WIFO

Unitary Taxation and Formulary Apportionment

Estimation of Global Revenue Implications and Review of Wider Consequence

Simon Loretz

Research assistance: Cornelia Schobert

May 2025

Austrian Institute of Economic Research

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Austrian Institute of Economic Research
Commissioned by Vienna Chamber of Labour

Internal review: Margit Schratzenstaller
Research assistance: Cornelia Schobert

This project reviews the revenue implications of the introduction of a global implementation of unitary taxation and formula apportionment. The combination of a various sources of firm-level data allows to learn more about the channels and the extent of the reallocation of tax revenues. The empirical estimates are embedded in a comprehensive review of the existing literature and a discussion of wider implications.

2025/2/S/WIFO project no: 23125

Media owner (publisher), producer: Austrian Institute of Economic Research
1030 Vienna, Arsenal, Objekt 20 • Tel. (43 1) 798 26 01 0 • https://www.wifo.ac.at • Place of publishing and production: Vienna

Free download: https://www.wifo.ac.at/publication/pid/53209586

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Content

List of tables III

List of figures III

Executive Summary 4

1. Introduction 6

2. Related literature 7

2.1 Revenue consequences of unitary taxation and formula apportionment 7

2.2 Impact of choice of apportionment factors 9

2.3 Dynamic effects of unitary taxation and formula apportionment 10

2.3.1 Distortions to factor allocation under unitary taxation and formula apportionment 10

2.3.2 Distortions to ownership and organisational form under unitary taxation 12

2.3.3 Changes to tax competition under unitary taxation and formula apportionment 13

2.3.4 Implications of unitary taxation and formula apportionment for wages and employment 14

3. Data and Methodology 16

3.1 Data 16

3.1.1 Firm-level data (ORBIS) 16

3.1.2 Aggregate data 17

3.2 Methodology 19

3.2.1 Impact of unitary taxation 19

3.2.2 Approach based on unconsolidated firm-level information 23

3.2.3 Approach based on aggregate CbCR data 25

3.2.4 Hybrid approaches based on firm-level and aggregate CbCR data 27

4. Results 30

4.1 Analysis based on unconsolidated ORBIS data 30

4.1.1 Impact of international loss consolidation 30

4.1.2 Changes to the distribution of the tax base 31

4.1.3 Changes to the tax liabilities 35

4.2 Analysis based on aggregate CbCR data 40
4.2.1 Changes to the distribution of the tax base 40
4.2.2 Changes to the distribution of the tax revenues 44
4.3 Analysis based on hybrid approaches with aggregate CbCR data and firm-level information 48
4.3.1 Impact on distribution of tax base and tax revenues at the country level 48
4.3.2 Impact on distribution of tax base and tax revenues at the MNE level 51
5. Conclusion 53
References 56
Appendix 59
A.1. Detailed methodological description 59
A.1.1. Data cleaning ORBIS data 59
A.1.2. Imputation payroll and employment information 61
A.2. Detailed results 64

List of tables

Table 1: Descriptive statistics unconsolidated ORBIS data 17
Table 2: Descriptive statistics aggregated CbCR data 18
Table 3: Tax revenue effects modelled with unconsolidated ORBIS data 2014-2021 36
Table 4: Comparison tax revenues under different tax rate assumptions, sum 2016-2021 47
Table 5: Tax liability effects at the MNE level modelled with hybrid approach, 2014-2021 52

Table A 1: Country coverage unconsolidated ORBIS data 60
Table A 2: Average wages (in thousand USD) used for CbCR and hybrid analysis 62
Table A 3: Tax base allocation, unconsolidated ORBIS data – single factors 64
Table A 4: Tax base allocation, unconsolidated ORBIS data – weighted formulas 65
Table A 5: Tax base allocation, aggregated CbCR data – single factors 66
Table A 6: Tax base allocation, aggregated CbCR data – weighted formulas 72
Table A 7: Tax base allocation, aggregated CbCR data (cross-section)– single factors 78
Table A 8: Tax base allocation, aggregated CbCR data (cross-section)– weighted formulas 84
Table A 9: Statutory and effective tax rates, average over 2014 to 2021 90
Table A 10: Tax base allocation, hybrid approach, sums 2014 to 2021 – single factors 96
Table A 11: Tax base allocation, hybrid approach, sums 2014 to 2021 – weighted factors 100
Table A 12: Tax revenue simulation, hybrid approach, 2014 to 2021 104
Table A 13: Simulation results sales by destination, hybrid approach, 2014 to 2021 112

List of figures

Figure 1: Tax base reduction because of international loss consolidation 2014-2021 30
Figure 2: Overall tax base redistribution because of unitary taxation, 2014-2021 32
Figure 3: Change in corporate tax base, by apportionment factors (1/3) 33
Figure 4: Change in corporate tax base, by apportionment factors (2/3) 34
Figure 5: Change in corporate tax base, by apportionment factors (3/3) 35
Figure 6: Change in tax base, by apportionment factors, largest absolute tax bases 40
Figure 7: Change in corporate tax base, by apportionment factors, largest relative losses 41
Figure 8: Change in corporate tax base, by apportionment factors, largest relative gains 42
Figure 9: CBCR data -Tax base allocation, by apportionment factors, by country groups 43
Figure 10: CBCR data - Tax revenues by apportionment factors and country groups 44
Figure 11: CBCR data - Tax revenues, by apportionment factors and country groups 45
Figure 12: CBCR data - Tax revenues by apportionment factors and country groups 46
Figure 13: Hybrid approach -Tax base allocation by apportionment factors, by country groups 48
Figure 14: Hybrid approach - Tax revenues, by apportionment factors, by country groups 50

Executive Summary

The current system of international taxation requires multinational companies to calculate their taxable profits and to pay their corporate taxes in each country with a taxable presence. This creates substantial compliance costs and opens opportunities for corporate tax avoidance. As an alternative tax system unitary taxation would calculate the taxable profits at the corporate group level and use apportionment factors to allocate the taxing rights to countries.

This study aims to estimate what such a fundamental switch in the tax system would imply for the distribution of the tax revenues at the country level and the level of tax liabilities at the corporate group level. Additionally, the implications for tax competition and change in firm behaviour are discussed.

