015; European Commission, 2017; Schön, 2018).

In line with the OECD’s recent economic impact assessment on Pillar I Amount A (O’Reilly et al., 2023), we classify all in-scope MNEs according to the revenue sourcing categories of Art. 7 MLC based on their major revenue source. We disregard any segmentation within MNEs, acknowledging that segmentation based on publicly available financial data is, at best, imprecise and leads to pseudo-accuracy. *Appendix Table 16* displays the share of MNEs across revenue sourcing categories and revenue share across revenue sourcing categories based on MNEs’ group revenue. We find that 65% of in-scope MNEs derive a major part of their

⁵⁰ Firm coverage in Orbis is heavily skewed towards larger and more profitable firms and subject to large variation across countries (Bajgar et al., 2020). While these limitations of the database only have a limited impact on the identification of the largest, and most profitable MNEs, which are subject to Pillar I Amount A, it does not allow for identifying an unbiased sample of firms that are potentially subject to Art. 12B UN Model.

revenues from selling finished goods and their components. Another 11% of affected MNEs generate their major revenues from other services, which encompasses particularly digital content and digital service provision. Only 2% of in-scope MNEs derive a major part of their revenues from online advertising services. However, given that these 2% account for more than 6% of in-scope revenue, online advertising is highly relevant. Note that none in-scope MNE derives its major revenue from online intermediation services or the licensing and sale of user data, two revenue streams that are frequently mentioned in the debate on taxing the digital economy. Applying segmentation to the MNEs' revenues will likely lead to different results.

We concentrate on the quantitatively or politically most relevant business model types identified and compare the effects of the two reform proposals on the basis of case studies. Specifically, we incorporate the findings from our descriptive economic analysis in Chapter 2 and the legal comparison in Chapter 3 to assess the implications for affected MNEs and tax revenues in developing and developed countries.

4.2 (Online) Advertising Services

Online advertising services are digital business models that enable firms to monetize the provision of free online goods or services to a broad user or consumer base. The large online audience and the possibility of targeted advertising using algorithms are highly attractive to marketers. These may pay for every thousand views of the advertisement (cost-per-mille), based on user clicks (cost-per-click), or only when users take a specific action, such as making a purchase (cost-per-action) (OECD, 2015), thus making online advertising versatile in terms of compensation. The UN lists online advertising services first in its exemplary list of ADS (Art. 12B par. 6a UN Model), while the OECD places it second in its revenue sourcing catalog. These frontline positions underscore the relevance of the business model from the perspective of both the UN and the OECD. Prominent examples of MNEs relying on online advertising services include Meta Platforms, Inc., which encompasses Facebook, Messenger, Instagram, and WhatsApp and generates “substantially all of [its] revenue from selling advertising placements to marketers”⁵¹. Similarly, Alphabet Inc., which operates Google and YouTube, among others, generates more than 80% of its revenue from advertising services.⁵² The two main types of online advertising are display advertisements and search engine advertisements.

⁵¹ Meta Platforms, Inc. Financial report 2021, p. 7, https://s21.q4cdn.com/399680738/files/doc_financials/annual_reports/2023/2021-Annual-Report.pdf (Accessed 03.06.2023)

⁵² Alphabet Inc., Financial report 2022, p. 32, https://abc.xyz/investor/static/pdf/20230203_alphabet_10K.pdf (Accessed 03.06.2023).

Display advertisements require marketers to pay for the display of their advertisements on certain websites or to specific audiences. Search engine advertisements require advertisers to pay to appear in Internet search results when users search for particular keywords (OECD, 2015).

In a nutshell, business models relying on online advertising services are two-sided and depend on marketers, who pay for the placement of the advertisement, and viewers, who are the users of the free online content and potential consumers of the advertised good or service. Thus, they involve at least three parties: the advertisement service provider, the marketer, and the viewer, which may be located in up to three different jurisdictions. Given the global distribution of MNEs and the worldwide population (Chapter 2.1), it is likely that the advertisement service provider is located in a high-income country while the viewer is located in a developing country. The advertiser may be either a local firm in the country or geographical region of the viewer or an MNE located in a third country, most likely a developed country. In *Appendix Figure 15 (Panel A)*, we display an online advertising service business model with parties in three different countries and highlight revenue cash flows. In addition, we graphically illustrate the place of taxation following the proposals of the OECD and the UN.

The current international tax system allocates the taxing rights on the profits of the online advertisement service provider to its residence country, i.e., the high-income country. Following the revenue sourcing rules of Pillar I Amount A, the taxing rights on the Amount A profits from online advertising services are reallocated to the market jurisdictions, which are defined as the countries where the viewers of the advertisement are located (Art. 7 par. 1(d)(ii) MLC).⁵³ Since the provision of advertising services is an entirely digital business model, no nexus and economic substance is required in viewers' countries. Additionally, no WHTs are involved. As a result, Pillar I Amount A shifts the taxing rights on 25% of the excess profit from the residence country of the advertising service provider to the countries of the viewers. The residence country of the advertising service provider provides double taxation relief for the taxes levied on the Amount A profit in the viewer country with respect to the Amount A taxing right.

In contrast, following Art. 12B UN Model, the residence country of the marketer is considered the market jurisdiction. This country is entitled to levy WHTs on the payments – which are

⁵³ Meta, in its annual report, follows this definition of a market jurisdiction and segments revenue by user location in its annual report (Meta Platforms, Inc. Financial report 2021, p. 58, https://s21.q4cdn.com/399680738/files/doc_financials/annual_reports/2023/2021-Annual-Report.pdf (Accessed 03.06.2023)).

made by the marketer – to the advertising service provider or tax 30% of the profits generated by the advertising service provider. The place of taxation under both rules only coincides if the viewers and the marketer are located in the same country. Thus, any jurisdiction in which foreign marketers place online advertisements in order to address local viewers without any physical presence is granted an Amount A taxing right but no taxing right under Art. 12B UN Model. Considering the geographical distribution of the world population (potential viewers) and multinational companies (potential marketers), developing countries will very likely benefit more from the allocation of taxing rights under Amount A than under Art. 12B UN Model.

In the OECD's Pillar I proposal, advertising services other than online advertising services are listed as a separate category in the revenue sourcing catalog (Art. 7 par. 1(d)(iii) MLC). This category encompasses advertising services via billboards or fixed sites, as well as print media, television, or radio (OECD 2023, Annex D Section B1). Notably, these services extend beyond purely digital businesses. We display the business model of a traditional advertising service, including revenue cash flows and the place of taxation under Amount A and Art. 12B UN Model, in *Appendix Figure 15 (Panel B)*. Following the OECD proposal, revenue is sourced at the place of display or reception of the advertisement, which aligns with the location of the viewer. Thus, the logic of allocating the Amount A taxing right corresponds to the case of online advertising services. Art. 12B UN Model, in principle, does not cover such services as they do not constitute an ADS. Consequently, profits from such services are typically taxed in the residence country of the advertising service provider (Art. 7 UN Model). However, out-of-home advertisement is evolving, and digital-out-of-home advertisement (DOOH) is among the fastest-growing types of advertising. DOOH screens are internet-of-things (IoT) devices that display advertisements on buildings, within shopping centers, or on public transportation. These devices are connected to the internet and enable dynamic advertisements by adjusting to the surrounding audience in real-time.⁵⁴ According to the UN Model commentary, advertising on digital interfaces, including advertising “displayed on an Internet-connected good” (UN Model Commentary on Art. 12B, par. 8, 2021), is classified as online advertising. Consequently, as soon as an on-site advertisement is displayed on an IoT device, it constitutes an ADS under Art. 12B par. 6a) UN Model and a taxing right is granted to the jurisdiction of the marketer. This illustrates the sensitivity of Art. 12B UN Model to technical details which may be decisive in determining which jurisdiction receives the taxing right.

⁵⁴ <https://www.intel.de/content/www/de/de/internet-of-things/iot-solutions/digital-signage/dooh.html> (05.10.2023).

4.3 Online Intermediation Services

Online intermediation services are two-sided market business models, also referred to as platform business models, that enable and support the transactions between independent sellers and (potential) buyers of goods and services through a digital interface (Täuscher & Laudien, 2018). Thereby, the intermediary offers advantages for both the supply- and the demand-side (Gawer, 2016). For potential buyers, online intermediation services effectively reduce search costs and facilitate secure transactions by matching buyers with appropriate sellers using data analytics to consider buyers' preferences. For sellers, online intermediaries offer access to a much broader customer base, enabling them to reach customers globally without requiring a physical presence. The offered goods and services at the online intermediation platform may be digital, such as stock photography and art (e.g., Shutterstock), or non-digital, such as physical goods or location-specific services (e.g., Amazon Marketplace, AirBnB). Thereby, the intermediary is independent of the supply- and demand-side participants and serves solely as a broker, who imposes fees for the provision of its intermediation services. The pricing mechanism, as well as the paying party, vary with the pricing model of the intermediary and may have different implications for taxation. Entrepreneurship literature generally distinguishes between the monetization via a commission model, subscription model, or advertising model (Schlie et al., 2011). Täuscher & Laudien (2018) analyze pricing mechanisms of online intermediaries and report that most online intermediation services charge a commission to the supplier. An example may be a fee based on the number of posted items (e.g., Etsy⁵⁵). Alternatively, the buyer pays a commission per purchase (e.g., Airbnb⁵⁶), or either the supply-side or the demand-side participants pay a subscription fee for the usage of the platform (e.g., Shutterstock⁵⁷). Online intermediaries that monetize by providing online advertising are the exception and are classified as online advertising services (Chapter 4.2). For online intermediation services that charge either the supply- or the demand-side participants, we display a potential cross-border scenario involving the intermediation service provider, the seller, and the buyer in three countries in *Appendix Figure 16*. Again, given the global distribution of MNEs and the worldwide population (Chapter 2.1), it is likely that the online intermediation service provider is located in a high-income country while the consumer may be

⁵⁵ Etsy, Inc. Integrated Annual Report 2021, p. 3, https://s22.q4cdn.com/941741262/files/doc_financials/2021/ar/Q1_EtsyInc_Etsy_AnnualReport_2021.pdf (03.03.2024).

⁵⁶ Airbnb, Inc. Form 10-K 2023, p. 57, <https://investors.airbnb.com/financials/sec-filings/sec-filings-details/default.aspx?FilingId=17283799> (07.03.2024).

⁵⁷ Shutterstock, Inc. Form 10-K 2021, p. 7, <https://investor.shutterstock.com/static-files/9e2d2604-6e02-43e3-a57c-9bf992b970ea> (07.03.2024).

located in a developing country. The seller may be either a local firm in the country or geographical region of the buyer or an MNE located in a third country, most likely a developed country. In *Panel A*, we display an intermediary that charges the supply-side participants, and in *Panel B*, one that is monetized by the (potential) buyers. In both figures, we further illustrate the implications for taxation under the proposals of the OECD and the UN.

The current international tax system grants the taxing right on the intermediary's business profits to the residence country of the intermediation service provider or the countries where it physically operates. According to the OECD proposal, the taxing right on Amount A profit is split equally between the jurisdictions of the seller and the buyer (Art. 7 par. 1 (d)(iv) MLC). For services that are location-specific, the taxing right is split between the jurisdictions of the seller and the location of performance (Art. 7 par. 1 (d)(iv) MLC). The rationale of this approach seems based on the fact that intermediaries are equally dependent on the supply- and demand-side. While this rationale can be questioned (e.g., Collier et al., 2021), the allocation of Amount A is robust with respect to the pricing model and other tax planning opportunities of the intermediary. Since the provision of online intermediation service is an entirely digital business model, the MDSH is most likely not applicable in either involved jurisdiction. Additionally, no WHTs are involved. Ultimately, Pillar I Amount A shifts the taxing rights on 25% of the excess profit from the residence country of the intermediation service provider to the two market countries. In our scenario, the customer country, which is the developing country, and the country of the seller, which could be either a developing or a developed country, each receive taxing rights on 12.5% of the excess profit. The residence country of the intermediary, a high-income country, grants double taxation relief for the taxes levied on the Amount A profit in both market jurisdictions.

In contrast, under the UN Model, the allocation of taxing rights depends on the pricing model of the intermediary service provider (Art. 12B par. 6d) UN Model). If the platform charges the seller, the taxing right is allocated to the seller's location. If the buyer pays a commission (e.g., AirBnB) or a subscription fee (e.g., Changes Shutterstock), the taxing right is allocated to the purchaser's location. Such nuances in pricing models, especially changes in pricing models or the emergence of mixed pricing models, provide tax planning opportunities for intermediaries and simultaneously tax revenue uncertainties for the involved countries. Since Art. 12B UN Model is applicable in bilateral cases based on tax treaties, intermediaries may find pricing mechanisms that circumvent any Art. 12B-equivalent provision in tax treaties. Given the

flexibility in the pricing mechanisms, any reallocation of taxing rights for online intermediation services seems unlikely under Art. 12B UN Model.

4.4 Other Services

“Other services” describes a residual category of the OECD’s revenue sourcing catalog (Art. 7 par. 1(d)(ix) MLC). Besides the provision of digital content that is not a component of a finished good (Art. 7 par. 1(c) MLC), other services include all kinds of services that are not explicitly listed in Art. 7 par. 1(d) MLC.⁵⁸ Being centered around the provision of digital content, other services encompass almost all automated digital services that are explicitly listed in Art. 12B par. 6 UN Model, namely, online search engines, social media platforms, digital content services, online gaming with multiplayer functionalities, cloud computing services, and standardized online teaching service. Note that also under Art. 12B UN Model these revenue categories are mutually exclusive to any online intermediation services, online advertising services and the supply of user data. Hence, if other services are financed by one of these revenue streams, the respective other revenue category takes precedence. Examples of the automated provision of digital content are services that allow for streaming, accessing, or downloading videos, music, games, books and other text, computer programs, software and (mobile) applications (e.g., Alphabet, Inc.’s revenues derived from YouTube subscriptions⁵⁹, Spotify’s premium segment⁶⁰, major revenue streams of Netflix⁶¹ and Sony⁶²). Also, online newspapers, online libraries, and other online databases fall under this category (UN Model Commentary, 2017). Similar to online intermediation services, other services may be monetized by levying a per-item fee on the user or by subscription. However, unlike online intermediaries, providers of other services supply digital goods on their behalf. Consequently, other services do not constitute a two-sided business model, but the payor for the service is always the user, which has consequences for the allocation of the taxing right under the UN’s and the OECD’s proposal.

⁵⁸ Other services exclude location-specific services, (online) advertising services, online intermediation services, passenger and cargo transport services, and the operation of customer reward programs.

⁵⁹ Alphabet, Inc., Annual Report 2023, pp. 35-36, <https://abc.xyz/assets/43/44/675b83d7455885c4615d848d52a4/goog-10-k-2023.pdf> (10.03.2024).

⁶⁰ Spotify Technology S.A., Form 20-F 2023, pp. 43, 47, https://s29.q4cdn.com/175625835/files/doc_financials/2023/ar/26aaaf29-7cd9-4a5d-ab1f-b06277f5f2a5.pdf (10.03.2024).

⁶¹ Netflix, Inc., Form 10-K 2023, p. 21. https://s22.q4cdn.com/959853165/files/doc_financials/2023/ar/Netflix-10-K-01262024.pdf (10.03.2024).

⁶² Sony Group Corp., Corporate Report 2023, p. 38, https://www.sony.com/en/SonyInfo/IR/library/corporatereport/CorporateReport2023_E.pdf (10.03.2024).

Appendix Figure 17 displays a potential cross-border scenario of other services and indicates the place of taxation under both proposals. Given the global distribution of MNEs (Chapter 2.1), the country of the service provider is most likely a high-income country. Users are located globally, with fast-growing consumer bases in developing countries.⁶³ Under the current tax system, the taxing right is granted exclusively to the country where the company providing the other service is located. No WHT applies, and a physical presence in the market jurisdiction is not required.⁶⁴ Pillar I Amount A allocates the taxing right to the jurisdiction where the service is used (Art. 7 par. 1(d)(ix) MLC), significantly benefiting developing countries with large consumer markets. Similarly, Art. 12B UN Model reallocates taxing rights to the location of the user as the user pays for the service. Both reforms could thus have positive implications for developing countries. The extent, however, will depend on the affected firms, gross- or net-taxation under Art. 12B UN Model, the tax treaty network of these countries. Also note that Art. 12B UN Model is more prone to tax planning by channeling cash flows from customers to countries where no Art. 12B applies.

4.5 Sale of Physical Goods

Given the extended scope of Pillar I Amount A beyond purely digital business models, a significant share of affected MNEs includes manufacturing firms that generate revenue from the sale of finished goods or their components (mainly NACE Rev. 2 main industry “C – Manufacturing”). These business models may be classified as rather traditional but benefit from digitalization, and the implications for taxation (as described in Chapter 4.1) still apply to some extent. Revenues from the sale of finished goods and components refer to transactions involving physical goods or components, either in a business-to-business (B2B, e.g., Caterpillar, Hewlett-Packard) or a business-to-consumer (B2C, e.g., Coca-Cola Company, L’Oreal, Nike or Starbucks) context. They may involve direct sales of a finished good from the MNE to the final customer or indirect sales through one or various intermediaries, such as retail stores. The sale of components is limited to B2B transactions as the buyer refers to another firm that integrates the components into its products before selling them to a final customer (e.g., Nucor, Paccar). While the in-scope MNE is most likely located in a high-income country (Chapter 2.1), the final customer and the intermediaries may be located in a developing or developed country. In the case of the sale of components, the buyer of the component might be located in a middle-income country, which is a developing country, as manufacturing and production activities are

⁶³ I.e., Netflix and Spotify report the largest revenue growth in Latin America, which is almost entirely classified as developing.

⁶⁴ Considering digital services, the MDSH, including WHT adjustments, can thus be regarded as irrelevant.

dominant business activities in these countries (Chapter 2.1, *Appendix Table 5*). Note that in the case of the sale of components, various other firms may be involved in the value chain until a finished good is produced and sold to a final customer. *Appendix Figure 18* illustrates business models involving the sale of finished goods to a final customer (*Panel A*) as well as the sale of components (*Panel B*) and highlights the place of taxation under the OECD proposal.

The current international tax system allocates the taxing right on the profits of MNE, which is the seller of the finished goods or their components, to its residence country or another country where it physically operates. Under Pillar I's revenue sourcing rules, adjusted revenues derived from the sale of finished goods and components are treated as arising in the jurisdiction where the goods are delivered to the final customer (Art. 7 par. 1(a) MLC). This applies irrespective of the number of intermediaries or subsequent firms in the value chain. The primary indicators for sourcing these revenues include the delivery address of the final customer and the location of the retail store selling to the final customer (Annex D Sec. 1 par. 2 MLC). In business models involving independent distributors, additional indications and allocation keys are employed to ensure that taxation rights on Amount A profits are allocated based on the actual market location (Annex D Sec. 1 par. 3 MLC). Similarly, for revenues derived from the sale of components designed to be incorporated into finished goods, the sourcing rules focus on the final destination of the goods containing these components (Art. 7 par. 1(c) MLC). The rules consider the delivery address of the final customer of the finished goods that include the component, the location of the retail store, and the location of independent distributors, provided certain conditions are met (Annex D Sec. 2 par. 2 MLC). These provisions ensure that taxation rights on Amount A profits from components align with the final sale of the finished goods, reflecting the integrated nature of modern supply chains. As a result, Pillar I Amount A reallocates taxing rights to the market jurisdiction, irrespective of the degree of digitalization of the affected MNE. If the MNE operates in the country of the final customer, an MDSH reduces the Amount A taxing right in this jurisdiction, accounting for profit already allocated to the country under the current international tax system.