The switch to unitary taxation implies that the taxable profits are calculated at the corporate group level. This automatically consolidates existing losses across border and eliminates intra-group profit shifting. The international loss consolidation reduces the overall corporate tax base temporarily because loss-carry forwards are brought forward and permanently to the extent losses where irrecoverable under the current system. Overall, this study finds moderate reduction of the tax base of less than 10 % with stronger initial transition effects and stronger effects during economic crises.

The elimination of profit shifting will increase the overall tax revenues because none of the proposed apportionment factors will reallocate the tax base back to tax havens/investment hubs. The exact extent of the increase in tax revenues and which countries are gaining most tax revenues depends on the apportionment factors and the assumptions about the applicable tax rates.

Simulating the use of single factors illustrates which countries will benefit from a specific choice of apportionment factors. Relying on tangible assets implies less redistribution of corporate tax base and consequently a more moderate redistributions away from the tax haven/investment hub countries. In contrast, using employment related factors implies much stronger redistribution of tax base. The use of wages costs will strongly reallocate toward high-income and high wage tax countries while using the number of employees would allocate much more toward low income countries. Using sales by destination will result in a reallocation towards large countries. However, the exact extent of tax base redistribution under a sales by destination apportionment system crucially depend whether taxing rights are allocated to countries without the requirement of another taxable presence or not.

The overall tax revenue effects also crucially depend on the assumption about the applicable tax rate. Using the statutory tax rate for the simulation shows a strong increase in the tax liabilities which is likely overstated because the taxable profits in the financial accounts also include tax exempt income. However, modelling the tax liabilities at the corporate group level it is possible to quantify the additional tax liabilities in the vicinity of 5 to 10%. However, these tax increases are not equally distributed but reflect loss consolidation and the elimination of profit shifting through unitary taxation. At the firm level this implies that only a small majority of companies will see a tax increase, while a substantial share of corporate groups will also see a tax decrease.

At the country-level this implies that tax haven/investment countries are experiencing a reduction in their tax revenues if the simulation applies the statutory tax rates. Combining the statutory tax rates with a global minimum tax rate of 25% these tax revenue losses can be compensated from most individual countries.

The switch to unitary taxation with formulary apportionment would not only alter the tax competition incentives for jurisdictions, but also change the investment incentives for firms. Largely eliminating tax motivated profit shifting unitary taxation would imply a tax increase primarily for MNE groups which were previously aggressive in their tax planning. This has some implications for the long-run effects of such a fundamental tax reform. The increased tax burden is expected to also fall on labour, but there is also some empirical evidence that the gains from corporate tax avoidance are primarily shared with executive staff. The asymmetric tax increase for MNE groups which are currently more tax aggressive suggests that there will be some real responses if the profit shifting possibilities are significantly reduced. At the same time the economic costs of reallocating apportionment factors are substantially higher, which will mitigate the distortions under unitary taxation.

1. Introduction

The current system of international corporate taxation taxes the profits of multinational companies (MNEs) in each country where the corporate group is active. This separate accounting approach requires to price all intra-firm transactions based on an arm's length principle. Given the substantial variation in statutory corporate tax rates across countries and the continued relevance of tax havens this system provides incentives and opportunities for MNEs to engage in aggressive tax planning and relocate their corporate tax base.

As one potential alternative to the existing system unitary taxation has been debated for quite some time now. Under a such a system the corporate profits and tax base would be calculated at the corporate group level. This would eliminate the need for arm's length prices and render profit shifting irrelevant. In a second step the taxing rights for the groupwide corporate tax base profit would be allocated to individual jurisdictions based on apportionment factors.[1])

While such tax systems are currently only implemented at the subnational level, most notably in the United States, Canada, Japan and Germany, there have been a number of tax reform proposals which include aspects of unitary taxation with formula apportionment. The most prominent examples include the proposal for a Common Consolidated Corporate tax base (CCCTB) by the European Commission, which has been remodelled into the Business in Europe: Framework for Income Taxation (BEFIT) recently.

Unitary taxation at a global level, in contrast, has received less attention in the scientific debate. This is despite the fact that the OECD Pillar 1 Proposal contains elements of unitary taxation, at least for the largest most profitable firms. This study attempts to contribute to the discussion of a fundamental reform of international corporate taxation by investigating potential impacts of a switch to global unitary taxation with formula apportionment. Special focus lies in the effects on the tax revenues beyond EU countries, and the relevance of different apportionment factors.

The study is structured as follows. Section 2 reviews the existing literature. Starting with a review of the literature findings about the tax revenues implications of unitary taxation and formula apportionment the dynamic effects of a switch to unitary taxation are discussed based on the findings of the theoretical and empirical literature. Section 3 describes the available data and the implications for the methodology, which is largely determined by the data availability. In Section 4 the results for the different methodological approaches are presented. For each of the data sources first the tax base reallocation and the tax revenue implications are presented. For the analysis based on the consolidated accounts the tax liability results are also presented at the corporate group level. Section 5 provides the most important conclusions.

[1]) See de Mooij et al. (2019) for a general overview of formula apportionment.

2. Related literature

The introduction of unitary taxation with formula apportionment would represent a fundamental change in the taxation of international corporations and is likely to have substantial impacts on the tax liabilities of corporations, the amount and distribution of tax revenues, and on the behaviour of firms and policy makers. While there are no studies which simultaneously address all these aspects for a potential introduction of unitary taxation at a global level, there are various strands of literature investigating partial effects of similar reforms, e.g. the consolidation and formula apportionment part in the common consolidated corporate tax base (CCCTB) proposal.[2])

2.1 Revenue consequences of unitary taxation and formula apportionment

There is a strand of empirical literature which investigates the implications of unitary taxation and formula apportionment on tax liabilities of firms and tax revenues of countries. Early contributions focus on selected US multinational enterprises (MNEs) and compare the tax liabilities under the existing separate accounting to a hypothetical scenario of unitary taxation. *Shackelford and Slemrod* (1998) and *Clausing and Lahav* (2011) both investigate the implied change in tax liabilities for the 50 largest US MNEs. While *Shackelford and Slemrod* (1998) find a 38% increase of the tax base in the US, *Clausing and Lahav* (2011) only find a more moderate increase of 22%, despite increased tax differentials between the US and subsidiaries countries.

With the proposed introduction of a common consolidated corporate tax base (CCCTB) in the European Union research interest shifted to the tax revenue consequences for the Member States. Fuest et al. (2007) use data from German MNEs to find that corporate tax revenues would be substantially reduced because of international loss consolidation. The underlying mechanism is that losses can only be offset domestically under separate accounting, while they are automatically offset internationally under unitary taxation. However, in most countries losses can be carried forward to be offset against future profits in the same jurisdiction. To this extent the tax revenue loss due to international consolidation is at least partially of a transitory nature.[3]) However, as noted by *Devereux and Loretz* (2008b), this effect is likely overstated because of the reduced loss carry forward possibilities. *Devereux and Loretz* (2008b) use ORBIS data for European MNEs and only find an overall decrease in tax revenues if the participation in the CCCTB is voluntary. Furthermore, a substantial redistribution of tax revenues from low to high tax jurisdictions is found. In a subsequent analysis *Loretz and Schratzenstaller* (2019) investigate the re-launched CCCTB proposal and find a similar pattern, i.e. tax base being reallocated from low-tax jurisdictions to larger higher tax countries. *Cline et al.* (2010) perform a similar exercise based on Bureau van Dijk data, but extrapolate the data to match the macro-level distribution. While they consistently find the Netherlands, Ireland and Luxembourg to lose corporate tax base, their analysis also finds higher tax countries like Denmark or Germany to have

[2]) See Matheson et al. (2021) for a recent overview of the literature on unitary taxation and formula apportionment.

[3]) The relevance of international loss consolidation and the implied insurance function of unitary taxation with formula apportionment has already been theoretically discussed in *Gérard and Weiner* (2003). See also *Mardan and Stimmelmayr* (2018) for a theoretical simulation of the short-run and long-run impact of unitary taxation on loss consolidation. See also the discussion in section 3.2.1.

less tax base. *Oestreicher and Koch* (2011) exclude (estimated) dividend income from the tax base and account for domestic consolidation under separate accounting, and correspondingly find a more moderate overall reduction in the tax revenues of approximately -4.5%. The countries with the biggest reductions in tax revenues are Cyprus, Austria, Finland, the Netherlands, Ireland, the Netherlands and Luxembourg, although through the consideration of exempted dividend income even their tax revenue reduction is only between 10 and 20%.[4]) *Nerudová and Solilová* (2019) base their analysis on Bureau van Dijk data and find that Luxembourg, Cyprus, Ireland, Finland, the Netherlands, Malta and Belgium will see a significant (more than 20%) reduction in the tax base, while the overall reduction in the tax base due to international loss consolidation is only 4.2%.

The pattern of reallocation of tax base away from so-called 'investment hubs' has subsequently been used as an indicator of profit misalignment in *Cobham and Loretz* (2014) and *Cobham and Janský* (2018).[5]) While *Cobham and Loretz* (2014) solely rely on unconsolidated data from ORBIS, *Cobham and Janský* (2019)additionally use US data from the Bureau of economic analysis (BEA). Both data sources allow to some extent to evaluate the effect of global unitary taxation and formula apportionment. More recently *de Mooij et al.* (2021) also use BEA and ORBIS data and additionally US country-by-country reporting (CbCR) data from the inland revenue service (IRS) to investigate the tax revenue consequences of unitary taxation with formula apportionment. The BEA and ORBIS data allow for an analysis of the impact of international loss consolidation which is found to reduce the overall tax base up to 10%.

Empirical estimates find an approximately 10% reduction of the overall corporate tax base due to international loss consolidation.

The reallocation of the tax base to higher tax countries is found to only partially offset this reduction for the analysis based on ORBIS or BEA data. The analysis based on the CbCR data in contrast finds a strong positive effect on global tax revenues. Depending on the apportionment factor tax revenues are found to increase up to 15%. *Viegas and Dias* (2021) also use US CbCR data to find a reallocation of profits from Ireland, the Netherlands and Luxembourg to other European countries. Also based on aggregate CbCR data *Sweeny* (2021) models formula apportionment using different factors and finds substantial redistribution of tax base.[6]) *Palanský and Schulz* (2024) evaluate the formulary apportionment foreseen in the BEFIT proposal using CbCR data and similarly find Ireland, the Netherlands, Luxembourg and Malta losing tax base to other European countries.

[4]) Except for Cyprus, where the revenue reduction is approx. 25%, albeit based on a very small number of observations.

[5]) The OECD (2020) defines investment hubs as jurisdictions with an inward FDI position of more than 150% of GDP.

[6]) The results are very unstable, with countries winning or losing tax base varying between apportionment factors. However, since the report lacks a clear description of methodology it is difficult to provide and explanation for such patterns.

A shift to unitary taxation with formula apportionment is found to reallocate corporate tax base away from (low-tax) investment hubs. The size of the effect is likely substantial, but largely unclear since all existing data sets are likely to lead to biased results.

Overall, a number of patterns can be observed. There appears to be a consensus in this empirical literature that investment hubs will lose corporate tax base compared to the current system of separate accounting. The extent of this reallocation is less clear, with studies based on Bureau van Dijk data producing a smaller reallocation in comparison to the CbCR or BEA data. There are a number of potential explanations of this pattern. First, it is likely that the analysis based on Bureau van Dijk data is underestimating the reallocation away from low-tax jurisdictions because the data is typically less complete for these countries. At the same time the use of unconsolidated accounts is the only methodological approach which allows for a quantification of the impact of international loss consolidation. In consequence any analysis based on CbCR or BEA data is likely to moderately overestimate the tax revenue gains. Finally, the use of country-specific data on MNE activities can only provide a partial picture. And even if the relative tax change for a small group of MNEs appears to be very large the absolute tax base implications might only be limited.[7])

2.2 Impact of choice of apportionment factors

The extent of the reallocation of corporate tax base also to a large extent depends on the choice of apportionment factors. Formula apportionment has been first used in the subnational context in the US and Canada.[8]) While the US allows for competition in the apportionment factors, there has been a consensus in the EU that a CCCTB or a BEFIT should include a common definition of the apportionment factor.[9]) The CCCTB proposal included a modified Massachusetts formula which would allocate the tax base according to the distribution of tangible assets (1/3), sales by destination (1/3) and an employment factor split into the number of employees (1/6) and payroll (1/6). Given this clear reference, the majority of the empirical analyses used these apportionment factors to estimate the impact of formula apportionment on tax revenues.