In contrast, Art. 12B UN Model exclusively targets ADS, leaving manufacturing companies unaffected by the reallocation of taxing rights to market countries. Against the background that developing countries heavily rely on imports of goods and contribute to the profits of MNEs through large consumer markets (Chapter 2), refraining from reallocating taxing rights on MNE profits from the sale of finished goods or their components may disproportionately affect these countries.

5 Review of the Revenue Estimating Studies

5.1 Overview of the Studies

We now examine the existing revenue estimating studies on Amount A of Pillar I (Starkov & Jin, 2022; Tandon & Rao, 2022; Baraké & Le Pouhaër, 2023; O'Reilly et al., 2023) and Art. 12B UN Model (Starkov & Jin, 2022). Both initiatives do not aim at raising additional tax revenues, as they neither increase corporate tax rates nor the global corporate tax base and given that they include mechanisms to avoid double taxation. Instead, they aim at reallocating taxing rights to market jurisdictions and may, thus, be viewed as a “zero-sum redistribution of corporate tax base across jurisdictions” (O'Reilly et al., 2023, p. 13). Nonetheless, both initiatives might have net positive global revenue effects if they, on average, reallocate taxing rights from low- to higher-tax countries. This redistributive effect is particularly relevant for developing countries. Therefore, we review the existing revenue estimating studies⁶⁵ on both reform proposals, with a focus on the implications for developing countries, and highlight their respective limitations in the subsequent Chapter 5.2.

In the prior academic literature, several attempts have been made to estimate the tax revenue effects of Pillar I Amount A. These empirical studies rely on various data sources and time periods. Most importantly, they consider different legal design stages of the Pillar I reform proposal. Only one of them, Starkov & Jin (2022), also includes estimates of the tax revenue effects of Art. 12B UN Model, considering the implications for developing countries. The studies on Amount A of Pillar I estimate allocable residual profits of between 85 and 204.6 billion USD globally, resulting in net positive global tax revenue gains between 3.7 and 31.7 billion USD annually. In comparison, with 1.5 to 11.4 billion USD, Art. 12B UN Model is estimated to raise significantly lower net positive global tax revenues than Pillar I.

Starkov & Jin (2022) is the only study that not only estimates the tax revenue effects of OECD's Pillar I Amount A but also that of Art. 12B UN Model. The study focuses on the 84 South Centre Member Countries, which are almost all classified as developing⁶⁶, and utilizes the FactSet and Orbis databases. For the South Centre Member Countries, Amount A of Pillar I is estimated to generate aggregate tax revenues of 4.4-5.8 billion USD for years 2018-2020 from 76 in-scope MNEs, defined in line with the July 2021 Inclusive Framework statement and based on a 20 billion EUR turnover and a 10% profitability threshold.⁶⁷ In contrast, to estimate the

⁶⁵ We did not include IMF (2022) due to its brevity and non-transparent calculation.

⁶⁶ Only Barbados, Guyana, Panama, and Seychelles are classified as high-income countries. Western Sahara is not classified by the World Bank.

⁶⁷ Starkov & Jin (2022) also include country-based revenue estimates.

tax revenue effects of Art. 12B UN Model, the study distinguishes between pure and hybrid ADS firms. Pure ADS firms are engaged in services delivered over the Internet with minimal human involvement, indicating a primary reliance on digital platforms and services without significant physical presence to generate revenue. Hybrid ADS firms, in contrast, involve a combination of digital services and other operations, suggesting they have diverse revenue streams that include, but are not limited to, automated digital services. Applying the net method of Art. 12B only to pure ADS firms results in the lowest aggregate tax revenues of 1.5-2.0 billion USD in 2018-2020. Using estimates for pure ADS firms based on the gross method at a 3% (4%) tax rate, the aggregate tax revenue is estimated to be 2.3-3.0 billion (3.1-4.0 billion) USD. Notably, including hybrid ADS firms under Art. 12B significantly increases resulting tax revenues to 3.8-4.2 billion USD under the net method and 7.4-8.6 billion USD or 9.8-11.4 billion USD under the gross method, with a 3% or 4% tax rate, respectively. Depending on the respective scenario and on the individual country, the study considers either Pillar I Amount A or Art. 12B UN Model more favorable for developing countries. However, the ranges of estimated revenues are much smaller for Pillar I Amount A (maximum range of 0.6 billion USD) than for Art. 12B (maximum range of 2.8 billion USD), indicating unclear revenue implications under the UN proposal. Only when considering hybrid ADS firms under the gross method could revenues under Art. 12B surpass those from Pillar I Amount A based on the July 2021 Inclusive Framework statement. However, given that Pillar I Amount A has significantly changed with the progress reports of July 2022 and October 2023 in favor of developing countries⁶⁸, and considering that the hybrid ADS scenario suffers from severe limitations, as described in Chapter 5.2, the tentative support of the study for Art. 12B UN Model has to be interpreted with caution.

The second study under review, Tandon & Rao (2022), uses the publicly available Forbes 2000 list and OECD data to estimate 68 MNEs in scope of Pillar I Amount A as of 2021, with allocable net profits amounting to approximately 85 billion USD. Net tax revenue gains of 3.7 billion USD are estimated for 43 South Centre Member Countries and 13 additional developed countries. Calculations are based on the July 2022 progress report, with some assumptions and approximations. The authors find that South Centre Member Countries alone gain 5.4 billion USD of net tax revenues under Pillar I, which is – at least partly – redistributed from developed countries. However, for most countries, net tax revenue gains amount to one

⁶⁸ I.e., reduced revenue thresholds under the nexus test for countries with a low GDP, reduced MDSH effects for low- and lower-middle-income countries due to the jurisdictional offset percentage, and high profit thresholds for the application of the MDSH and the obligation to grant double taxation relief.

percent or less of existing tax revenues from incomes and gains, indicating a neglectable increase in fiscal capacity. Notably, comparing the revenue estimates to Starkov & Jin (2022) reveals that the legal design features of Pillar I Amount A have changed in favor of developing countries.

Baraké & Le Pouhaër (2023) combine Forbes lists and Orbis data to identify 69 MNEs in scope of Pillar I Amount A and approximate destination-based revenues using the OECD's AMNE database. Calculations are based on the July 2022 progress report, with some assumptions and approximations. They project a global gross revenue potential of 24 billion EUR from Amount A, which, after accounting for double taxation relief mechanisms using the OECD's CbCR database, results in a net gain of 15.6 billion EUR for 142 Inclusive Framework member countries. The study emphasizes the redistributive aim of Amount A over aggregate revenue generation, forecasting a net positive impact for high-tax jurisdictions through reallocating taxing rights from low- to higher-tax countries. In particular, the authors expect that Amount A is paid for by tax havens. Developing countries are estimated to collect around 23% of the total net revenues. In relative terms, gains from Amount A would represent 0.17% of total tax revenues for developing countries.

The only study on Pillar I Amount A that is based on the MLC published in October 2023 is the updated economic impact assessment provided by the OECD (O'Reilly et al., 2023). The study uses a combination of micro- and macro-level data sources, i.e., Orbis, MNEs' annual reports, aggregated and anonymized CbCRs, and OECD's AMNE dataset. For the year 2021, the authors identify 106 in-scope MNEs and estimate a total of 204.6 billion USD in allocable residual profit⁶⁹, i.e., Amount A, resulting in tax revenue gains of between 17.4 and 31.7 billion USD for 143 Inclusive Framework member states.⁷⁰ Over the period from 2017 to 2021, the allocable residual profit ranges between 100.3 and 204.6 billion USD, with between 74 and 106 in-scope MNEs. For the 143 Inclusive Framework member states, this results in average annual tax revenue gains of 9.8 to 22.6 billion USD from 2017 to 2021. These numbers are substantially different from the 2020 economic impact assessment (OECD, 2020), which, for the year 2016

⁶⁹ The *allocable* residual profit does not necessarily equal the *reallocated* amount. Part of the allocable residual profit may be *unallocated* if (1) a receiving jurisdiction does not implement Amount A, (2) there is no nexus in a jurisdiction, (3) the allocated amount is reduced due to the MDSH in a jurisdiction, or (4) a jurisdiction already has taxing rights on that dollar of profit (O'Reilly et al., 2023, p. 22).

⁷⁰ Splitting Amount A by business types yields an estimated 88.8 billion USD for finished B2C goods and B2C services from 45 MNEs, 49.1 billion USD for ADS from only 5 MNEs, 25.6 billion USD for B2B services from 9 MNEs, 14.7 billion USD for components from 18 MNEs, 9.3 billion USD for location-specific services from 11 MNEs, 6.2 billion USD for transport services from 2 MNEs, 5.9 billion USD for finished B2B goods from 11 MNEs, and 5 billion USD for real estate from 6 MNEs.

and a 750 million EUR revenue threshold, estimates 500 in-scope MNEs, 123 billion USD in allocable residual profit, and 5 to 12 billion USD in tax revenue gains. The smaller number of in-scope MNEs in the updated assessment and simultaneous increase in the estimated Amount A and tax revenue gains reflect differences in the proposed Pillar I design features.⁷¹ The implementation of Pillar I Amount A is expected to result in tax revenue gains for both developing and developed countries and losses for investment hubs⁷², indicating that substantial profits are currently concentrated in investment hubs and the right to tax these profits is shifted to market jurisdictions following the implementation of Pillar I Amount A. Notably, tax revenue gains are estimated to be higher for low- and middle-income countries than for high-income countries when measured relative to their current CIT revenues. Specifically, for the year 2021, the upper (lower) bound of revenue *gains* relative to *CIT revenues* is estimated at 3.0% (2.5%) for low-income countries, 1.6% (1.2%) for middle-income countries, and 1.4% (0.9%) for high-income countries. This indicates that relative to their respective current CIT revenues, low-income countries within the Inclusive Framework can anticipate between double and triple the additional tax revenues compared to high-income countries. Simultaneously, the revenue *losses* in investment hubs are estimated at between 0.5% and 7.9% of CIT revenues.⁷³ Income-group-level revenue estimates in absolute terms are not reported in the study.

Overall, the revenue estimating studies on Pillar I illustrate a positive but small impact on developing countries' fiscal capacity and increased fairness in international taxation. Considering that developing countries, under the current international tax system, likely collect only marginal tax revenues from affected MNEs, Pillar I Amount A thus, to some extent, fosters the development of their domestic economies. The estimated reallocation of tax revenue from low-tax countries and investment hubs to high-tax countries and developing countries aligns with the goal of fostering fairness and inter-nation equity. Art. 12B UN Model achieves both goals to a lesser extent, given the smaller tax revenues expected for developing countries and a less clear understanding of the countries from which the tax revenue redistribution originates.

⁷¹ The most significant changes to the Pillar I Amount A design features between the 2020 OECD Blueprint and the MLC released in October 2023 are (1) an increase in the revenue threshold from 750 million EUR, which aligned with the current CbCR and Pillar II revenue threshold, to 20 billion EUR and (2) a scope-expansion beyond ADS and consumer-facing businesses, i.e., it no longer targets only highly digitalized businesses.

⁷² Investment hubs refer to countries with inward FDI positions exceeding 150% of GDP, i.e., Anguilla, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Turks and Caicos Islands, Bailiwick of Guernsey, Cyprus, Gibraltar, Hungary, Ireland, Isle of Man, Jersey, Luxembourg, Netherlands, Switzerland, Hong Kong (China), Liberia, Malta, Marshall Islands, Mauritius, Mozambique, and Singapore (OECD, 2020).

⁷³ With a similar trend but slightly lower magnitudes, on average, over the years 2017 to 2021, the following upper (lower) bounds are estimated for Inclusive Framework members relative to CIT revenues: low income 2.0% (1.5%), middle income 1.1% (0.7%), high income 1.0% (0.5%), and investment hubs -0.3% (-5.3%).

5.2 Limitations of the Studies

Estimating the tax revenue effects of future reforms is inherently challenging, especially when the reform imposes significant changes to current taxation principles, as is the case for Pillar I Amount A and Art. 12B UN Model. We identify three main limitations of the studies attempting to estimate the revenue effects of the reforms. First, a fundamental issue in estimating the tax revenues from these two competing reforms is that many conventional data sources, such as Orbis or CbCRs, only capture business activity based on physical nexus. However, given that both reforms aim at reallocating taxing rights to market jurisdictions, data providing insights into the market presence of an MNE beyond what is captured by a physical nexus is required to estimate the effects accurately. For instance, as traditional data sources available to researchers do not allow the identification of the location of the final consumer but just the physical presence of the MNE, revenue-sourcing rules under Pillar I that allocate taxing rights to the place of the final consumer cannot be accurately modeled. Likewise, under Art. 12B UN Model, detailed payment data would be required to determine the jurisdiction from which the payment for the ADS originates and estimate the revenue effects accurately.

Second, considering the complexity of the reforms' provisions, traditional data sources do not allow the authors to account for all legal design features of the two proposals, which may be decisive when evaluating the effects. Instead, the studies are based on different and necessary assumptions, of which some can, however, be questioned. In particular, the following Pillar I Amount A design features concerning either the definition of in-scope MNEs, the allocation of taxing rights, or the elimination of double taxation may be decisive for evaluating the effects of the reform but are entirely or partly neglected by some or all studies. Concerning the definition of in-scope MNEs, the studies generally do not take into account the segmentation rules under Pillar I due to data limitations, likely resulting in an underestimation of the number of affected MNEs and, consequently, the expected tax revenues. Concerning the allocation of taxing rights, the lower nexus threshold benefitting small jurisdictions and tail-end revenue provisions are only accounted for by O'Reilly et al. (2023). The WHT adjustments are not modeled in any revenue study. These design features generally benefit low- and middle-income countries, thus, not modeling them likely underestimates tax revenue gains for developing countries. Additionally, the impact of the MDSH – beyond that of the WHT adjustments – is often disregarded. This generally leads to an overestimation of the newly allocated taxing rights and the total tax revenue gains under Pillar I. However, as indicated in Chapter 3, the MDSH is most likely not applicable to low-income countries, and only rarely to middle-income countries, thus, it is not expected to significantly affect revenue estimates for developing countries.

Concerning the elimination of double taxation, only O'Reilly et al. (2023) account for the newest set of rules, including the de minimis thresholds and the tiered elimination approach. As small, low- and middle-income jurisdictions are unlikely to provide double taxation relief, this limitation should not affect the estimated revenue gains. Overall, not modeling one or multiple of these legal design features of Pillar I Amount A produces an inaccurate estimation of the revenue effects, with an underestimation of tax revenue gains for developing countries.

Lastly, the studies may not account for challenges in the technical implementation of the reforms, which especially applies to Art. 12B UN Model. That is, to estimate the revenue effects of Art. 12B accurately, studies must consider its requirement for bilateral implementation in tax treaties. Considering that the tax treaty network of developing countries is limited (Chapter 2), assuming the application of Art. 12B in all bilateral country constellations leads to a significant overestimation of tax revenue gains, especially for developing countries with a sparse network of tax treaties.

When estimating the tax revenue effects of Pillar I Amount A, the study by Starkov & Jin (2022) is based on a few key assumptions that limit the reliance of its estimation results. First, similar to other studies, and due to data limitations, the study does not adequately capture the market presence of MNEs and, thereby, the specific revenue sourcing rules, resulting in inaccuracies in the estimated revenue effects and underestimating revenue gains for developing countries. Second, it does not consider the segmentation of MNEs' revenues and, therefore, likely underestimates the number of affected MNEs. Concerning the legal design features of Pillar I, the study does not consider the impact of the MDSH and, thus, overestimates the amount of allocated taxing rights and the overall tax revenue gains of the reform proposal, with little or no consequences for developing countries. Conversely, and due to the update of Pillar I Amount A after the release of the study, it does not comprehensively model the tail-end revenue provisions, the tiered elimination approach, and the treatment of withholding taxes, underestimating the tax revenue gains for developing countries. Lastly, the authors assume that the jurisdiction hosting the parent company of the MNEs will provide full relief from double taxation. This assumption presumes that the Amount A relief amount (AR_S) equals the sum of all Amount A profits allocated to the market jurisdictions (Chapter 3.1.4), which is not always the case. Consequently, the taxable Amount A in a market jurisdiction and the tax revenue may be lower than estimated by Starkov & Jin (2022).

When estimating the tax revenue effects of Art. 12B UN Model, Starkov & Jin (2022), first and most importantly, assume all revenues of ADS firms to be subject to Art. 12B. This assumption

requires universal bilateral application of Art. 12B. That is, Art. 12B is assumed to apply not only in cases of existent tax treaties but also in the absence of one. However, given the very limited existing tax treaty network, especially of developing countries, as indicated in Chapter 2, such widespread adoption is highly unlikely and would require many countries to bilaterally negotiate many new tax treaties and amend existing ones. Consequently, the study strongly overestimates the revenue effects of Art. 12B UN Model. Second, and irrespective of data limitations, in some of the modeled scenarios, in-scope firms are not identified accurately. For instance, when considering hybrid ADS firms, all financial services are assumed to be affected, implying that all financial services are digitally automated services. These firms account for about 60% of the estimated profit in scope. However, this assumption seems questionable, with many financial and insurance firms likely being misclassified as (entirely) digital, again resulting in a significant overestimation of the revenue effects of Art. 12B UN Model.

The third study, Tandon & Rao (2022), relies on publicly available data, potentially leading to a comparatively lower number of in-scope MNEs and, consequently, a lower Amount A profit estimate compared to O'Reilly et al. (2023). Due to the update of Pillar I Amount A in October 2023, the study also does not account for the tiered approach to eliminating double taxation, the special nexus thresholds, tail-end revenue provisions, and the treatment of withholding taxes. Thus, the study might underestimate the tax revenue gains for developing countries. On the other hand, the analysis assumes that double taxation relief is granted entirely by the jurisdiction of the MNE headquarters, which is unlikely and could lead to an overestimation of revenue effects. Lastly, details on the elimination of double taxation approach are omitted from the study. While this may affect the revenue potential of double taxation relieving countries, mainly high-income countries, it should barely affect estimated revenues of developing countries.