Formula apportionment based solely on the number of employees is likely to result in a large reallocation of corporate tax base, while other apportionment factors lead to less extreme redistribution.

Devereux and Loretz (2008b) find substantially more redistribution of tax base if the number of employees is used as an apportionment factor. Within a European subsample, the Eastern European countries with relatively lower wages are benefitting from such an apportionment

[7]) This is a simple mechanical effect. Comparing the tax base change to a small baseline tax base will increase the relative effect size.

[8]) See *Weiner* (2005) for a brief description of the history of formula apportionment.

[9]) See *Agúndez-García* (2006) for a comprehensive discussion of the apportionment factor in the context of the CCCTB proposal.

factor. In contrast, apportionment by sales is found to imply a relatively small redistribution of tax base. However, due to a lack of data availability, sales by origin (including sales to affiliated parties) are used as an apportionment factor. It is worth noting that there is no information about sales to unrelated third parties by destination as it is foreseen as apportionment factors in the policy proposals is not available.[10]) *De Mooij et al.* (2021) find similarly that using the number of employees as apportionment factor implies far larger reallocation of tax base than assets. This result holds for all three data sources. For the BEA data where the comparison between more apportionment factors is possible, the number of employees implies by far the biggest reallocation of tax base.[11]) That apportionment based on the number of employees results in the biggest reallocation of tax base also stems from the fact that this is the only apportionment factor which does not include any economic valuation. Using a headcount of the number of employees does not account for their contribution to the output of the firm.[12])

The second biggest reallocation is found by sales by destination while using payroll or asset as apportionment factor results in a more moderate redistribution of the tax base. That said, there are still some countries where the apportionment by sales by destination results in substantial tax base changes. Furthermore, the overall picture that investment hubs and low-tax jurisdictions see a significant reduction in tax base also holds regardless of the apportionment factor.

2.3 Dynamic effects of unitary taxation and formula apportionment

The existence of unitary taxation with formula apportionment in several countries and the plans of introducing a CCCTB in the EU sparked some interest in the economic analysis of the wider impact of such a tax system in comparison to separate accounting. In contrast to static tax revenue effects, it is important to consider the long-run implications of unitary taxation with formula apportionment.

Arguably the important benefit of a switch to unitary taxation is that it eliminates the need for arm's length pricing as it cancels out intra-group transactions. In consequence, profit shifting as observed under separate accounting will be replaced by other distortions, most importantly to the ownership structure and the factor allocation. In addition, the elimination of profit shifting will change the nature of tax competition.[13])

2.3.1 Distortions to factor allocation under unitary taxation and formula apportionment

It has long been argued that corporate taxation turns into a tax on factors under formula apportionment.[14]) Evidence for such a distortive effect of payroll weights is found *in Goolsbee and*

[10]) Even the OECD (2020) has to use a very crude approximation of sales by destination based on the analytical MNE database. Absent any better information this study also follows this approach to approximate sales by destination.

[11]) Measured as the median or average change in tax revenues as reported in the appendix table A1.

[12]) Standard economic theory assumes that wages reflect the marginal contribution of the employees to the output. As such a payroll factor is expected to have a strong link to output than just the number of employees which would give employees equal weight regardless of their activities.

[13]) This discussion broadly follows *de Mooij et al.* (2021) but labels the changed 'profit shifting incentives' 'ownership distortions' instead.

[14]) See *McLure* (1981).

Maydew (2000) and *Riedel* (2010). Evidence of a distortion of the asset weights is found in *Gupta and Hofmann* (2003) while *Clausing* (2016) investigates the distortion of all factors. The latter finds that the initially positive effects of switches to a sales by destination apportionment factor vanish over time as factors become less responsive to taxation.

The empirical evidence on factor distortions is however based on subnational taxes which are generally substantially lower than federal taxes. Therefore, the impact of unitary taxation with formula apportionment on factor distortion might be larger if unitary taxation is implemented at the international level. For example, *Bettendorf et al.* (2009) and (2010) simulate in a computable general equilibrium (CGE) model that Ireland as a low tax country will initially lose part of the tax base because of the introduction of the CCCTB, but the dynamic effects for investment reallocation will result in a net welfare gain.

Ortmann and Pummerer (2023) theoretically investigate whether the distortions to factor allocation are larger under separate accounting or formula apportionment and find that a switch to unitary taxation reduces the distortion if profit shifting under separate accounting was substantial.

Accounting for the findings of the standard corporate tax literature and in particular the corporate tax incidence literature, the impact of unitary taxation on factor distortions needs to be seen in a slightly different light. There is a consensus in the standard economic literature that a higher corporate tax reduces investment.[15]) This finding holds despite the convincing evidence that MNEs also engage in aggressive tax planning activities including profit shifting which should weaken the impact of statutory tax burden on real investment.[16]) These two findings can be reconciled by the observation that not all MNEs engage in aggressive tax planning. This implies that under the current system of separate accounts some MNEs respond to corporate tax differentials by reallocating real activities, while others only shift profits.[17]) *Hanappi and Whyman* (2023) also find that profit shifting opportunities reduce the investment elasticities and furthermore show that corporate tax differentials lead to investment reallocation within MNE groups. The change in investment in response to corporate taxation entails further effects on employment and wages. The corporate tax incidence literature considers general equilibrium effects and finds that the tax burden on corporate income is also at least partially borne by labour.[18]) Considering this the corporate tax can be viewed as a tax on factors already under the existing system of separate accounting. The question is therefore much more whether the factor distortions are likely to increase following a switch to unitary taxation.

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[15]) See *de Mooij and Ederveen* (2008) for a comprehensive overview and meta-analysis of the literature measuring the corporate tax effects on investment.

[16]) See *Beer et al.* (2020) for a recent overview and meta-analysis of the research on international corporate tax avoidance.

[17]) The argument is brought forward by the OECD for the introduction of a global minimum taxation only for the largest MNEs, since *Millot et al.* (2020) find that the most profitable MNEs are less responsive to taxation in their investment decisions.

[18]) See *Harberger* (2008) for a synthesis of the corporate tax incidence literature, stating that the incidence of a corporate tax will fall on labour in an international setting, with capital also bearing a burden if there is a coordinated tax increase.

The existing factor distortions because of international tax differentials are likely to be increased through a switch to unitary taxation because they now contain the distortions due to profit shifting.

Devereux and Loretz (2008a) analyse this question in a pure cost of capital approach absent profit shifting opportunities and find that formula apportionment is associated with similar distortions to the investment decision than separate accounting. Taking into account that unitary taxation is ruling out the profit shifting opportunities, e.g. transfer pricing and profit shifting via internal transactions which are present under separate accounting, it can be assumed that the factor distortions will be increased for those MNEs which were engaged in aggressive tax planning under the current system.

Additionally, one should take into account recent developments in international corporate taxation, namely the implementation of a global minimum tax for larger MNEs. Under the simplifying assumption that the global minimum taxation fully achieves its objective of taxing corporate profits at a certain minimum rate, the factor distortions are likely to be substantially reduced.[19]) Absent (large) tax differentials there is little incentive to distort factor allocations because of tax reasons under both separate accounting and unitary taxation. Interpreting the global minimum tax as a step toward global harmonisation of corporate taxation, the international tax system will move closer to its second best outcome.[20])

2.3.2 Distortions to ownership and organisational form under unitary taxation

Given that tax differentials continue to exist between countries there are now incentives to adjust the corporate group structure. *Gordon and Wilson* (1984) describe the incentive to merge with entities in low-tax jurisdictions to reduce the corporate tax burden. *Hines* (2010) argues that apportionment factors which do not adequately reflect the value generation provide an incentive to distort ownership. More importantly, the analysis in *Nielsen et al.* (2003) shows that unitary taxation can result in a distortion of the choice of organisational structure. For example, *Altshuler and Grubert* (2010) simulate that distortions in the organisational form will reduce revenue gains of unitary taxation. Some of the organisational adjustments, e.g. outsourcing labour intensive activities in response to apportionment by a payroll factor, have similar consequences as factor reallocation at the firm level. However, the implications for the jurisdictions can vary substantially depending on whether activities are outsourced or reallocated. *Buettner et al.* (2011) show that German firms strategically chose to consolidate to reduce their corporate tax burden. *Gresik* (2016) shows more generally that it is not optimal for similar countries (i.e. abstracting from the situation of small low-tax jurisdictions) if firms are able to choose between formula apportionment and separate accounting.

[19]) Given the recent and yet incomplete implementation of Pillar 2 so far, it remains to be seen to which extent the global minimum taxation will achieve the goal to tax all corporate profits at a minimum effective tax rate.

[20]) The second best outcome is a achieved if the only remaining distortion is the general reduction in investment because the corporate tax burden has rendered some investments unprofitable after tax.

That said, the introduction of unitary taxation for the largest MNEs only could be close to such a situation as it will provide an incentive to de-merge into groups below a revenue threshold for those MNEs which would face a substantially increased tax burden under unitary taxation. Even more relevant is the potential distortion for mergers and acquisitions, if such an acquisition will imply that the newly formed group falls within the scope of unitary taxation and in consequence faces a higher tax burden.[21])

While a change in organisational form is likely to come with more far-reaching implications[22]), distortions to mergers and acquisitions (M&A) activities cannot be ruled out. Depending on initial size relative to the threshold and the tax aggressiveness the distortion to M&A activities can take on different forms, incentives to de-merge, (dis-)incentives to merge and distortions to the choice of acquisition targets. This in turn can have profound implications for the employment and wages in the affected companies.

2.3.3 Changes to tax competition under unitary taxation and formula apportionment

The fact that corporate tax competition will change under unitary taxation and formulary apportionment is well established in the theoretical literature. For example, *Pethig and Wagener* (2007) show that tax competition under formula apportionment is most intense if the apportionment factors are mobile, implying that using assets as apportionment factor results in more intensive tax competition than using an employment or sales factor. Following the same line of argumentation *Eichner and Runkel* (2008) show that using sales by destination as apportionment factor could successfully limit tax competition. *Riedel and Runkel* (2007) additionally address the implication of a partial implementation of unitary taxation with formula apportionment. This waters' edge results in changed profit shifting incentive towards the non-participating country.

The switch to unitary taxation will change the nature of international tax competition from competition for profits and real activities to competition for real activities.

On a more general level, the change in the nature of tax competition has probably an ambiguous impact on the intensity of tax competition. One the one hand it is expected that the tax base will be less elastic because factor reallocation, changes in ownership or organisational forms are substantially more costly than the reallocation of profits under separate accounting. On the other hand, the economic consequences for the jurisdictions are larger if real activity is reallocated rather than just the tax base. In sum, the benefits of a corporate tax rate reduction are larger but at the same time more difficult to obtain. This could in theory result in a situation where less jurisdictions engage in corporate tax competition but do so more aggressively. However, it is also important to account for recent developments in international corporate

[21]) While the introduction of the Pillar 2 legislation is too recent to see substantial direct evidence of such distortions, the topic is discussed at big tax consultancies, e.g. https://www.ey.com/en_ch/tax/beps-pillar-ii-what-are-the-impacts-on-m-a-transactions, https://www2.deloitte.com/content/dam/Deloitte/us/Documents/Tax/us-ma-tax-talk-november-2023.pdf or https://www.pwc.co.uk/services/tax/insights/impact-of-pillar-2-on-deals.html,

[22]) In most countries the top personal income tax rates are higher than the corporate income tax rates.

taxation, most notably the implementation of Pillar 2 in numerous countries worldwide and the anti-tax avoidance directive in the EU Member states. Both changes should contribute to less international corporate tax competition already under separate accounting.[23]) These reduced incentives for international tax competition will also apply under unitary taxation.

2.3.4 Implications of unitary taxation and formula apportionment for wages and employment

There are two important channels how a switch to unitary taxation with formula apportionment can affect the employment and wage outcomes. First, the change in the tax system will change the level of the corporate tax liabilities for the individual firms. Second, the change in the tax system will affect the incentives for individual firms.

Starting with the change in the level of the tax liabilities, the standard economic literature predicts that investment, employment and/or wages will be negatively correlated to a higher corporate tax burden. There are two competing effects of a switch to unitary taxation on the corporate tax liabilities. The implicit introduction of international loss consolidation reduces the tax liabilities, while the elimination of profit shifting opportunities increases the tax liabilities. Under the assumption that the latter effect is dominant, it can be expected that the switch to unitary taxation will imply some downward pressure on investment and employment and/or wages in particular for those firms which are aggressive in their tax planning. To some extent this effect will be mitigated by increased investment and employment and/or wages in firms which were particularly constrained by the lack of international loss consolidation and not aggressive in their tax planning.