Baraké & Le Pouhaër (2023) estimate the revenue generated by Pillar I's Amount A on a gross basis after double taxation relief has been granted. The effect of the MDSH is not accounted for. Using the AMNE database (OECD, 2016), the paper proxies each jurisdiction's market share concerning the MNEs and ultimately estimates the profit reallocation to these jurisdictions. The AMNE database, which is also used in O'Reilly et al. (2023), contains FDI data based on surveys or FDI registers, depending on the respective country (country notes on inward and outward activities, OECD (2017))⁷⁴. We highly value the comprehensiveness and transparency of the study and the effort of modelling activity in market countries. However,

⁷⁴ <https://www.oecd.org/sti/ind/amne.htm> (13.03.2024).

relying on FDI data and not accounting for the safe harbor is associated with major limitations. First, FDI data in the AMNE database are based on surveys and FDI registers, including not only the MNEs in the scope of Pillar I. This assumes that the investment behavior of the largest MNEs in an economy is comparable to that of the average firm and implies a systematic distortion of the revenue estimates. Second, only an estimate of profit reallocation to countries where direct investments occur is possible. Since any direct investment constitutes a taxable nexus under current international tax law, the estimated profit reallocation under Amount A remains incomplete. Opposed to FDI, direct business is not available in the AMNE database. Consequently, the database cannot estimate profit reallocation to pure market jurisdictions. This contradicts the design of Amount A. As a result, the revenue estimate before taking into account double taxation relief is likely to be understated. After considering the effects of double taxation reliefs, the net revenue gains and revenue redistribution are additionally biased because more relief must be granted, and pure market countries are not eligible as relieving countries. Instead, the identified double taxation-relieving countries must grant additional relief for the profit reallocated to jurisdictions where the covered MNEs conduct direct business, and further countries may be obliged to grant double taxation relief. Third, and most importantly, relying on FDI data and disregarding the effect of the safe harbor adjustment overestimates the tax revenue redistribution and the overall revenue gains of the reform proposal.

The updated economic impact assessment (O'Reilly et al., 2023) offers the most recent and comprehensive data and estimation approach, given that it incorporates the MLC released by the OECD in October 2023. While the study suffers from similar data limitations as the other studies and, thus, also does not consider the segmentation rules under Pillar I, it does account for most of its legal design features. In particular, the study considers the lower nexus threshold for small jurisdictions, tail-end revenue provisions, the MDSH (excluding WHT adjustments), de minimis thresholds, and the tiered elimination approach. However, there are a few limitations remaining. First, while the MNE data cover 222 jurisdictions worldwide, the tax revenue gains are estimated solely for the 143 Inclusive Framework members, and tax revenue gains for different income groups are only given relative to current CIT revenues. While providing revenue estimates only for countries that, in principle, support Pillar I Amount A, is reasonable, reporting only relative changes in tax revenue is not transparent. Second, due to data limitations, the study does not integrate the treatment of withholding taxes into its estimation approach, likely underestimating the revenue effects for developing countries. Third, the authors acknowledge that their model is static, that is, the estimates do not account for benefits of Amount A that may result from a more stable international tax system, reduced unilateral

measures, or reduced tax and trade disputes. Additionally, and similar to the other studies, the study does not account for the costs of implementing Amount A or any costs resulting from the increased complexity of the tax system. However, given the centralized nature of Amount A administration and the formulaic nature of many of its provisions, these costs may mainly be limited to the initial implementation costs. Lastly, the authors do not account for behavioral changes of MNEs and countries. Due to incorporating the MLC released in October 2023 and more recent data than the other studies despite the mentioned limitations, the assessment provides a broad indication of the magnitude of Amount A and the most refined estimate of the revenue impacts of Pillar I currently available.

Comparing the estimated revenues and taking into account the limitations, Pillar I Amount A can be considered to have a higher revenue potential for developing countries than Art. 12B UN Model.

6 Conclusion

Pillar I Amount A and Art. 12B UN Model are two alternative tax reform proposals with the goal of redistributing taxing rights from the residence country of an MNE to its market jurisdictions based on newly designed nexus rules independent of physical presence. Since developing countries are home to a large proportion of the world's population, i.e., have a large consumer base, but MNEs have little physical presence in these countries, both proposals appear favorable to developing countries at first. Nonetheless, we see the need for proper legal and economic analysis. Evaluating the two reform proposals from the perspective of developing countries can be based on three criteria. First, the reform proposals should increase fiscal capacity in developing countries, that is, generate tax revenues and contribute to stable government revenue. Second, the reform proposals should not discriminate against net-importing countries and account for the inequality in the international tax system. And third, the reform proposals must be administrable for both tax administration and affected businesses in developing countries, a criterion which is beyond the scope of our report.

The implementation of both proposals and any subsequent implications hinges upon their global approval. The initial entry into force of the MLC on Pillar I Amount A requires ratification by at least thirty countries, including the residence countries of at least 60% of the UPEs of MNEs in scope. In particular, the United States are decisive for its global implementation. Once the minimum conditions for implementation are met, however, a multilateral redistribution of taxing rights is enacted. Art. 12B UN Model is less dependent on individual countries but relies on the amendments of existing bilateral tax treaties. Based on our evidence on the current tax

treaty network, the potential application of Art. 12B UN Model is limited for middle-income countries due to their sparse tax treaty network and low-income countries are mainly excluded from it. Therefore, provided that the United States agrees to Pillar I Amount A, this proposal is better suited to the needs of developing countries as it cannot be compromised by existing bilateral power asymmetries that exist in bilateral tax treaty relationships.

In terms of revenue potential, Pillar I Amount A generally appears to be more promising for developing countries. Although we find that Pillar I Amount A only applies to 120 MNEs, with the number of in-scope MNEs doubling once the revenue threshold is decreased, these constitute the largest and most profitable firms worldwide. The broad scope of Pillar I Amount A, regardless of digital or traditional business models, reliably redistributes taxing rights at the global scale. Although more than half of the in-scope firms at least partially operate in traditional business models, a significant share of revenue gains is estimated to result from digital business models. In contrast, Art. 12B UN Model is limited to automated digital services but does not employ any size thresholds. Due to the limited data available, it is not possible to determine the absolute number of companies potentially subject to Art. 12B UN Model. However, reviewing the existing revenue estimating studies, we conclude that the potential tax revenues arising from Art. 12B UN Model are below the ones arising from Pillar I Amount A.

For individual countries, the overall net effects of each reform proposal depend on various factors. Art. 12B UN Model links taxing rights to cash flows from customers. This may lead to zero revenues in the country of the final user of the ADS if the business model is monetized by a third party, i.e., in the case of online advertising and online intermediation services. If Art. 12B captures cash flows from ADS, the revenue potential depends on whether net or gross taxation is applied in the specific case, with gross taxation generating more tax revenue. In addition, enforcement capacities are crucial for rising tax revenue. If only applicable in some bilateral cases, the revenue potential for a developing country is significantly hampered by tax planning opportunities. Channeling customer payments from the customer's location, the developing country, to a country with which no Art. 12B provision is in force, effectively circumvents the rule and, consequently, any revenue potential. Not only from a revenue perspective but also considering fairness, this result is undesirable.

The revenue potential for individual countries under Pillar I Amount A depends on the characteristics of the MNE in scope and on the income group of the respective country, with lower-income countries receiving preferential treatment. Overall, our case study analysis shows robust results in the allocation of the new taxing rights. If the developing country already has

taxing rights on the MNE's profits under the current tax system, e.g., due to a physical nexus or WHT regimes, these taxing rights are considered, leading to a lower Amount A taxing right. For low- and lower-middle-income countries, which rely on source taxation via WHTs, this effect is mitigated by applying a correction factor to the WHT adjustment.

Tax revenue losses from either of the reform proposals can result from double taxation relief that must be granted with respect to the proposed new taxing right. Since large MNEs only have a sparse physical presence in developing countries and do not allocate significant profits there, the potential of an obligation to grant double taxation relief is small under Pillar I Amount A. Since Art. 12B applies to firms of any size, it is likely that some developing countries that apply Art. 12B are obliged to relieve double taxation. In particular, if double taxation with respect to gross taxation of the ADS profits has to be relieved, a revenue loss may occur.

Lastly and apart from the reported benefits of Pillar I Amount A over Art. 12B UN model, the high complexity of the reform proposal has to be considered. It is beyond the scope of this study to assess in detail the administrative burden that may result – specifically for developing countries with limited fiscal capacities – from its assessment and computation of the different elements of Amount A.

In sum, our report demonstrates that Pillar I Amount A, despite its complexity, better addresses the interests of developing countries than Art. 12B UN Model, a proposal specifically designed in the interest of these countries. In particular, the OECD's proposal will likely outperform the UN's proposal regarding its tax revenue potential.

Literature

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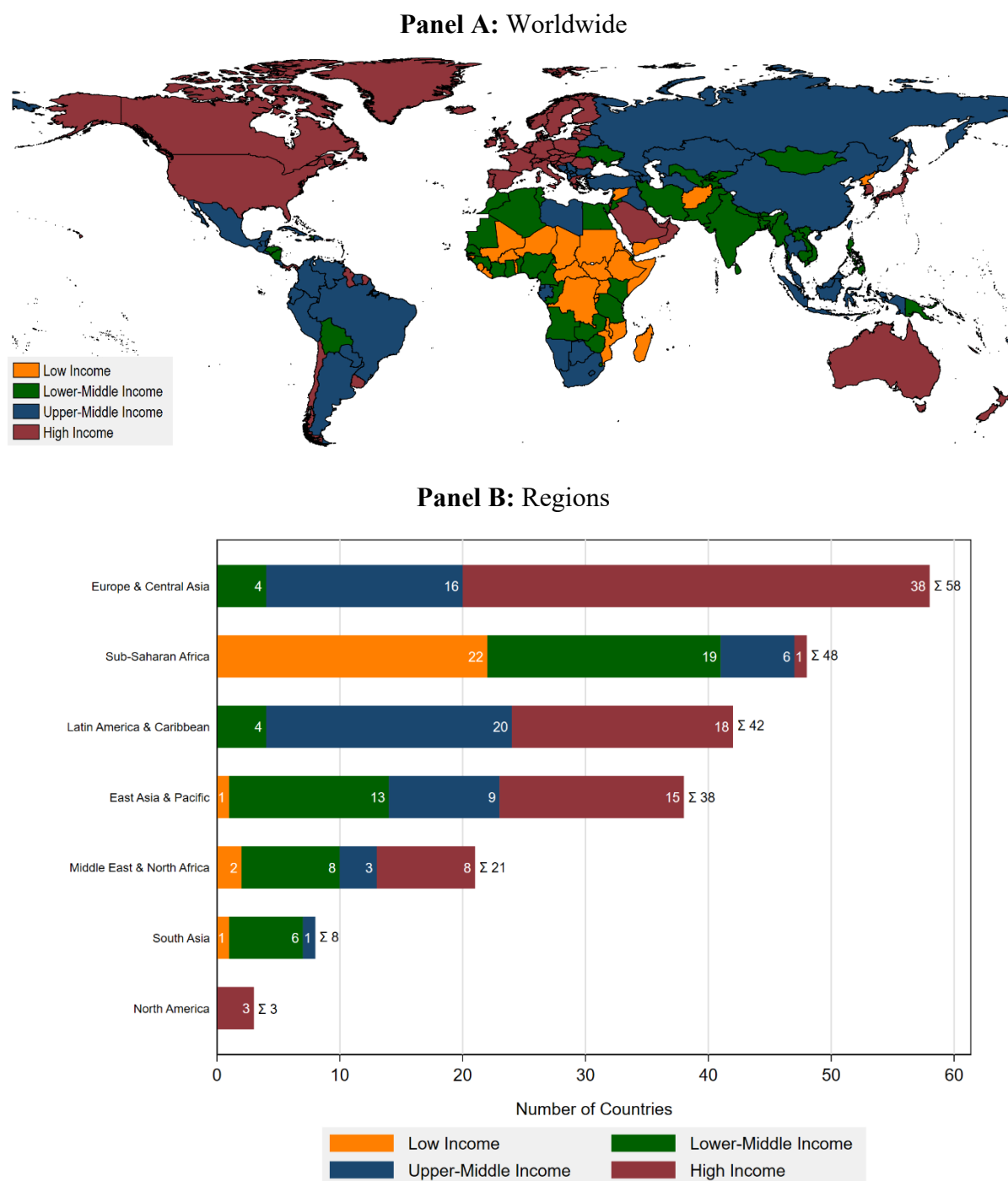
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Appendix

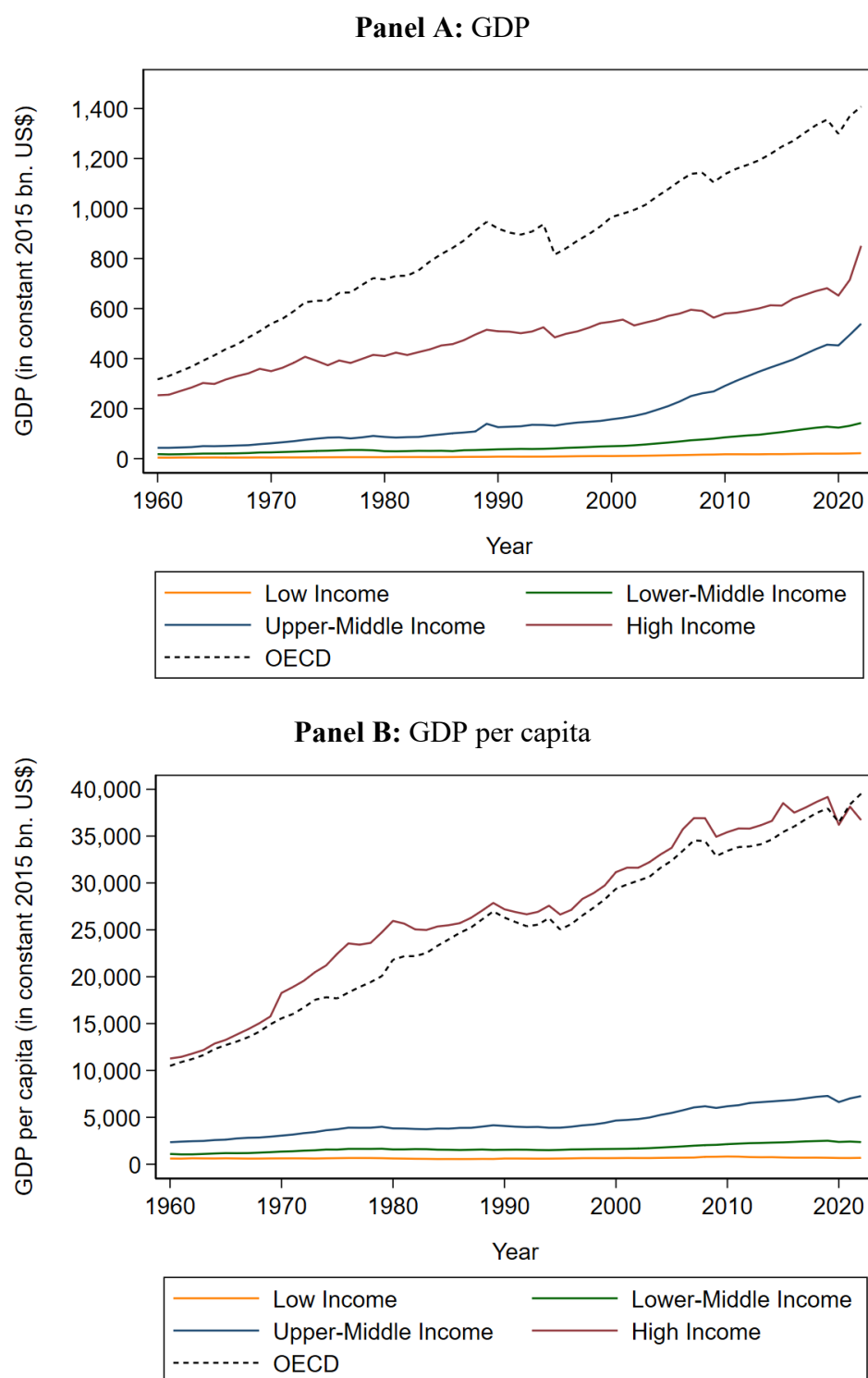
Figure 1: Geographical Dispersion of World Bank Income Groups



Notes: This figure displays the geographical dispersion of countries by World Bank income groups. *Panel A* maps the location of 216 countries by income group. Geodata for the Channel Islands and Taiwan, both classified as high-income country, is missing. *Panel B* displays the number of all 218 countries by geographic region and income group. Countries are assigned to World Bank income groups according to their 2023 classification, based on 2022 GNI. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years. Boundaries are as of 2021.

Data Source: World Bank Official Boundaries, World Country Polygons – Very High Definition [accessed 21.10.2023], World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

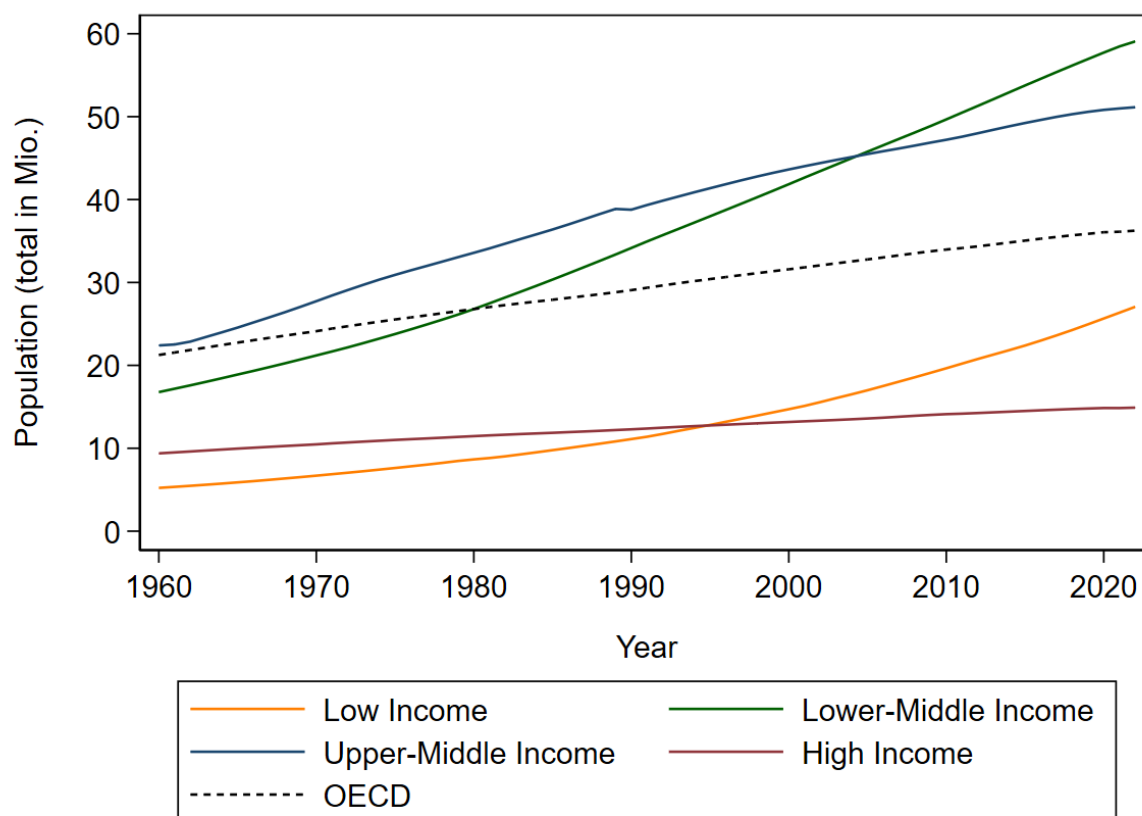
Figure 2: Gross Domestic Product (GDP) by Income Group



Notes: This figure displays the average GDP (*Panel A*) and GDP per capita (*Panel B*) for the years 1960 to 2022 by World Bank income groups. Countries are assigned to World Bank income groups according to the most recent 2023-2024 classification (instead of historic income groups) to ensure intertemporal comparability. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