The second channel how the switch to unitary taxation will affect employment and wages is through changed incentives. The elimination of profit shifting opportunities and the apportionment based on the factors imply that real activities have a direct impact on the corporate tax burden. Under unitary taxation which includes wages or employment in the apportionment formula there is an incentive to increase (decrease) employment or wages in low- (high-) tax jurisdictions because this will have an impact on the MNE-wide effective tax rate. Standard economic reasoning implies that for any given capital stock (and for given demand situations) an additional worker will have declining marginal output. Therefore, apart from some easily transferable activities, any change in employment implies a deviation from the efficient factor allocation.[24]) As such, there is an economic cost of reallocating employees in order to reduce the effective tax burden of the MNE. Reallocation of both capital investment and employment at the same time in reaction to tax differentials closely resembles the existing tax distortions to investment behaviour under separate accounting.

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[23]) The strength of argument of reduced tax competition because of the implementation of Pillar 2 clearly depends on how many countries implement the policies and how many loophole remain after the implementation in national tax laws.

[24]) In fact, the relative immobility of labour compared to capital is often used as an argument for the inclusion of employment or wages as apportionment factors. The flip side of the coin is that if employment is shifted because of tax reasons, it likely implies welfare losses. There are, however, some activities (e.g. call centres) which arguably can be performed at any location of a MNE group and serve as input for the group overall.

There is limited evidence from existing systems with formula apportionment how the choice of the apportionment factors influences employment and wage outcomes. *Welsch* (2023) examines whether a switch towards sales by destination formula has positive employment effects in export-oriented service sectors and finds a moderately positive employment effect. Since this effect is found to be due to the expansion of employment in these sectors rather than reallocation from neighbouring states, there is no adverse effect on the tax revenues in these states. However, the effect is measured against the other industries in the same US state and therefore it cannot be concluded that formula apportionment by sales by destination implies a generally positive employment effect. This is also consistent with the findings of *Clausing* (2016) who finds no significant impact of the apportionment factors on state wide economic activity.

Hence overall, it can tentatively be concluded that the switch to unitary taxation primarily affects the employment outcomes because of reduced profit shifting opportunities and consequently higher tax burdens. The additional employment effects of an exact choice of the formula apportionment are to a large extent driven by the fact that previous profit shifting activities based on internal transaction now need to be achieved by reallocating real activities. Arguably heavy reliance on payroll and/or employment factors will somewhat increase these effects. That said, none of the existing formula apportionment systems relies primarily on employment-based factors and there is also little economic justification to give employment a significant weight in any formula.[25])

An alternative view on the switch to unitary taxation is that this is effectively combating tax avoidance. As such one would expect a reversal of employment/wage effects of tax avoidance found by *Han et al.* (2021) who show that corporate tax avoidance increases wages of the employees, with the strongest effects for executive employees. Additionally, *Dyreng et al.* (2022) find that in firms with higher corporate tax incidence on shareholders tend to be more aggressive in corporate tax avoidance. In contrast, in the corporate tax incidence literature it is found that corporate tax is disproportionately borne by vulnerable workers.[26]) Following these arguments, the elimination of tax avoidance through internal transactions is therefore expected to reduce wages within previously tax aggressive firms. To which extent this would imply primarily reduced salaries for executive employees or reduced wages for the most vulnerable workers, cannot consistently be answered with the existing empirical evidence.

[25]) The headcount of employees does not tell anything about their contribution to the firms' value creation. To put things into perspective: nobody would argue that the number of machines or the number of sold goods should serve as an apportionment factor.

[26]) Fuest et al. (2021) find evidence for stronger wage effects for younger employees, female employees and blue color workers.

3. Data and Methodology

This section first describes the available data at the different levels of aggregation and then sets out the methodology used to estimate the impact of unitary taxation on the tax base, the allocation of taxation rights, and the resulting tax liabilities of MNE groups.

3.1 Data

3.1.1 Firm-level data (ORBIS)

The main firm-level data source is ORBIS provided by Moodys.[27]) ORBIS is the largest and most comprehensive publicly available firm-level dataset and includes balance sheet information, profit and loss accounts and ownership information for companies worldwide. The information includes both consolidated and unconsolidated accounts. While being the most comprehensive and likely also the most widely used data set ORBIS also has its limitations.[28])

The ORBIS version used for this study is the global dataset as of July 2023. This includes in principle all companies worldwide, however for a substantial number of companies only basic information about the location and no financial accounts are available. For the purposes of this study we download basic ownership information, industry classification and consolidated and unconsolidated accounts. After the identification of relevant parent companies, i.e. corporate global ultimate owners of corporate groups which have subsidiaries in at least two countries, we merge the consolidated accounts of parent companies to the unconsolidated accounts of its subsidiaries.[29]) While the information from the consolidated accounts will not be used in all parts of the analysis, this ensures a consistent data sample.

The financial accounts vary in coverage, but generally for a large number of firms there is information about operating revenues/turnover and tangible fixed assets. In comparison, the information on the number of employees and payroll is incomplete for a large number of the observations. To mitigate the sample attrition, we therefore impute missing values wherever possible.[30])

Additionally, we restrict the sample to large MNEs with a turnover of more than 750 million Euros. This corresponds to the threshold for the CbCR and ensures that the methodological approach based on combining firm-level data with aggregate data is consistent. The resulting data covers 6,648 corporate groups with 111,178 distinct entities. Over the time span 2014 to 2021 a total of 622,190 unconsolidated accounts are used for the analysis.

The dataset covers MNE with headquarters in 79 different countries and subsidiaries in 81 different countries. However, it is worth noting that the dataset is far from representative since

[27]) Previously ORBIS and its European sub database Amadeus were provided by Bureau Van Dijk.

[28]) See *Kalemli-Özcan et al.* (2024) for a detailed description of the representativeness of ORBIS data.

[29]) We use the `guo50c` variable definition of ORBIS which identifies global ultimate corporate owners with more than 50% ownership. The unique BvD identifiers for the merge, see Appendix A.1 for a more detailed description.

[30]) See Appendix A.1 for a description of the data cleaning and the imputation process for missing variables.

important countries are missing. For example, there are hardly any unconsolidated accounts in the US, Canada and Switzerland.

Table 1: **Descriptive statistics unconsolidated ORBIS data**
Dataset after cleaning and extrapolation

Variable	Average	Standard deviation	Minimum	Maximum
Tangible assets	76.14	1025.14	0	161,876.6
Turnover	225.62	1720.94	0	306,692.5
Earnings before interest and taxation	13.59	232.22	-31,369.53	35,809.66
Profit and losses before taxation	17.56	277.94	-49,220.17	41,347.24
Taxation	3.10	73.49	-6,210.59	20,852.9
No. of employees	463.35	3438.28	0	793,462
Cost of employees	18.20	172.63	0	70,805.93
Statutory tax rate	0.26	0.06	0	0.38

Source: Moodys, own data manipulation. 622,190 observations for the time span 2014 to 2021. All values in million Euros, except the number of employees and the statutory tax rate.

3.1.2 Aggregate data

In addition to the firm-level information from ORBIS aggregate data is used in the analysis. This includes the aggregate Country-by-Country reporting (CbCR) data and the foreign affiliate statistics (FATS) both provided by the OECD. Additionally, country-level data about statutory corporate tax rates and other macro information is necessary.

CbCR data

The publicly available CbCR data is only available at the aggregate level.[31]) The information is available at the bilateral level, i.e. by headquarter country and subsidiary country. However, for some headquarter countries the information is further aggregated at continent level. In these cases, we use other macro-level information to estimate a gravity equation and predict the country shares.[32]) The information contained includes the number of corporate groups and entities the aggregated values are based on. Additionally, the aggregation is done separately for corporate groups with positive or negative profits.[33]) The variables included in the CbCR data are tax paid, tax accrued, pre-tax profit and losses, number of employees, assets and revenue split into revenues to related and unrelated parties.[34]) Given that there is no clear mentioning about the reporting of the revenues, it is more likely that the revenues constitute sales by origin.With the latest update of the aggregated CbCR data of 11th of July 2024 the

[31]) OECD (2023)

[32]) See methodology section 0 for a brief description of the estimation of country shares.

[33]) However, this information is only available for some HQ countries. Additionally, the number of large MNEs which are overall loss-making is quite small for some HQ jurisdictions. Therefore, the split by profitable and non-profitable MNEs is not further used in the analysis.

[34]) See OECD (2024a) for a general description and caveats for the latest aggregate CbCR data.

dataset comprises information of large MNEs headquartered in 56 countries. The information is broken down in up to 200 jurisdictions, resulting in 14,974 bilateral observations for the time span 2016 to 2021.

Table 2: **Descriptive statistics aggregated CbCR data**
Dataset before cleaning and extrapolation

Variable	Average	Standard deviation	Minimum	Maximum
Tangible assets	20,794	217,555	-1,511	9,110,000
No. Of employees	85,579	796,926	0	25,400,000
Unrelated party revenues	31,093	319,263	-9,791	13,300,000
Total revenues	44,392	438,977	-8,651	17,700,000
Tax paid	661	6,855	-972	302,000
Tax accrued	647	7,014	-60,221	295,000
Pre-tax profits	3,545	39,495	-314	1,850,000

Source: OECD. 14,974 observations for the time span 2016 to 2021. All values in Mio. USD, except the number of employees. Only the aggregated values for all groups are reported.

Other aggregate data

While the financial accounts in ORBIS contain information about the cost of employees for a large number of firms, the coverage is still far from complete. To fill these gaps information about **wages** is sourced from the International Labour Organisation (ILO).[35]) For the European countries more granular information at the industry level is available from the structural business survey (SBS) provided by Eurostat. For the analysis at the firm-level financial accounts payroll costs are imputed at the most granular level possible. This is the division level in the NACE rev. 2 classification for most industries in Europe and the sector level for agriculture and mining. For the full imputation procedure of payroll costs see also Appendix A.1.2.

The information about the **statutory corporate tax rates** is from the Tax Foundation.[36]) For countries with local profit taxes an average of these local statutory tax rate is included. Special tax regimes with higher (e.g. for oil producing companies) or lower (e.g. reduced rates for income from intellectual property in patent boxes) are not considered because there is insufficient information to split the profits accordingly.[37])

Additionally, the CEPII **gravity dataset** is used for the extrapolation of the bilateral datasets. This dataset includes information about the GDP, the population and the bilateral distances between the countries. We use the World Bank Analytical Classifications[38]) to categorize countries according to income groups.

[35]) Mean nominal monthly earnings of employees by sex and occupation -- Harmonized series.

[36]) https://taxfoundation.org/data/all/global/corporate-tax-rates-by-country-2023/.

[37]) See also the discussion on the use of effective tax rates.

[38]) https://blogs.worldbank.org/en/opendata/new-world-bank-group-country-classifications-income-level-fy24

3.2 Methodology

The description of the methodology starts out with the description of the mechanisms at work and how these could be quantified in an ideal scenario where all the necessary information would be available. This is then contrasted against the approach which is possible with the available firm-level data and the possible methodology based on aggregated data. This highlights that some of the discussed apportionment factors will require data which is not yet available. For example, apportionment by sales by destination requires information which is neither contained in the financial accounts nor in the aggregated country- by-country data. In consequence simulating unitary taxation with apportionment according to sales by destination is only possible in a hybrid approach linking the consolidated financial accounts to additional data sources.

3.2.1 Impact of unitary taxation

Tax liabilities under separate accounting

Consider a MNE group with N legal entities (headquarter or subsidiary) in a number of jurisdictions, which are subscripted with c. It is possible that the number of entities in each jurisdiction - denoted as n_c - ranges between zero up to $N-1$.[39]) Denote the unconsolidated values for the taxable profit as π_i which are subject to the tax rate τ_c under separate accounting. No corporate tax system allows for fully symmetric treatment of losses. Therefore, in the case of negative tax profits the country-specific provisions for loss consolidation, loss carry forward or loss carry backward determine the tax treatment. Absent any provisions the tax base (TB) in a given year t is

(1) $$TB_{it} = \max(\pi_{it}, 0)$$

However, in most countries tax losses can be carried forward to be offset against future tax profits. Therefore, the tax loss of the previous year will be the **loss carry forward** (LCF) in the current year, i.e. $\pi_{it-1} = LCF_{it}$ if $\pi_{it-1} < 0$ and reduce the tax base accordingly

(2) $$TB_{it} = \max(\pi_{it} + LCF_{it}, 0)$$

and the loss carry forward for the next period will be

(3) $$LCF_{it+1} = \min(\pi_{it} + LCF_{t}, 0)$$

which will be relevant in the case of further losses or insufficient taxable profits to offset previous loss-carry forwards.[40]) In cases where losses can be carried back the tax base in a given year can be become negative if the entity had a positive tax base in the previous period. The resulting tax base is then:

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[39]) Per assumption we are only considering MNE groups, i.e. corporate groups with legal entities in at least two jurisdictions. Furthermore, the time subscript for the group variables is dropped because it is outside the scope of this study to model a changing composition of MNE groups.