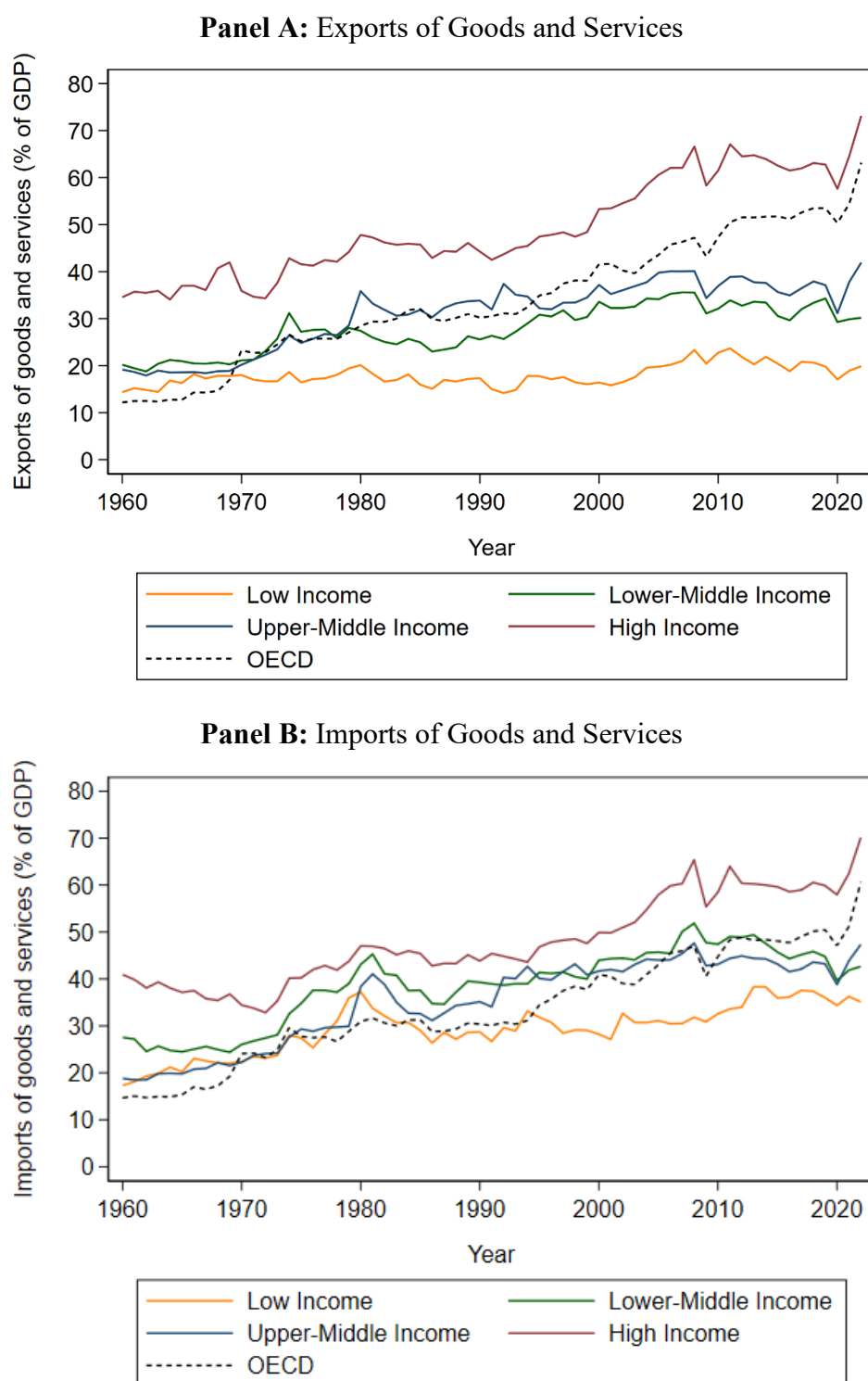
Figure 3: Population by Income Group



Notes: This figure displays the average population for the years 1960 to 2022 by World Bank income groups. Countries are assigned to World Bank income groups according to their most recent 2023-2024 classification (instead of historic income groups) to ensure intertemporal comparability. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

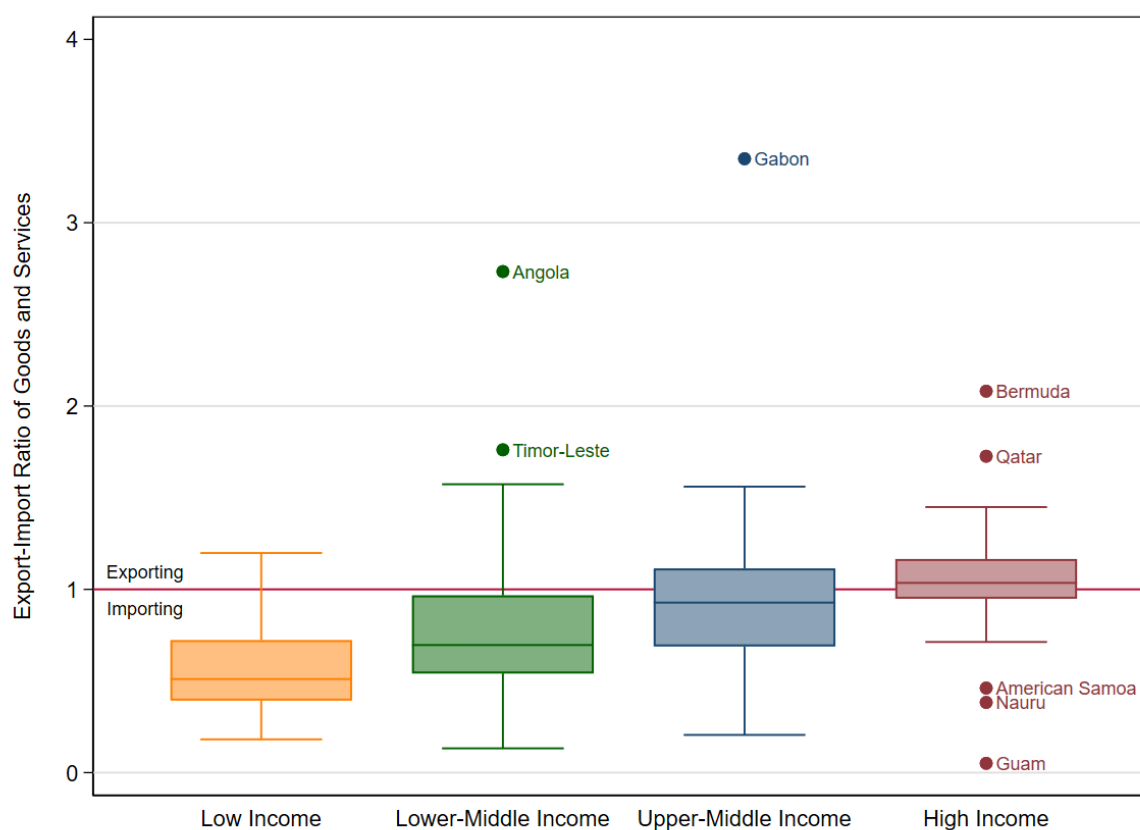
Figure 4: Development of Exports and Imports by Income Group



Notes: This figure displays the average exports (*Panel A*) and imports (*Panel B*) of goods and services for the years 1960 to 2022 by World Bank income groups. Countries are assigned to World Bank income groups according to their most recent 2023-2024 classification (instead of historic income groups) to ensure intertemporal comparability. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

Figure 5: Export-Import Ratios in 2021 by Income Group

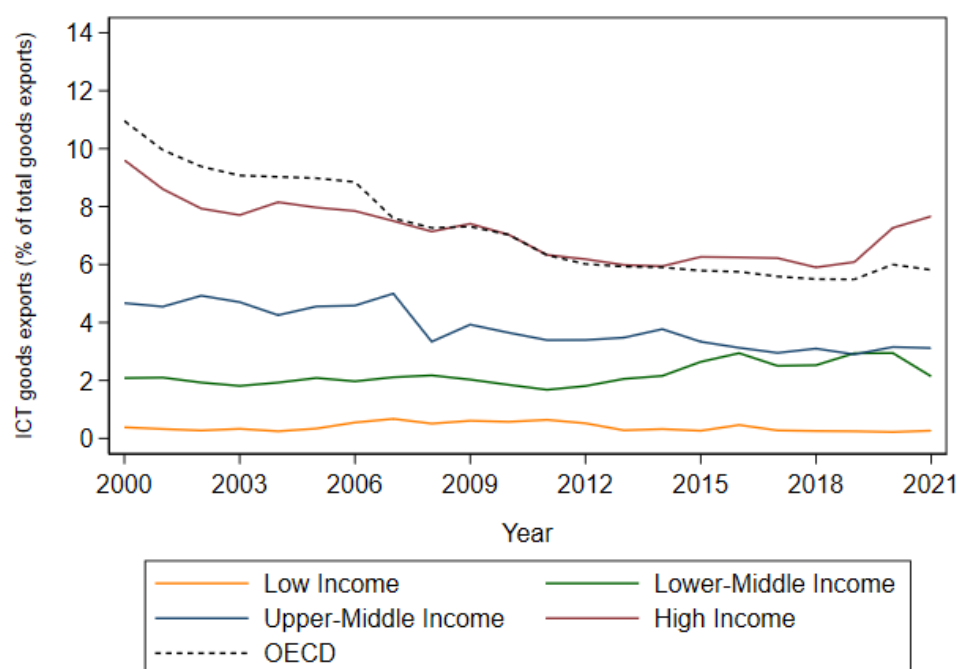


Notes: This figure displays the per-country ratio of exports to imports of goods and services for the year 2021 by World Bank income groups. Countries are assigned to World Bank income groups according to their 2023-2024 classification. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

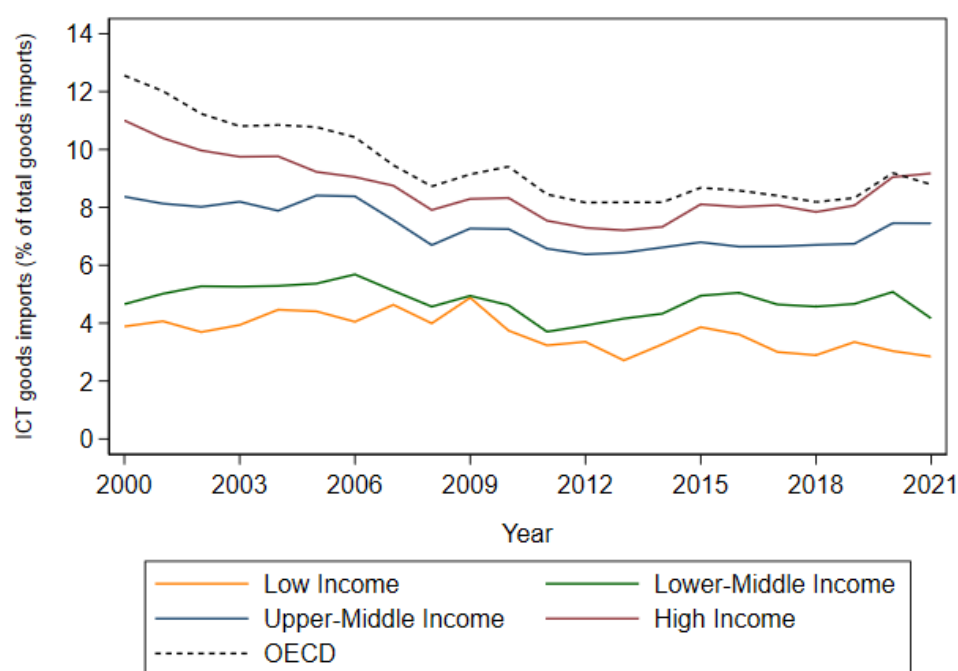
Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

Figure 6: Development of ICT Goods Exports and Imports by Income Group

Panel A: ICT Goods Exports



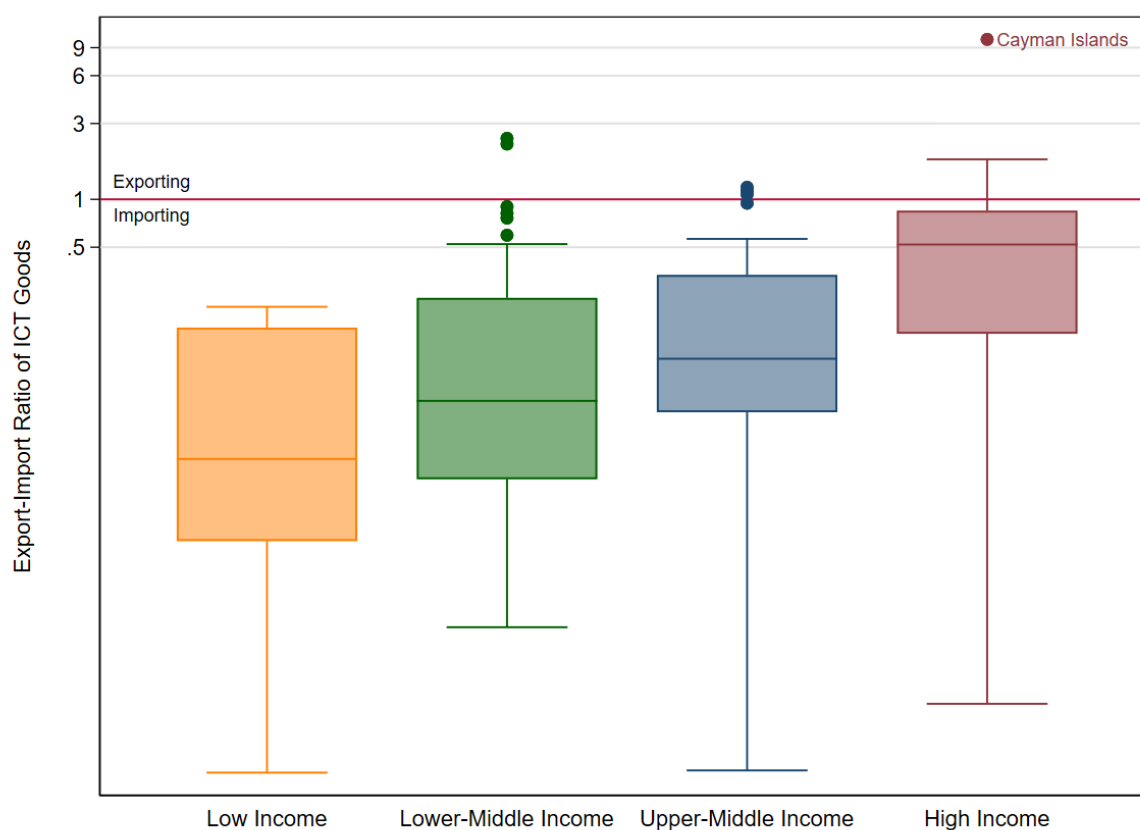
Panel B: ICT Goods Imports



Notes: This figure displays the average ICT goods exports (Panel A) and imports (Panel B) for the years 2000 to 2021 by World Bank income groups. Countries are assigned to World Bank income groups according to their most recent 2023-2024 classification (instead of historic income groups) to ensure intertemporal comparability. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

Figure 7: Export-Import Ratios of ICT Goods in 2021 by Current Income Group

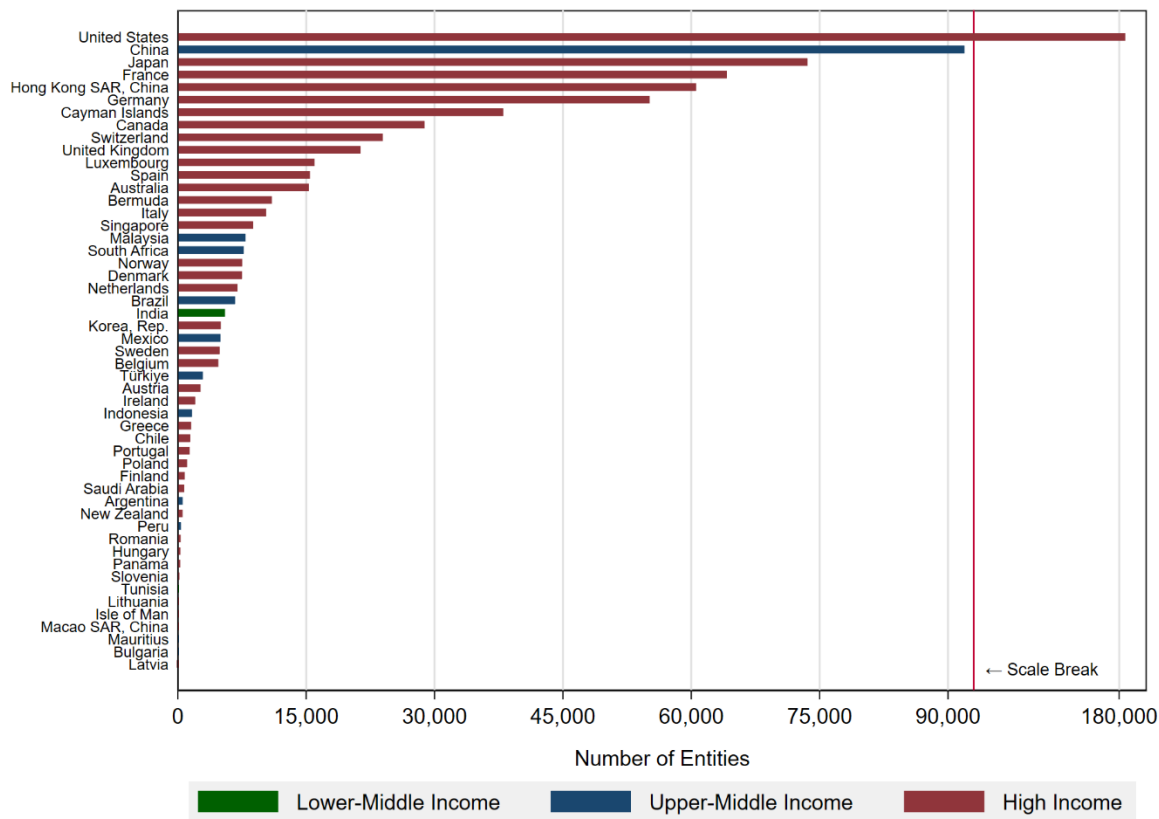


Notes: This figure displays the per-country ratio of ICT goods exports to ICT goods imports for the year 2021 by World Bank income groups. Countries are assigned to World Bank income groups according to their 2023-2024 classification. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years. The y-scale is in log due to the Cayman Islands outlier.

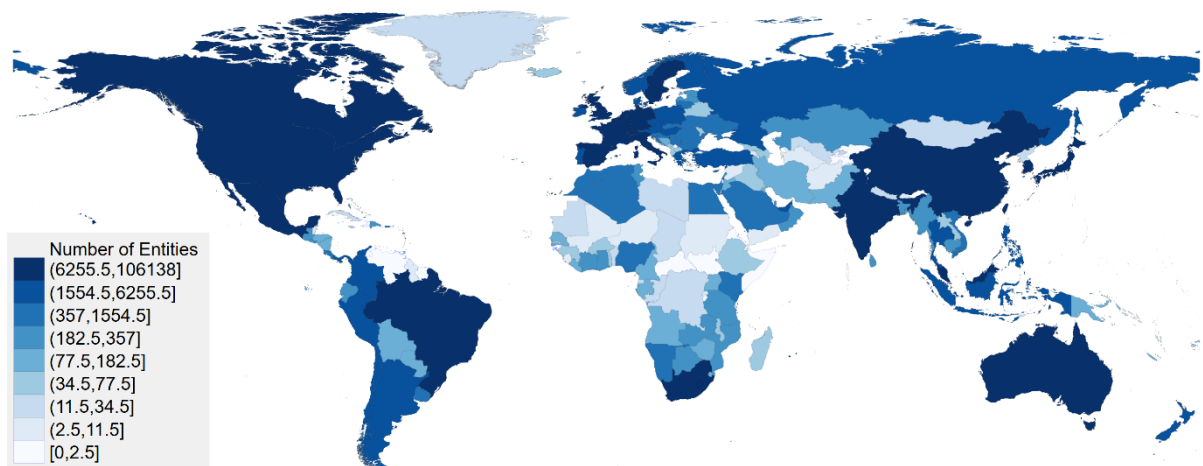
Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

Figure 8: Physical Presence of Large Multinational Enterprises

Panel A: Number of Constituent Entities by Ultimate Parent Entity Jurisdiction



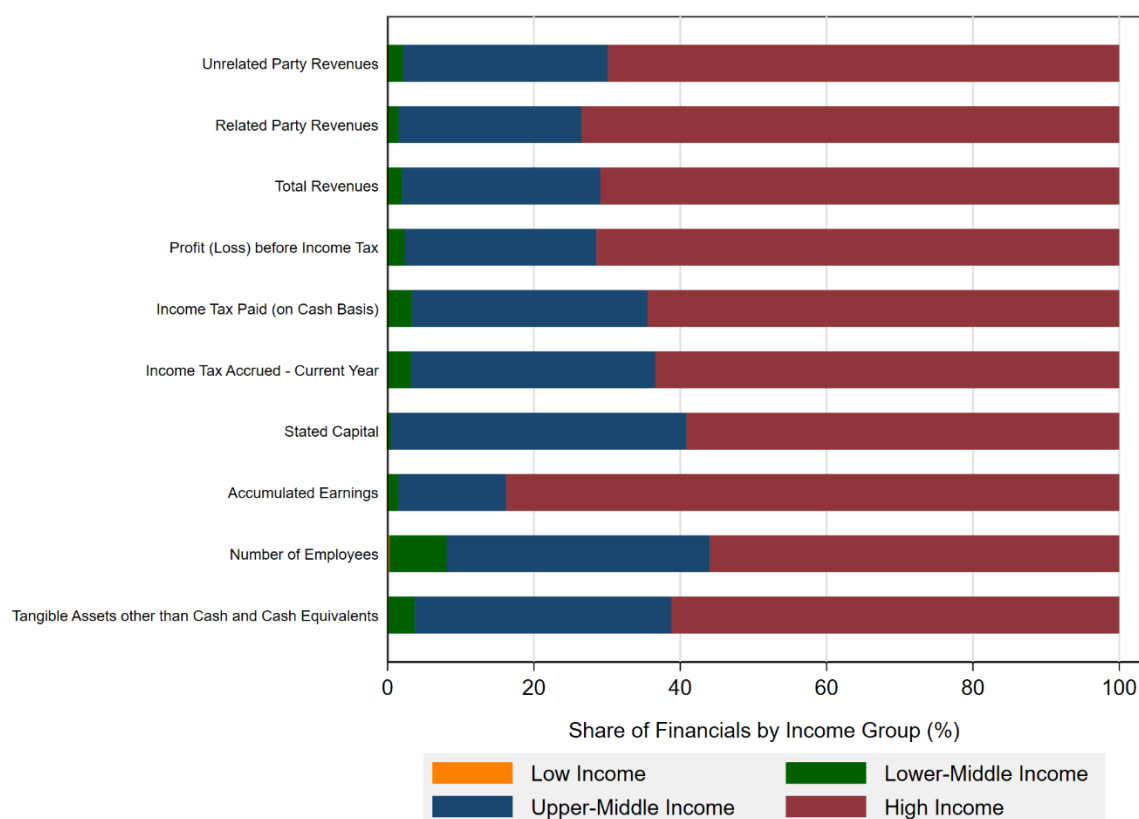
Panel B: Location of Constituent Entities of Large MNE Groups



Notes: This figure displays the total number of constituent entities of large MNE groups with revenues ≥ 750 Mio. EUR that are subject to Country-by-Country Reporting for the year 2020. *Panel A* displays the number of constituent entities aggregated by the jurisdiction in which their ultimate parent entity is resident for tax purposes. *Panel B* displays where constituent entities of MNE groups are resident for tax purposes. Constituent entities include both separate entities and permanent establishments that prepare separate financial reporting and are included in the consolidated financial statements.

Data Source: OECD.Stat, Country-by-Country Reporting Table I – Aggregate totals by jurisdiction [accessed 21.11.2023]; World Bank Official Boundaries, World Country Polygons – Very High Definition [accessed 21.10.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

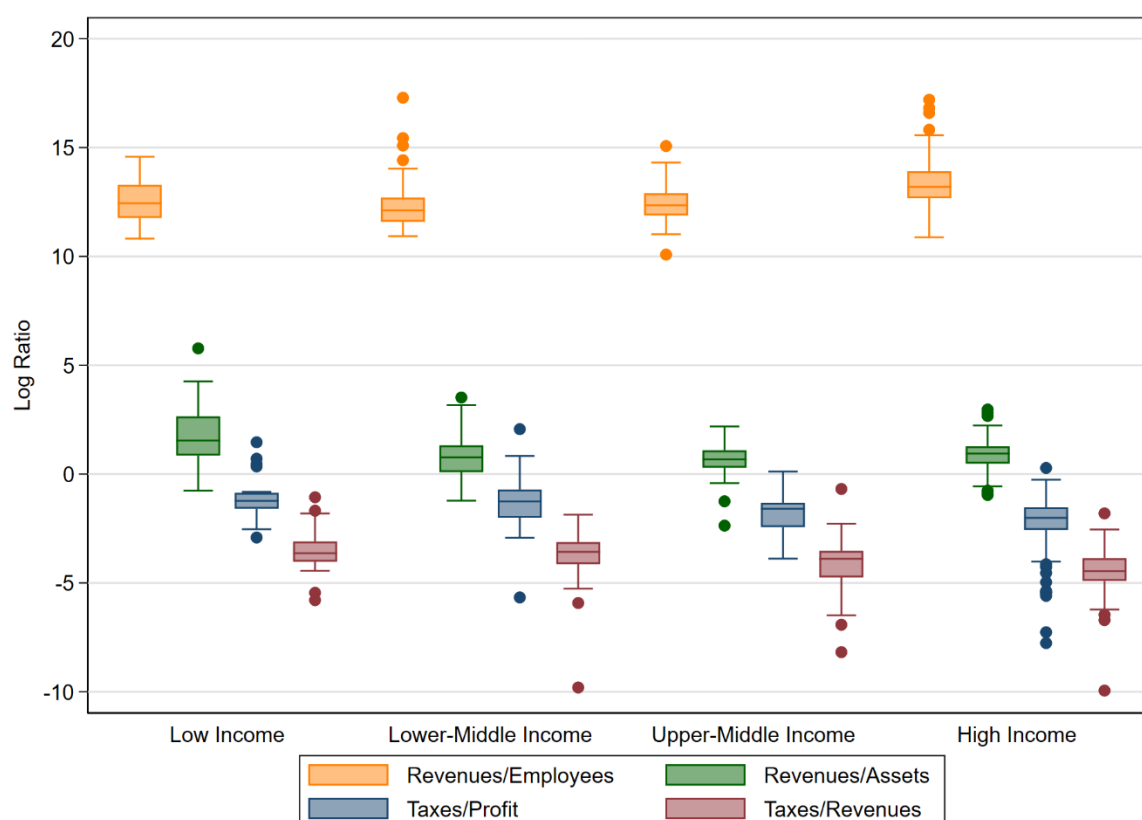
Figure 9: Share of Financials of Large Multinational Enterprises by Income Group



Notes: This figure displays the share of financial indicators of large MNE groups with revenues ≥ 750 Mio. EUR that are subject to Country-by-Country Reporting by income groups for the year 2020.

Data Source: OECD.Stat, Country-by-Country Reporting Table I – Aggregate totals by jurisdiction [accessed 21.11.2023]; World Bank Official Boundaries, World Country Polygons – Very High Definition [accessed 21.10.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

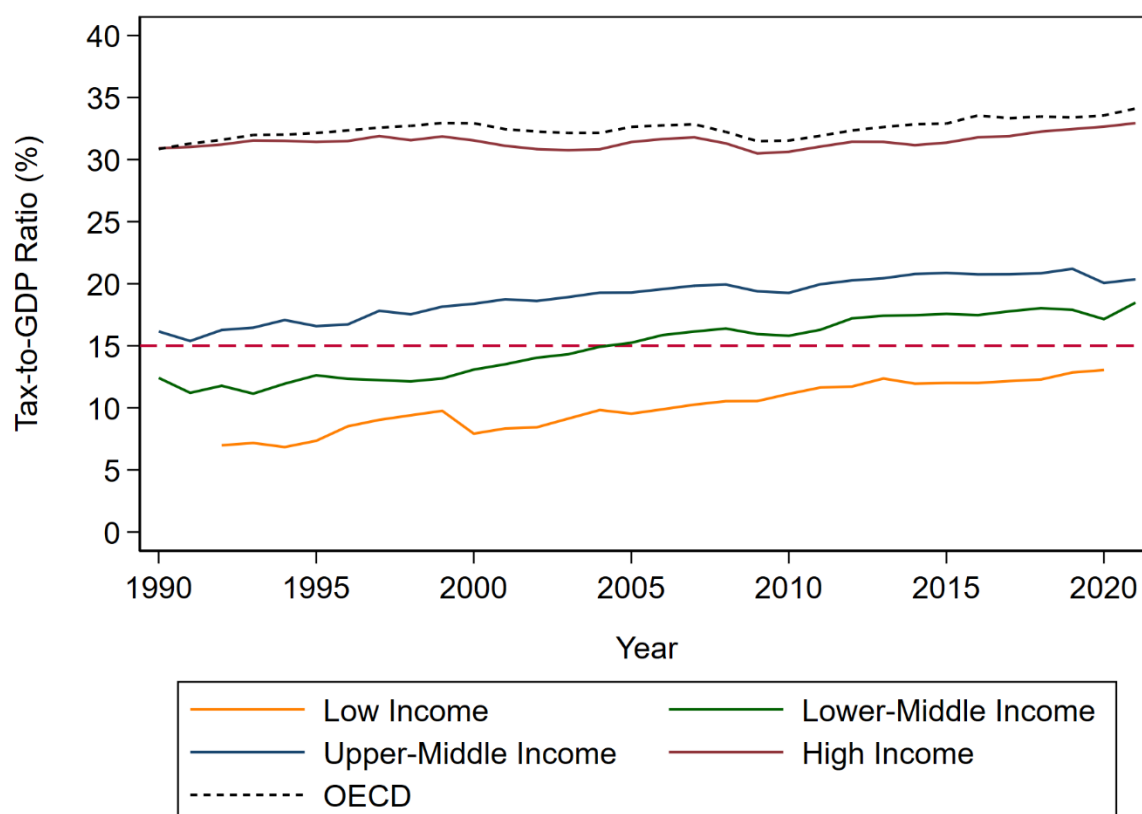
Figure 10: Distribution of Financial Ratios of Large MNEs by Income Group



Notes: This figure displays the financial ratios in USD of large multinational enterprises subject to Country-by-Country Reporting. Displayed are the distribution of the logarithmic transformation of (1) total revenues per employee, (2) total revenues to tangible assets, (3) accrued taxes to pre-tax profit, and (4) accrued taxes to total revenues within each income group. The lower ratios of accrued taxes to pre-tax profit and accrued taxes to total revenues for high-income countries are driven by very low ratios in tax havens, which are classified as high-income countries.

Data Source: OECD.Stat, Country-by-Country Reporting Table I – Aggregate totals by jurisdiction [accessed 19.10.2023]; World Bank Official Boundaries, World Country Polygons – Very High Definition [accessed 21.10.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

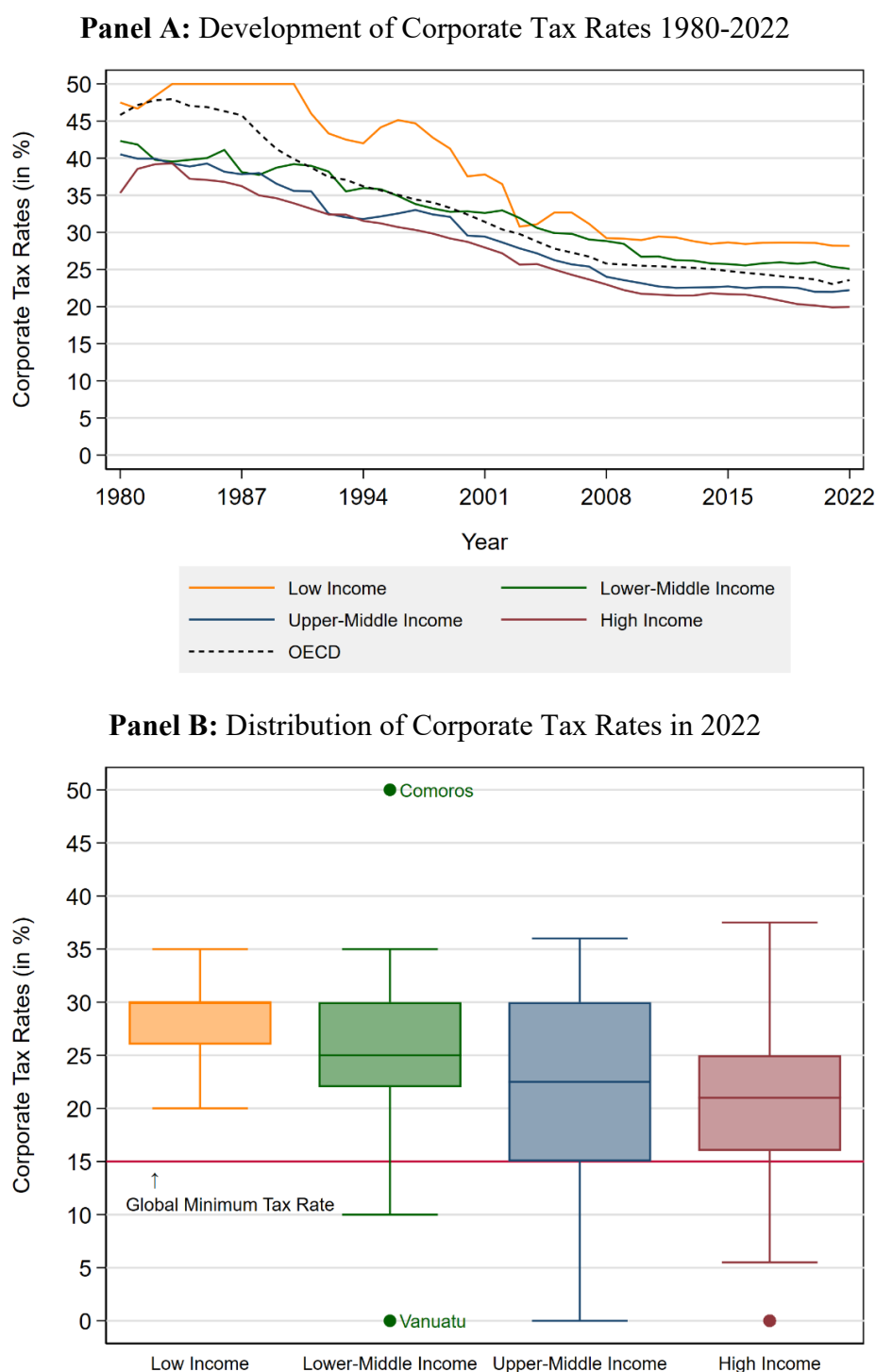
Figure 11: Development of Total Tax-to-GDP Ratios by Income Classification



Notes: This figure displays the average per-country ratio of total tax revenue to GDP by country income group for the years 1990 to 2021. Total taxes include taxes on income, profit and capital gains, social security contributions, taxes on payroll and workforce, taxes on property, taxes on goods and services, other taxes and custom duties collected for the EU. Countries are classified into income groups in accordance with the World Bank's income classification 2023-2024, which is based on GNI per capita. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

Data Source: OECD.Stat, Global Revenue Statistics Database (accessed: 23.08.2023); World Bank Income Classification 2023-2024 and 2020-2021.

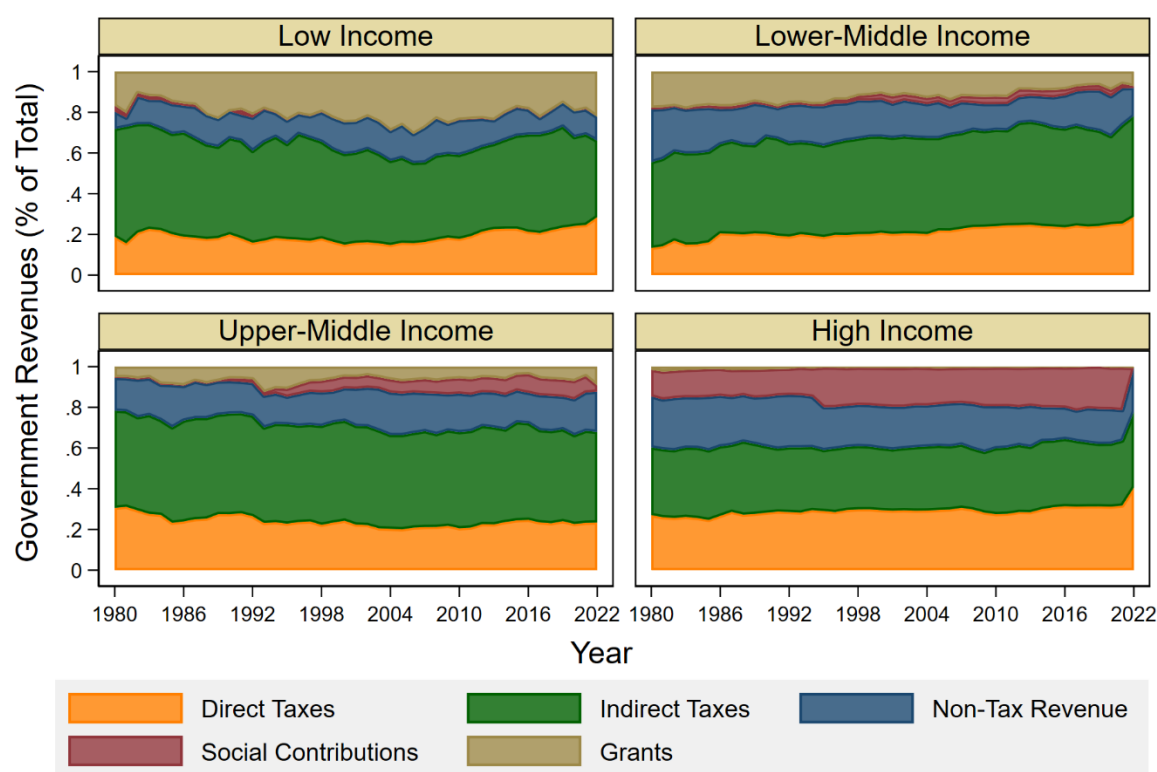
Figure 12: Corporate Tax Rates by Income Group



Notes: Panel A displays the average corporate tax rates for the years 1980 to 2022 by World Bank income group (unbalanced). Panel B displays the 2022 corporate tax rates of 212 countries by World Bank income group. Countries are assigned to World Bank income groups according to their 2023-2024 classification. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years. Outliers in the high-income group are the following (tax haven) countries with corporate tax rates of 0%: Bahamas, Bahrain, Bermuda, British Virgin Islands, Cayman Islands, Isle of Man, Turks and Caicos Islands, and the United Arab Emirates.

Data Source: Corporate Tax Rates Around the World 1980-2022, Tax Foundation [accessed 13.10.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Figure 13: Government Revenue Composition by Income Group

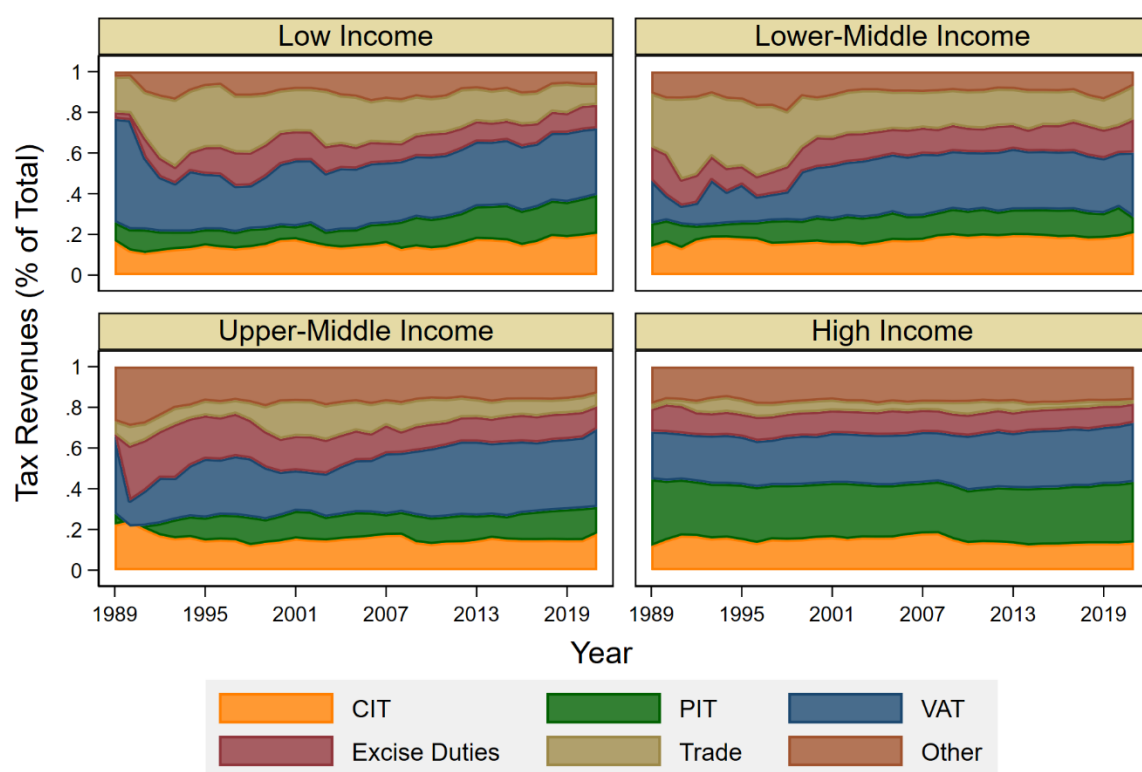


Graphs by Income Group

Notes: This figure displays the average per-country ratio of different government revenue components to total government revenues by World Bank income group for the years 1980 to 2022 (unbalanced). Overall, 119 countries are included. The income group is assigned based on the most recent 2023-2024 classification (instead of historic income groups) to ensure intertemporal comparability.

Data Source: UNU-WIDER Government Revenue Dataset, Version 2023, available at: <https://doi.org/10.35188/UNU-WIDER/GRD-2023> [accessed 22.09.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Figure 14: Tax Revenue Composition by Income Group



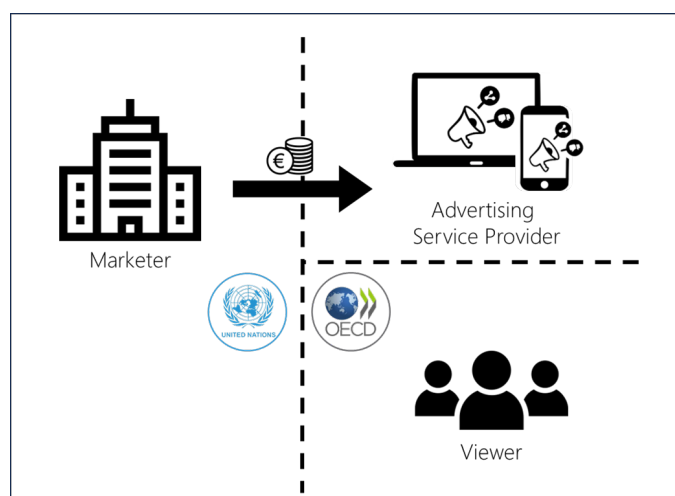
Graphs by Income Group

Notes: This figure displays the average per-country ratio of different tax revenue components to total tax revenues by World Bank income group for the years 1989 to 2021 (unbalanced). Overall, 119 countries are included. Social security contributions are excluded. The income group is assigned based on the most recent 2023-2024 classification (instead of historic income groups) to ensure intertemporal comparability.

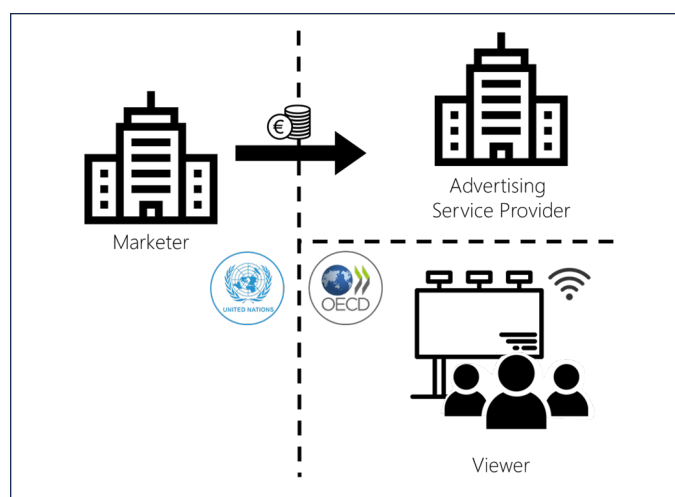
Data Source: UNU-WIDER Government Revenue Dataset, Version 2023, available at: <https://doi.org/10.35188/UNU-WIDER/GRD-2023> [accessed 22.09.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Figure 15: Digital Business Model – Advertising Services

Panel A: Online Advertising Services



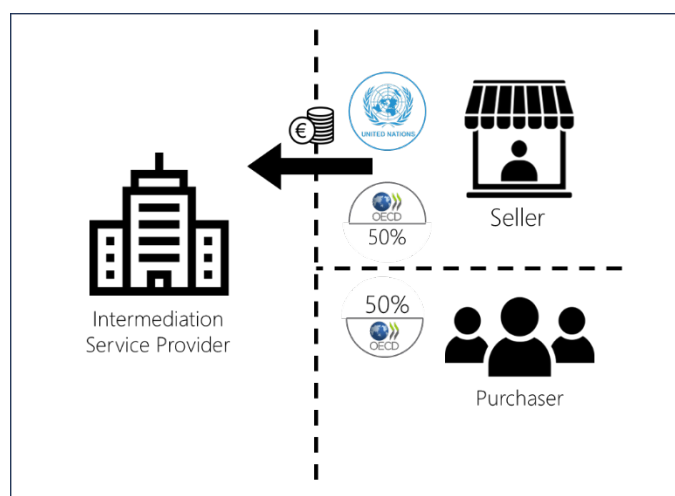
Panel B: DOOH Advertising Services



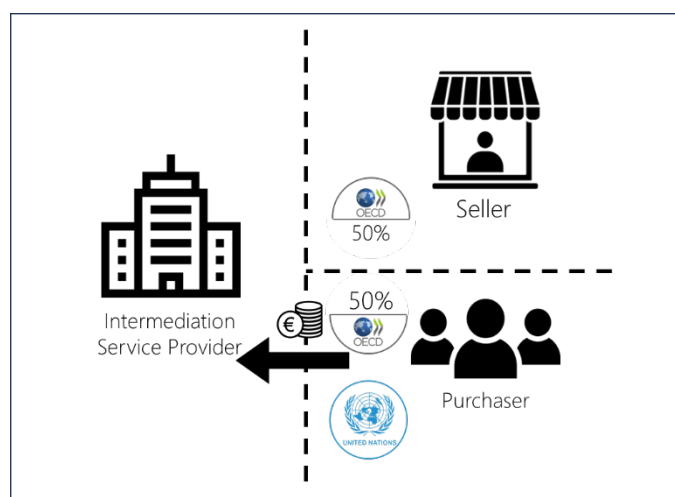
Notes: This figure displays the place of taxation of online advertising services (*Panel A*) and digital out-of-home (DOOH) advertising services via an internet-of-things (IoT) device (*Panel B*) under Pillar I Amount A (Art. 7 par. 1(d)(ii) MLC) and Art. 12B par. 6(a) UN Model. In both cases, the respective icon indicates the place of taxation of the advertising service provider under the OECD's and the UN's proposal, if three jurisdictions are involved. Note that the place of taxation under both rules coincides, if the marketer and the viewer are located in the same country.

Figure 16: Digital Business Model – Online Intermediation Services

Panel A: Monetization via the Supply Side

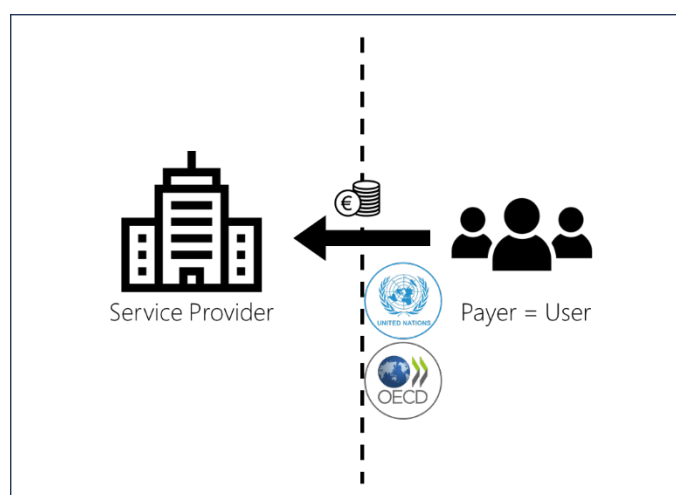


Panel B: Monetization via the Demand Side



Notes: This figure displays the place of taxation of online intermediation services monetized either via the supply side (*Panel A*) or the demand side (*Panel B*) under Pillar I Amount A (Art. 7 par. 1(d)(iv) MLC) and Art. 12B par. 6(d) UN Model. In both cases, the respective icon indicates the place of taxation of the online intermediation service provider under the OECD's and the UN's proposal, if three jurisdictions are involved. Note that the place of taxation under both rules coincides, if the seller and the buyer are located in the same country.

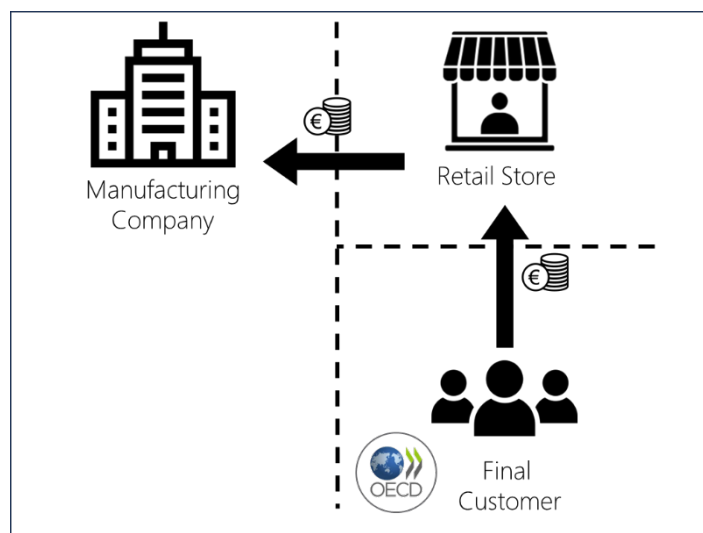
Figure 17: Digital Business Model – Other Services



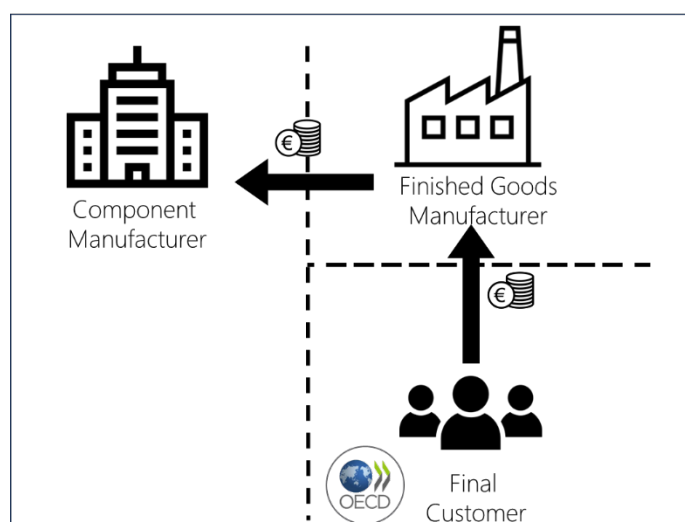
Notes: This figure displays the place of taxation of other services, which is centered around the provision of digital content, under Pillar I Amount A (Art. 7 par. 1(d)(ix) MLC) and Art. 12B UN Model. Other services encompass almost all automated digital services (ADS) that are explicitly listed in Art. 12B par. 6 UN Model, namely, online search engines, social media platforms, digital content services, online gaming with multiplayer functionalities, cloud computing services, and standardized online teaching service. For other services, Pillar I Amount A and Art. 12B UN Model allocate the taxing right to the same jurisdiction as the final user is also the payer for the service.

Figure 18: Non-Digital Business Model – Sale of Physical Goods

Panel A: Sale of Finished Goods



Panel B: Sale of Components



Notes: This figure displays the place of taxation for the sale of physical goods under Pillar I Amount A (Art. 7 par. 1(a) MLC). This revenue stream does not constitute an ADS and is not subject to Art. 12B UN Model. *Panel A* illustrates the place of taxation of Amount A profits of a manufacturer that produces finished goods. *Panel B* illustrates the place of taxation of Amount A profits of a component manufacturer. Irrespective of the location of any potential retailer or a subsequent manufacturing company in the value chain, the place of taxation is determined by the location of the final customer.

Table 1: Country Classification by Income Level

Income Group	Countries			
Low Income	Afghanistan Burundi Burkina Faso Central African Republic Congo, Dem. Rep. Eritrea Ethiopia	Gambia, The Guinea-Bissau Liberia Madagascar Mali Mozambique Malawi	Niger Korea, Dem. People's Rep. Rwanda Sudan Sierra Leone Somalia	South Sudan Syrian Arab Republic Chad Togo Uganda Yemen, Rep.
Lower-Middle Income	Angola Benin Bangladesh Bolivia Bhutan Côte d'Ivoire Cameroon Congo, Rep. Comoros Cabo Verde Djibouti Algeria Egypt, Arab Rep. Micronesia, Fed. Sts.	Ghana Guinea Honduras Haiti India Iran, Islamic Rep. Jordan Kenya Kyrgyz Republic Cambodia Kiribati Lao PDR Lebanon Sri Lanka	Lesotho Morocco Myanmar Mongolia Mauritania Nigeria Nicaragua Nepal Pakistan Philippines Papua New Guinea Senegal Solomon Islands	São Tomé and Príncipe Eswatini Tajikistan Timor-Leste Tunisia Tanzania Ukraine Uzbekistan Vietnam Vanuatu Samoa Zambia Zimbabwe
Upper-Middle Income	Albania Argentina Armenia Azerbaijan Bulgaria Bosnia and Herzegovina Belarus Belize Brazil Botswana China Colombia Costa Rica Cuba	Dominica Dominican Republic Ecuador Fiji Gabon Georgia Equatorial Guinea Grenada Guatemala Indonesia Iraq Jamaica Kazakhstan Libya	St. Lucia Moldova Maldives Mexico Marshall Islands North Macedonia Montenegro Mauritius Malaysia Namibia Peru Palau Paraguay West Bank and Gaza	Russian Federation El Salvador Serbia Suriname Thailand Turkmenistan Tonga Türkiye Tuvalu St. Vincent and the Grenadines Venezuela(*) Kosovo South Africa
High Income	Aruba Andorra United Arab Emirates American Samoa Antigua and Barbuda Australia Austria Belgium Bahrain Bahamas, The Bermuda Barbados Brunei Darussalam Canada Switzerland Channel Islands Chile Curaçao Cayman Islands Cyprus Czechia	Germany Denmark Spain Estonia Finland France Faroe Islands United Kingdom Gibraltar Greece Greenland Guam Guyana Hong Kong SAR, China Croatia Hungary Isle of Man Ireland Iceland Israel Italy	Japan St. Kitts and Nevis Korea, Rep. Kuwait Liechtenstein Lithuania Luxembourg Latvia Macao SAR, China St. Martin (French part) Monaco Malta Northern Mariana Islands New Caledonia Netherlands Norway Nauru New Zealand Oman Panama Poland	Puerto Rico Portugal French Polynesia Qatar Romania Saudi Arabia Singapore San Marino Slovak Republic Slovenia Sweden Sint Maarten (Dutch part) Seychelles Turks and Caicos Islands Trinidad and Tobago Taiwan, China Uruguay United States British Virgin Islands Virgin Islands (U.S.)

Notes: This table presents the World Bank country classification by income level as of 2023. Classified are all 189 World Bank member countries and all other countries with a population exceeding 30,000. Included are also "non-self-governing territories" belonging to the US, France, the UK, or New Zealand. In total, 217 countries are classified. Countries are categorized into income groups based on their 2022 GNI per capita, calculated using the World Bank Atlas method. These groups are low-income (USD 1,135 or less) with 26 countries, lower-middle-income (USD 1,136 to USD 4,465) with 54 countries, upper-middle-income (USD 4,466 to USD 13,845) with 54 countries, and high-income (USD 13,846 or more) with 83 countries. For Venezuela(*), the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years. The 38 OECD member states are marked in bold.

Data Source: World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Table 2: Number of Countries by Geographic Region and World Bank Income Group

	Low Income	Lower-Middle Income	Upper-Middle Income	High Income	Total
Europe & Central Asia	0	4	16	38	58
Sub-Saharan Africa	22	19	6	1	48
Latin America & Caribbean	0	4	20	18	42
East Asia & Pacific	1	13	9	15	38
Middle East & North Africa	2	8	3	8	21
South Asia	1	6	1	0	8
North America	0	0	0	3	3
Total	26	54	55	83	218

Notes: This table presents the number of countries by geographic region and World Bank income group. Countries are assigned to World Bank income groups according to their 2023 classification. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

Data Source: World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Table 3: Descriptive Statistics of Economic Characteristics by Current Income Group

Variable	Mean	SD	Min	P25	Median	P75	Max	N
<i>GDP (in constant 2015 bn. USD)</i>								
Low Income	10.63	16.19	0.25	1.90	3.84	11.92	105.77	1,219
Lower-Middle Income	58.31	185.44	0.09	3.79	11.60	40.00	2,954.97	2,760
Upper-Middle Income	202.37	943.04	0.02	4.03	15.55	86.20	16,325.21	2,601
High Income	518.50	1,716.22	0.03	6.44	62.56	293.71	20,952.69	3,500
OECD	916.01	2,202.89	4.79	98.40	246.32	800.80	20,952.69	1,983
<i>GDP Growth (in %)</i>								
Low Income	3.36	6.64	-50.24	0.67	3.83	6.50	35.22	1,224
Lower-Middle Income	3.84	5.51	-42.45	1.68	4.17	6.44	49.44	2,706
Upper-Middle Income	3.94	7.80	-64.04	1.32	4.11	6.72	149.97	2,601
High Income	3.37	5.65	-54.23	1.09	3.17	5.57	81.88	3,532
OECD	3.31	3.43	-14.83	1.65	3.23	5.15	24.37	1,972
<i>GDP per capita (in constant 2015 USD)</i>								
Low Income	658.80	416.55	165.93	407.03	556.88	713.43	2,547.64	1,219
Lower-Middle Income	1,767.31	1,163.58	144.03	1,012.22	1,476.52	2,254.31	9,037.08	2,760
Upper-Middle Income	4,863.87	2,778.31	163.90	2,912.13	4,239.49	6,288.46	15,761.36	2,601
High Income	29,381.88	23,701.55	1,027.46	13,927.14	23,908.01	36,960.73	204,191.00	3,500
OECD	26,767.57	19,503.37	1,027.46	11,773.00	23,378.29	36,783.94	112,417.9	1,983
<i>GDP per capita Growth (in %)</i>								
Low Income	0.61	6.44	-48.39	-1.94	1.01	3.53	60.09	1,224
Lower-Middle Income	1.61	5.36	-43.56	-0.57	1.97	4.31	46.47	2,706
Upper-Middle Income	2.51	7.57	-64.42	-0.00	2.71	5.22	140.48	2,600
High Income	2.24	5.47	-55.09	0.08	2.20	4.60	77.51	3,532
OECD	2.48	3.34	-14.46	0.91	2.41	4.28	23.20	1,972
<i>GNI (in current bn. US\$, Atlas method)</i>								
Low Income	8.39	19.08	0.04	0.88	2.35	8.57	230.68	1,089
Lower-Middle Income	48.74	192.38	0.03	1.64	6.46	27.98	3,370.14	2,531
Upper-Middle Income	171.19	942.35	0.01	2.03	12.24	61.29	18,151.28	2,420
High Income	473.79	1,699.52	0.01	4.89	40.67	249.51	25,454.40	3,015
OECD	771.38	2,118.90	0.28	38.64	172.63	566.26	25,454.40	1,851
<i>Population (total, in Mio.)</i>								
Low Income	13.11	15.73	0.39	3.82	8.10	16.92	123.37	1,638
Lower-Middle Income	35.89	130.78	0.04	1.62	6.66	23.70	1,417.17	3,402
Upper-Middle Income	38.43	154.27	0.00	0.68	3.81	14.90	1,412.36	3,435
High Income	12.35	33.99	0.00	0.08	1.52	8.63	333.28	5,166
OECD	29.27	47.60	0.17	4.41	10.01	38.46	333.28	2,394
<i>Population Growth (in %)</i>								
Low Income	2.55	1.66	-16.88	2.16	2.68	3.10	16.62	1,612
Lower-Middle Income	2.24	1.21	-14.18	1.65	2.30	2.83	13.16	3,348
Upper-Middle Income	1.42	1.35	-10.95	0.57	1.44	2.40	7.43	3,380
High Income	1.37	2.17	-27.72	0.31	0.87	1.83	20.47	5,083
OECD	0.79	0.85	-2.57	0.27	0.69	1.22	6.01	2,355

Notes: This table presents descriptive statistics of the economic characteristics of 217 countries for the years 1960 to 2022 by World Bank income groups. Countries are assigned to World Bank income groups according to their 2023-2024 classification. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years. Until 2021, it was classified as an upper-middle-income country. We thus assign Venezuela to the upper-middle income group. N refers to the number of non-missing country-year pairs. Presented values are cut off after the second decimal.

Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

Table 4: Descriptive Statistics of Trade Characteristics by Current Income Group

Variable	Mean	SD	Min	P25	Median	P75	Max	N
<i>Exports of goods and services (% of GDP)</i>								
Low Income	18.12	9.95	1.57	10.80	15.75	24.09	66.07	1,079
Lower-Middle Income	28.89	17.27	2.39	16.98	25.43	37.75	166.71	2,458
Upper-Middle Income	32.99	19.11	0.00	18.94	29.17	44.10	166.36	2,251
High Income	52.64	39.02	1.26	26.78	43.37	66.85	433.83	2,913
OECD	37.48	26.60	2.05	20.88	30.84	45.43	211.43	1,903
<i>Exports of goods and services (annual % growth)</i>								
Low Income	6.43	30.46	-96.36	-5.70	3.39	13.45	575.74	841
Lower-Middle Income	6.74	28.73	-71.09	-1.75	5.20	12.52	1,051.41	2,083
Upper-Middle Income	5.92	15.29	-71.35	-0.38	5.35	11.36	218.09	1,790
High Income	5.40	9.51	-78.39	1.42	5.18	9.67	77.48	2,330
OECD	5.92	7.55	-31.07	2.15	5.38	9.49	51.76	1,879
<i>Imports of goods and services (% of GDP)</i>								
Low Income	29.71	13.83	1.12	20.78	27.90	35.37	113.66	1,079
Lower-Middle Income	40.39	23.17	2.98	24.51	34.32	52.74	191.45	2,458
Upper-Middle Income	37.81	21.50	0.01	20.75	35.54	52.06	209.01	2,251
High Income	50.98	36.11	5.19	27.83	41.06	63.46	429.35	2,922
OECD	36.86	22.80	3.67	22.02	31.06	44.83	176.68	1,903
<i>Imports of goods and services (annual % growth)</i>								
Low Income	6.79	23.92	-94.70	-4.70	4.20	14.10	328.68	841
Lower-Middle Income	5.97	16.21	-75.00	-2.10	5.09	13.46	136.84	2,083
Upper-Middle Income	6.03	15.51	-69.50	-1.50	5.73	13.84	123.27	1,790
High Income	5.64	9.92	-78.02	0.98	5.62	10.56	67.73	2,330
OECD	5.80	9.09	-38.45	1.45	5.66	10.27	49.52	1,879
<i>ICT goods exports (% of total goods exports)</i>								
Low Income	0.39	0.92	0.00	0.03	0.11	0.35	6.76	313
Lower-Middle Income	2.20	6.99	0.00	0.04	0.16	1.05	50.86	848
Upper-Middle Income	3.80	8.23	0.00	0.17	0.46	1.91	52.68	931
High Income	7.11	10.14	0.00	0.71	3.13	9.14	63.63	1,322
OECD	7.25	7.13	0.06	1.92	4.28	10.77	36.81	835
<i>ICT goods imports (% of total goods imports)</i>								
Low Income	3.68	2.13	0.00	2.21	3.27	4.63	11.71	334
Lower-Middle Income	4.76	5.26	0.56	2.74	3.79	5.01	51.47	916
Upper-Middle Income	7.28	6.01	0.00	3.74	5.22	8.35	42.82	970
High Income	8.62	6.91	0.00	4.80	6.94	9.84	57.53	1,333
OECD	9.47	4.48	3.11	6.22	8.47	11.98	35.88	835
<i>ICT service export (% of service exports, BoP)</i>								
Low Income	10.59	12.23	0.00	2.72	5.63	12.68	58.81	392
Lower-Middle Income	7.66	8.71	0.00	2.29	4.84	9.81	61.45	1,240
Upper-Middle Income	6.42	7.03	0.01	2.29	4.60	8.68	134.43	1,391
High Income	6.83	8.79	0.00	2.01	4.16	8.07	60.05	1,762
OECD	7.44	8.31	0.02	2.74	5.26	8.79	59.86	1,186

Notes: This table presents descriptive statistics of the export/import characteristics of 217 countries for the years 1960 to 2022 by World Bank income groups. Countries are assigned to World Bank income groups according to their 2023 classification. Data for Taiwan, classified as a high-income country, is missing. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years. N refers to the number of non-missing country year pairs. Presented values are cut off after the second decimal.

Data Source: World Development Indicators (WDI) by World Bank [accessed 27.09.2023]

Table 5: Financial Variables and Business Activities of Large MNEs

	Low Income	Lower-Middle Income	Upper-Middle Income	High Income
<i>Business Activities (# of Constituent Entities)</i>				
Research and Development	121	737	11,176	13,995
Holding or Managing Intellectual Property	131	843	7,666	12,625
Purchasing or Procurement	76	2,118	27,560	29,681
Manufacturing or Production	316	4,806	46,333	65,342
Sales, Marketing or Distribution	254	7,166	73,902	124,874
Administrative, Management or Support Services	84	3,410	29,184	62,089
Provision of Services to Unrelated Parties	470	5,656	35,713	87,992
Internal Group Finance	214	642	4,207	11,686
Regulated Financial Services	63	836	6,030	22,800
Insurance	11	304	1,173	4,978
Holding Shares or other Equity Instruments	118	907	17,877	102,422
Dormant	141	2,680	12,945	58,692
<i>Selected Financial Variables</i>				
Unrelated Party Revenues (<i>in bn. USD</i>)	20.26	1,134.81	15,198.15	37,885.00
Related Party Revenues (<i>in bn. USD</i>)	7.12	318.80	5,321.68	15,646.11
Total Revenues (<i>in bn. USD</i>)	27.39	1,451.82	20,505.92	53,524.62
Profit (Loss) before Income Tax (<i>in bn. USD</i>)	2.16	90.22	1,041.94	2,842.56
Income Tax Paid (on Cash Basis) (<i>in bn. USD</i>)	0.64	35.65	352.02	704.74
Income Tax Accrued – Current Year (<i>in bn. USD</i>)	0.74	32.51	343.66	652.46
Stated Capital (<i>in bn. USD</i>)	19.86	423.34	40,993.26	59,938.94
Accumulated Earnings (<i>in bn. USD</i>)	15.90	535.63	5,384.80	30,726.03
Tangible Assets other than Cash and Cash Equivalents (<i>in bn. USD</i>)	43.98	1,425.33	13,761.10	23,985.64
Number of Employees (#, <i>in thousand</i>)	358.18	11,618.23	53,358.92	83,005.94
Number of Constituent Entities (#)	1,312	24,879	219,122	558,456

Notes: This table presents MNE activity for the year 2020 summed by World Bank income groups. Constituent entities include both separate entities and permanent establishments that prepare separate financial reportings and are included in the consolidated financial statements. A constituent entity may be characterized by more than one business activity. Countries are assigned to World Bank income groups according to their 2023 classification. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years. Presented values are cut off after the second decimal. The presented statistics are subject to the data limitations reported by the OECD (OECD, 2023c). In particular, the underlying aggregated data does not include some jurisdictions with a small number of MNEs subject to CbCR to preserve confidentiality and may be subject to country-specific data cleaning procedures.

Data Source: OECD.Stat, Country-by-Country Reporting Table I – Aggregate totals by jurisdiction [accessed 21.11.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Table 6: Country-level Financial Ratios of Large MNEs by Current Income Group

Variable	Mean	SD	Min	P25	Median	P75	Max	N
<i>Revenues (in tsd. USD) per Employee</i>								
Low Income	592.47	864.62	15.48	53.06	174.48	894.57	2,855.61	20
Lower-Middle Income	438.91	1,103.84	13.05	91.97	162.96	258.84	5,628.44	51
Upper-Middle Income	811.57	3,824.74	38.77	118.08	189.40	319.41	27,205.07	50
High Income	1,481.50	4,746.60	30.02	312.88	486.47	893.23	39,895.96	77
<i>Pre-tax Profits (in tsd. USD) per Employee</i>								
Low Income	272.84	662.35	-12.75	3.22	9.71	74.00	2,188.50	20
Lower-Middle Income	-2.91	226.63	-681.83	-4.17	3.08	14.14	1,295.59	51
Upper-Middle Income	-170.24	1,364.96	-9,620.45	2.97	10.99	19.74	283.68	50
High Income	384.24	2,216.08	-1,312.43	10.43	27.19	61.64	18,150.05	77
<i>Revenues (in USD) per USD of Tangible Asset</i>								
Low Income	12.48	32.08	0.10	0.51	1.78	3.83	124.38	20
Lower-Middle Income	2.40	5.05	0.10	0.69	1.35	2.18	35.00	51
Upper-Middle Income	2.15	2.10	0.07	1.05	1.64	2.64	13.81	49
High Income	3.04	5.70	0.31	1.53	2.26	3.13	51.18	77
<i>Accrued Income Taxes per USD of Pre-tax Profit</i>								
Low Income	0.56	0.61	-0.28	0.25	0.29	0.80	1.97	20
Lower-Middle Income	1.19	9.09	-6.48	-0.01	0.18	0.40	64.93	52
Upper-Middle Income	0.93	4.13	-0.62	0.04	0.24	0.32	28.95	49
High Income	0.22	0.39	-0.39	0.02	0.15	0.27	2.56	79
<i>Accrued Income Taxes per USD of Revenue</i>								
Low Income	0.06	0.08	0	0.02	0.03	0.05	0.32	20
Lower-Middle Income	0.02	0.03	-0.02	0.01	0.01	0.03	0.19	52
Upper-Middle Income	0.02	0.05	-0.01	0.00	0.01	0.02	0.34	50
High Income	0.01	0.01	0	0.00	0.01	0.01	0.13	78

Notes: This figure displays the financial ratios of large multinational enterprises subject to Country-by-Country Reporting for the fiscal year 2020. Displayed is the country-level distribution of (1) total revenues per employee, (2) total revenues to tangible assets, (3) accrued taxes to pre-tax profit, and (4) accrued taxes to total revenues within each income group. The presented statistics are subject to the data limitations reported by the OECD (OECD, 2023c). In particular, the underlying aggregated data does not include some jurisdictions with a small number of MNEs subject to CbCR to preserve confidentiality and may be subject to country-specific data cleaning procedures.

Data Source: OECD.Stat, Country-by-Country Reporting Table I – Aggregate totals by jurisdiction [accessed 21.11.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Table 7: Descriptive Statistics on Tax Compliance Indicators by Current Income Group

Variable	Mean	SD	Min	P25	Median	P75	Max	N
<i>Ease of paying taxes</i>								
Low Income	57.43	16.88	17.90	48.95	58.40	73.05	84.60	24
Lower-Middle Income	62.16	14.54	21.60	53.70	61.90	71.40	89.20	53
Upper-Middle Income	70.66	12.30	34.40	64.90	71.20	78.20	94.00	51
High Income	81.69	10.89	46.70	77.75	84.05	87.90	100.00	60
OECD	83.07	7.56	58.60	80.60	84.90	94.60	100.00	38
<i>Time to comply (hours)</i>								
Low Income	270.58	146.27	90.50	189.00	240.00	313.00	834.00	24
Lower-Middle Income	256.69	162.35	52.00	168.00	216.00	327.00	1,025.00	53
Upper-Middle Income	273.35	234.15	52.00	153.50	210.00	302.00	1,501.00	51
High Income	154.00	78.62	22.50	96.50	139.50	214.00	408.00	60
OECD	163.59	69.86	50.00	119.00	141.50	230.00	334.00	38
<i>Tax payments</i>								
Low Income	36.41	12.03	9	29.5	36	45.5	56	24
Lower-Middle Income	30.14	14.95	5	19	32	42	59	53
Upper-Middle Income	18.60	12.51	5	9	11	30	50	51
High Income	13.99	10.80	3	8	10	17	57	60
OECD	10.12	4.09	5	8	9	11	23	38

Notes: This table presents descriptive statistics of the administrative burden of paying taxes and contributions within 188 countries for the calendar year 2018 by World Bank income groups. Countries are assigned to World Bank income groups according to their 2023 classification. N refers to the number of countries. Presented values are cut off after the second decimal.

Data Source: Doing Business 2020 by World Bank [accessed 08.10.2023]

Table 8: Tax Treaty Network**Panel A: Number of Tax Treaties**

Variable	Mean	SD	Min	P25	Median	P75	Max	N
Low Income	10.96	9.11	0	4	10	16	37	26
Lower-Middle Income	23.66	24.31	0	3	16	38	100	54
Upper-Middle Income	31.65	28.96	0	9	21	56	107	55
High Income	47.03	38.22	0	9	45	83	130	83
OECD	75.89	26.49	4	60	81.5	95	130	38

Panel B: Share of Countries per Income Group with which a Tax Treaty is in Force (in %)

	Low Income	Lower-Middle Income	Upper-Middle Income	High Income	Total
Low Income	9.53	6.69	3.07	3.93	5.07
Lower-Middle Income	6.69	9.43	8.98	14.43	10.89
Upper-Middle Income	3.07	8.98	13.87	22.30	14.58
High Income	3.93	14.43	22.30	31.64	21.72
OECD	5.66	23.83	36.80	50.80	35.20

Notes: The tables present the global dispersion of tax treaties by World Bank income group as of 2023, covering 3,608 bilateral and community tax treaties. *Panel A* describes the average number of concluded tax treaties per country by World Bank income group. *N* refers to the number of countries in the dataset, providing full coverage on a global level. *Panel B* describes the average share of countries per World Bank income group with which a tax treaty has been concluded by World Bank income group. *Total* equals the global share of countries with which a tax treaty has been concluded. As the table is set up as a matrix, each line corresponds to one column and vice versa. Presented values are cut off after the second decimal. We cover all bilateral tax treaties on corporate income taxation that are in force in 2023 and the following multilateral community treaties, if signed by a country: AMU (Arab Maghreb Union), CARICOM (Caribbean Community), CEMAC (Communauté Economique et Monétaire de l'Afrique Centrale), and ECOWAS (Economic Community of West African States), Nordic Convention. We include tax treaties of the former countries Swaziland, USSR, Yugoslavia, and others to the extent that the successor countries and the treaty partners have confirmed the applicability of the respective tax treaty, which we have manually checked. We do not include agreements to promote economic relations, exchange of information agreements, transportation tax treaties, individuals tax treaties or any other tax treaties that do not cover corporate income taxation. We exclude income tax treaties for countries that do not levy corporate income taxes, as these only relate to personal income taxation. We do not account for temporary or partial suspensions of tax treaties signed between the Russian Federation and a contracting party. Where the data sources provide inconsistent information, we rely on IBFD as the primary source since it allows for the most recent data. The income group is assigned based on the most recent 2023-2024 classification. For Venezuela, the income classification 2020-2021 (upper-middle income group) is used as the country is currently not classified, and its previous classification has remained stable over 5 years.

Data Source: Manually assembled data from Tax Treaties Explorer by Hearson (2021), available at: <https://www.treaties.tax> [accessed 10.09.2023], EY Worldwide Corporate Tax Guide (2022), and the most recent Country Tax Guides from IBFD Tax Research Platform [accessed October to December 2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023].

Table 9: Standard Withholding Tax Rates by Current Income Group

Variable	Mean	SD	Min	P25	Median	P75	Max	N
<i>Dividends (%)</i>								
Low Income	15.83	3.81	12.50	12.50	15.00	20.00	20.00	3
Lower-Middle Income	11.92	4.80	0.00	10.00	10.00	15.00	20.00	13
Upper-Middle Income	10.70	7.32	0.00	5.00	10.00	15.00	33.33	33
High Income	13.00	12.75	0.00	0.00	10.00	25.00	44.00	65
<i>Interest (%)</i>								
Low Income	15.83	3.81	12.50	12.50	15.00	20.00	20.00	3
Lower-Middle Income	15.30	5.46	5.00	10.00	15.00	20.00	25.00	13
Upper-Middle Income	15.69	7.61	4.50	10.00	15.00	15.00	35.00	33
High Income	10.36	11.34	0.00	0.00	10.00	19.00	35.00	65
<i>Royalties (%)</i>								
Low Income	18.33	2.88	15.00	15.00	20.00	20.00	20.00	3
Lower-Middle Income	15.38	5.18	10.00	10.00	15.00	20.00	25.00	13
Upper-Middle Income	16.76	7.67	5.00	10.00	15.00	20.00	35.00	33
High Income	12.69	11.08	0.00	0.00	15.00	20.00	35.00	65
<i>Technical Fees (%)</i>								
Low Income	16.33	3.21	14.00	14.00	15.00	20.00	20.00	3
Lower-Middle Income	14.22	5.61	5.00	10.00	15.00	20.00	20.00	11
Upper-Middle Income	15.33	9.17	0.00	10.00	15.00	20.00	35.00	31
High Income	9.08	10.77	0.00	0.00	0.00	20.00	35.00	63
<i>Management Fees (%)</i>								
Low Income	16.33	3.21	14.00	14.00	15.00	20.00	20.00	3
Lower-Middle Income	14.86	5.01	6.50	10.00	15.00	20.00	20.00	11
Upper-Middle Income	15.65	9.33	0.00	10.00	15.00	25.00	35.00	31
High Income	8.05	10.76	0.00	0.00	0.00	16.00	35.00	63

Notes: This table presents descriptive statistics of the standard withholding tax rates in 114 countries as of 2023 by World Bank income groups. These tax rates are applicable to businesses when making payments to other foreign or domestic business entities or individuals. Countries are assigned to World Bank income groups according to their 2023 classification. N refers to the number of countries in the dataset, reflecting coverage of (only) 11.5% of the countries belonging to the low-income group, 24.1% of the lower-middle-income group, and 60% and 45.8% of the upper-middle and high-income group, respectively.

Data Source: OECD.Stat, Standard Withholding Tax Rates [accessed 21.11.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Table 10: Treaty-based Withholding Tax Rates by Current Income Group

Variable	Low Income	Lower-Middle Income	Upper-Middle Income	High Income	N
<i>Dividends (%)</i>					
Low Income	10.00	9.60	2.50	3.33	12
Lower-Middle Income	9.60	10.24	8.67	9.55	513
Upper-Middle Income	2.50	9.00	6.70	6.43	990
High Income	3.33	9.51	6.46	5.34	2,767
N	12	516	987	2,767	4,282
<i>Interest (%)</i>					
Low Income	15.00	13.00	10.00	10.83	11
Lower-Middle Income	13.00	12.33	10.79	11.02	526
Upper-Middle Income	12.50	10.81	11.53	9.48	1,000
High Income	8.00	11.06	9.59	6.47	2,789
N	14	533	996	2,783	4,326
<i>Royalties (%)</i>					
Low Income	15.00	13.00	10.00	2.00	13
Lower-Middle Income	13.00	12.12	10.43	10.95	531
Upper-Middle Income	12.50	10.56	11.16	8.96	1,000
High Income	2.00	10.98	8.94	6.20	2,792
N	14	535	996	2,791	4,336
<i>Technical Fees (%)</i>					
Low Income	-	0.00	0.00	0.00	9
Lower-Middle Income	0.00	6.71	5.57	4.13	528
Upper-Middle Income	0.00	5.75	4.97	2.14	990
High Income	0.00	4.13	2.10	0.91	2,783
N	9	530	988	2,783	4,312

Notes: This table presents average country-pair withholding tax rates under bilateral tax treaties between 126 countries in effect as of 2023 by World Bank income groups. Multilateral and other tax-related agreements, such as tax information exchange agreements, as well as treaties that do not specify the applicable withholding tax rate are not included in the database. Where a tax treaty provides for different rates for specified ownership percentages, the rate for the highest ownership percentage is included. Countries are assigned to World Bank income groups according to their 2023 classification. N refers to the number of bilateral tax treaties. In principle, every tax treaty is included twice. However, the underlying dataset is not symmetric and lists some bilateral treaties only along one dimension.

Data Source: OECD.Stat, Treaty-based Withholding Tax Rates [accessed 21.11.2023]; World Bank country classification by income level 2023-2024 [accessed 25.08.2023]

Table 11: Impact of a Country on the Entry into Force of the MLC

Country	Unilateral DST	30 Countries Sign the MLC		> 30 Countries Sign the MLC	
		Min Impact	Max Impact	Min Impact	Max Impact
United States		81.00%	81.00%	81.00%	81.00%
China		3.33%	15.66%	0.00%	15.66%
Hong Kong, SAR China		3.33%	14.66%	0.00%	14.66%
France	X	3.33%	9.33%	0.00%	9.33%
United Kingdom		3.33%	8.16%	0.00%	8.16%
Japan		3.33%	7.83%	0.00%	7.83%
Germany		3.33%	7.50%	0.00%	7.50%
Switzerland		3.33%	5.66%	0.00%	5.66%
Ireland		3.33%	3.50%	0.00%	3.50%
Spain	X	3.33%	3.33%	0.00%	2.50%
Netherlands		3.33%	3.33%	0.00%	2.50%
India	X	3.33%	3.33%	0.00%	2.50%
Korea, Rep.		3.33%	3.33%	0.00%	1.83%
Belgium		3.33%	3.33%	0.00%	1.50%
Canada		3.33%	3.33%	0.00%	1.00%
Denmark		3.33%	3.33%	0.00%	0.66%
Mexico		3.33%	3.33%	0.00%	0.33%
Saudi Arabia		3.33%	3.33%	0.00%	0.33%
Other Jurisdictions (per country)	(X)*	3.33%	3.33%	0.00%	0.00%

Notes: This table presents the impact of a country on the entry into force of the MLC based on Annex I Table 2 MLC. It also displays existing digital services taxes (DST) and other unilateral measures subject to removal under Pillar I (Annex A Table 1 MLC). Of the other jurisdictions which are not explicitly listed, Austria, Italy, Tunisia, and Türkiye apply DST subject to removal (*). Since at least 30 countries and a minimum of 600 points are required for the entry into force of the MLC, the impact of one country is displayed in two distinct scenarios. Presented values are cut off after the second decimal.

Table 12: Revenue Sourcing Principles for Revenue Categories (Art. 7 MLC)

Revenue Categories	Share	Market Jurisdiction
<i>Location-specific services</i>		
Connected to tangible property	100%	Place of property
Other	100%	Place of performance
<i>Advertising services</i>		
Online	100%	Location of viewer
Other	100%	Place of display or reception
<i>Online intermediation services</i>		
Facilitating the sale or purchase of location-specific services	50%	Location of purchaser
	50%	Location of performance
Facilitating the sale or purchase of tangible goods, digital content or other services	50%	Location of purchaser
	50%	Location of seller
<i>Passenger transport services</i>		
By air	100%	Place of disembark from the aircraft
Other than by air	100%	Final place of final disembark from vehicle or vessel provided by or on behalf of the MNE
<i>Cargo transport services</i>		
By air	50%	Place where cargo is loaded onto the aircraft
	50%	Place where cargo is unloaded from the aircraft
Other than by air	50%	Place where cargo is loaded onto the vehicle or vessel provided by or on behalf of the MNE
	50%	Final place where cargo is unloaded from the vehicle or vessel provided by or on behalf of the MNE
<i>Customer reward programs</i>		
	100%	Proportionally to the number of members located in each jurisdiction who have redeemed or earned one or more units
<i>Other services</i>		
	100%	Place of use
<i>Licensing, sale or other alienation of IP</i>		
Related to finished goods or its components	100%	Place of delivery of finished goods to the final customer
Supporting a service or digital content	100%	Place of use of service or digital content
Other	100%	Place of use of IP
<i>Licensing, sale or other alienation of user data</i>		
	100%	Location of the user associated with the data
<i>Sale of finished goods or its components</i>		
	100%	Place of delivery of the finished goods to the final customer
<i>Sale, lease or other alienation of immovable property</i>		
	100%	Location of the immovable property
<i>Grants, subsidies, refundable credits by governments or international organizations</i>		
Made or funded by one or multiple jurisdiction(s) with known shares of funding	Proportionally	Funding jurisdiction(s)
Made or funded by multiple jurisdictions with unknown shares of funding	Equally	Funding jurisdictions
<i>Non-customer revenues not otherwise covered</i>		
	Proportionally	Locations where other revenues are sourced of other sourced revenues

Notes: This table depicts the revenue sourcing principles as described in Art. 7 par. 1-2 MLC. The market jurisdictions are identified using reliable methods as defined in Annex D MLC.

Table 13: Four-Tier Definition for Classification of Relieving Jurisdictions

Tier	Threshold return on depreciation and payroll	Additional requirement
<i>Tier 1</i>	$\frac{rP_s}{(d+p)_s} > \frac{15P}{(d+p)}$	$\frac{rP_s}{(d+p)_s} > 0.4$
<i>Tier 2</i>	$\frac{rP_s}{(d+p)_s} > \frac{1.5P}{(d+p)}$	$\frac{rP_s}{(d+p)_s} > 0.4$
<i>Tier 3A</i>	$\frac{rP_s}{(d+p)_s} > \frac{P}{(d+p)}$	$\frac{rP_s}{(d+p)_s} > 0.4$
<i>Tier 3B</i>	$\frac{rP_s}{(d+p)_s} > \frac{P}{(d+p)}$	

The adjusted elimination profit of an MNE in a specified jurisdiction s (rP_s) is determined as follows

$$rP_s = P_s - MDSH_s \times \left(1 - \frac{WHTUA_s}{P_s + WHTUA_s}\right) - aAR_s$$

and recalculated after a share of the Amount A relief amount (aAR_s) has been allocated to a specified jurisdiction.

Notes: This table presents the threshold return on depreciation and payroll of an MNE in a specified jurisdiction s and additional requirements that classify the respective specified jurisdiction into one of four tiers for the purpose of double taxation relief (Art. 11 par. 5 MLC). The tiers define the sequence in which specified jurisdictions are obliged to eliminate double taxation under Pillar I Amount A, i.e. the order in which the Amount A relief amount is allocated to countries. Thereby, a share of the Amount A relief amount is first allocated to Tier 1 jurisdictions, before the yet unallocated Amount A relief amount is allocated to higher-tier jurisdictions (Art. 11 par. 3 and 4 MLC).

Table 14: Amount A Relief Amount per Tier

Tier	Min	Max
<i>Tier 1</i>	$AR_{S1} \geq 13.5P \times \frac{(d+p)_s}{(d+p)}$ $\wedge AR_{S1} \geq \frac{[0.4(d+p) - 1.5P] \times (d+p)_s}{(d+p)}$	A_M
<i>Tier 2</i>	$AR_{S2} \geq 1.5P \times \frac{(d+p)_s}{(d+p)}$ $\wedge AR_{S2} \geq \frac{[0.4(d+p) - P] \times (d+p)_s}{(d+p)}$	$AR_{S2} \leq 13.5P \times \frac{(d+p)_s}{(d+p)}$ $\vee AR_{S2} \leq \frac{[0.4(d+p) - 1.5P] \times (d+p)_s}{(d+p)}$
<i>Tier 3A</i>	$AR_{S3A} \geq \left[\frac{P}{(d+p)} - 0.4 \right] \times (d+p)_s$	$AR_{S3A} \leq 1.5P \times \frac{(d+p)_s}{(d+p)}$ $\vee AR_{S3A} \leq \frac{[0.4(d+p) - P] \times (d+p)_s}{(d+p)}$
<i>Tier 3B</i>	0	$AR_{S3B} \leq \left[\frac{P}{(d+p)} - 0.4 \right] \times (d+p)_s$

Notes: This table presents the range of the Amount A relief amount per Tier as defined by Art. 11 MLC. Based on the thresholds for the adjusted jurisdictional return on depreciation and payroll we calculated the minimum and maximum values of the Amount A relief amount for each tier. The minimum amount is determined under the condition that (1) there are specified countries allocated to this tier and that (2) the obligation to eliminate double taxation is not yet fully allocated.

Table 15: Comparison of the Place of Taxation under Art. 7 MLC and Art. 12B UN-Model

Pillar I Amount A (Art.7 MLC)		Art. 12B UN-Model		Current Tax System
Revenue Category	Place of Taxation	Revenue Category	Place of Taxation	Place of Taxation
<i>Location-specific services</i>				
Connected to tangible property	Place of property	n/a		Residence country of service provider, if place of property / performance is not a PE,
Other	Place of performance	n/a		
<i>Advertising services</i>				
Online	Location of viewer	Par. 6a) online advertising services	Place of online advertiser	Residence country of (online) advertising service provider
Other	Place of display or reception	Par. 6a) online advertising services if Internet of Things (IoT) device; otherwise n/a	Place of advertiser if it pays the provider of the IoT-device	
<i>Online intermediation services</i>				
Facilitating the sale or purchase of location-specific services	50% Location of purchaser, 50% location of performer	Par. 6d) online intermediation platform services if user is charged, par. 6a) online advertising services if funded by online advertisements, par. 6b) supply of user data if funded by supply of user data	Par. 6d) Location of the user (=purchaser)	Residence country of intermediation service provider
Facilitating the sale or purchase of tangible goods, digital content or other services	50% Location of purchaser, 50% location of seller		par. 6a) Place of the online advertiser par. 6b) Place of the purchaser of the user data	
<i>Passenger transport services</i>				
By air	Place of disembark from the aircraft	n/a		Residence country of passenger transport service provider
Other than by air	Final place of final disembark from vehicle or vessel provided by or on behalf of the MNE	n/a		
<i>Cargo transport services</i>				
By air	50% each: Place where cargo is loaded onto/unloaded from the aircraft	n/a		Residence country of cargo transport service provider
Other than by air	50% each: Place/Final place where cargo is loaded onto/unloaded from	n/a		

Pillar I Amount A (Art.7 MLC)		Art. 12B UN-Model		Current Tax System
Revenue Category	Place of Taxation	Revenue Category	Place of Taxation	Place of Taxation
	the vehicle or vessel provided by or on behalf of the MNE			
<i>Customer reward programs</i>	Proportionally to the number of members located in each jurisdiction who have redeemed or earned one or more units	n/a		Customer reward may be taxed as income in the residence country of the customer under certain circumstances; no income is generated and taxes at the provider of the customer reward program
<i>Other services</i>	Place of use	par. 6c) search engines *) par. 6e) social media platforms *) par. 6f) digital content services, unless payment is qualified as a royalty par. 6g) online gaming with multiplayer functionalities par. 6h) cloud computing services, par. 6i) standardized online teaching *) If user is charged and not monetized through online advertising services and/or the supply of user data. May contain other services than ADS which are not covered by Art. 12B.	Location of user	Residence country of service provider
<i>Licensing, sale or other alienation of IP</i>				
Related to finished goods or its components	Place of delivery of finished goods to the final customer	n/a		Source country of royalty payments may be entitled to levy withholding taxes, otherwise residence country of beneficial owner of IP
Supporting a service or digital content	Place of use of service or digital content	n/a		

Pillar I Amount A (Art.7 MLC)		Art. 12B UN-Model		Current Tax System
Revenue Category	Place of Taxation	Revenue Category	Place of Taxation	Place of Taxation
Other	Place of use of IP	n/a		
<i>Licensing, sale or other alienation of user data</i>				
	Location of the user associated with the data	par. 6b) supply of user data	Place of the purchaser of the user data	Residence country of user data supplier
<i>Sale of finished goods or its components</i>				
	Place of delivery of the finished goods to the final customer	n/a		Residence country of seller of the finished goods
<i>Sale, lease or other alienation of immovable property</i>				
	Location of the immovable property	n/a		Residence country of the supplier of the immovable property; location of property if it constitutes a PE of the supplier
<i>Grants, subsidies, refundable credits by governments or international organizations</i>				
Made or funded by one or multiple jurisdiction(s) with known shares of funding	Proportionally at funding jurisdiction(s)	n/a		If taxed, residence country of entity receiving the grants, subsidies or credits
Made or funded by multiple jurisdictions with unknown shares of funding	Equally at funding jurisdictions	n/a		
<i>Non-customer revenues not otherwise covered</i>				
	Proportionally at locations where other revenues are sourced of other sourced revenues	n/a		Residence country of entity generating income classified as non-customer revenues; source country of interest payments may be entitled to levy withholding taxes

Notes: This table compares the place of taxation under Pillar I Amount A (Art. 7 par. 1-2 MLC) and Art. 12B UN-Model in dependence of revenue streams. It also displays the place of taxation under the current international tax system, considering residence and source taxation.

Table 16: Distribution Across Revenue Sourcing Rules

Revenue Categories	Number of MNEs	Share of MNEs	Group Revenue of MNEs	Share of Group Revenue
Sale of finished goods or its components	73	64.60%	3,749	62.15%
Location-specific services	13	11.50%	715	11.87%
Other services, i.e. digital content provision	12	10.62%	747	12.38%
Sale, lease or other alienation of immovable property	8	7.08%	289	4.80%
Licensing, sale or other alienation of IP	4	3.54%	133	2.21%
Advertising services	2	1.77%	375	6.21%
Cargo transport services	1	0.88%	23	0.39%
Passenger transport services	-	-	-	-
Online intermediation services	-	-	-	-
Customer reward programs	-	-	-	-
Licensing, sale or other alienation of user data	-	-	-	-
Grants, subsidies, refundable credits by governments or international organizations	-	-	-	-

Notes: This table presents the distribution (in absolute numbers and in percentage points) of in-scope MNEs across revenue sourcing categories (Art. 7 MLC). We classify an MNE under one revenue sourcing category based on its major revenue stream, derived from the annual report for the financial year 2022. We disregard any segmentation. We also disregard any in-scope MNE without publicly available data on its revenue streams, leading to seven disregarded in-scope MNEs. The table further presents the overall group revenue (operating revenue for the financial year ending in 2022) of the MNEs, classified under their major revenue sourcing category. Thereby, we disregard any segmentation of the revenue.

Data Source: BvD's Orbis [accessed 13.11.2023]; classification of MNEs based on annual reports for the financial year 2022.



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