[40]) This notation follows broadly de *Mooij et al.* (2021).

(4) $$TB_{it}^{LCB} = \min(-TB_{it-1}, \pi_{it})$$

Since losses cannot be offset against taxable profits twice the loss carry forward will be reduced accordingly.

(5) $$LCF_{it+1}^{LCB} = \min(\pi_{it} - TB_{it-1}, 0)$$

The possibility to offset losses against past positive tax profits is only available in few countries and additionally often restricted.[41]) Additionally, the necessary information to model loss carry back is not available. Hence, given its limited relevance, loss carry back is not considered in the modelling of the impact of a switch to formula apportionment.

Of potentially larger relevance is the possibility of **domestic loss consolidation**. In this case, the tax base and loss-carry forward in a jurisdiction c will be based on the sum of the taxable profits over the n_c entities, resulting in the following tax base:

(6) $$TB_{ct}^{lc} = \max\left(\sum_{0}^{n_c} \pi_{it} + LCF_{ct}^{lc}, 0\right)$$

and the loss-carry forward for the next period will be

(7) $$LCF_{ct+1}^{lc} = \min\left(\sum_{0}^{n_c} \pi_{it} + LCF_{ct}^{lc}, 0\right)$$

This implies that the tax base reported in an unconsolidated account of a MNE group can be of limited information if domestic loss consolidation is possible. Depending on the availability of loss carry forward and/or domestic loss consolidation the tax base under separate accounting is either defined in equation (2) at the subsidiary level or in equation (*6)* at the country group level. The tax liability for each subsidiary or country-group is the result of the application of the statutory tax rate τ_{ct} on the tax base:[42])

[41]) For example, loss carry back by one year is possible in Germany but limited to a maximum amount of 1 Mio. Euro. Austria introduced temporary loss carry back in response to the COVID-19 pandemic.

[42]) This simplification abstracts from preferential tax treatment of parts of the tax base (e.g. through reduced rates because of patent boxes) or partial exemption of the tax base (e.g., of dividends received). See the discussion in Information box 1 about different approaches for approximating the applicable tax rate. The main reason of using the statutory tax rate is that this is a tax rate which is actually legally set and therefore applicable in reality. Using a derived ETR might result in more realistic revenue estimates if there is substantial preferential tax treatment, but there is no situation where an effective tax rate is applied to a tax base. Additionally, if there is only limited coverage in the dataset the effective tax rates can lie outside a plausible range, see for example the values in Table A 9.

$$T_{ct}^{SA} = \tau_{ct} \begin{cases} \sum_{0}^{n_c} TB_{it} & without\ domestic\ consolidation \\ TB_{ct}^{lc} & with\ domestic\ loss\ consolidation \end{cases} \tag{8}$$

Tax liabilities under unitary taxation

Under unitary taxation the taxable profits will be consolidated at the MNE level, and any loss carry forward or loss carry backward will also take place at the MNE level.[43])

$$TB_t^{FA} = \max\left(\sum_{0}^{N} \pi_{it} + LCF_t^{FA}, 0\right) \tag{9}$$

and the loss-carry forward for the next period will be

$$LCF_{t+1}^{FA} = \min\left(\sum_{0}^{N} \pi_{it} + LCF_t^{FA}, 0\right) \tag{10}$$

In a next step the overall tax base in equation *(9)* needs to be apportioned to the countries. To this end apportionment factors need to be defined. Denote $\emptyset_{it}$as the amount of the apportionment factor in a subsidiary. Then it is possible to define the share of the tax base apportioned to country c as

$$\Theta_{ct} = \frac{\sum_1^{n_c} \emptyset_{it}}{\sum_1^{N} \emptyset_{it}} \tag{11}$$

In consequence under unitary taxation with formula apportionment the tax liability of a MNE in country c is

$$T_{ct}^{FA} = \tau_{ct} \Theta_{ct} TB_t^{FA} \tag{12}$$

Comparison of tax liabilities under separate accounting and unitary taxation

The switch from separate accounting to unitary taxation will affect the tax burden of MNEs and in consequence also the tax revenues of the countries. Starting with the overall tax base of the MNE it is straightforward to show that the tax base under unitary taxation is often smaller than under separate accounting because of the implicit international loss consolidation.

Unitary taxation implies automatic international loss consolidation, which will decrease the overall corporate tax base.

[43]) It is assumed that loss carry-forward will only be allowed in the case of unitary taxation. Loss carry back in contrast is not modelled.

The extent of this reduction of worldwide tax base because of international loss consolidation depends on the prevalence of losses within MNE groups. If all subsidiaries of a MNE are profitable the overall tax base will not change because of a switch to unitary taxation.[44]) If there are some subsidiaries with losses in an overall profitable MNE group, the calculation of the group wide tax base under unitary taxation will automatically consolidate the losses with the profits. Under separate taxation it is possible that these losses cannot be immediately offset if either domestic loss consolidation is not possible or if the country-group profit of the MNE is negative. In these cases, the MNE-wide tax base under unitary taxation will be smaller than under separate accounting. Hence the business cycle will play an important role, because during recessions the likelihood of losses is higher. Furthermore, it is worth noting that the reduction of the tax base in a given year because of international loss consolidation may imply an increase of the tax base in the following year because the losses are no longer available to be carried forward. In consequence, the switch to a unitary taxation system will likely have an initially higher reduction in the worldwide tax base because of international loss consolidation and the effect will be reduced over time.

The second important consideration is that apportionment is likely to reallocate taxing rights to countries with a different tax rate. Given the evidence of corporate taxation affecting the location, investment and profit shifting decisions of MNEs, the reallocation of tax bases between countries will not be random.[45])

In line with the definition of the share of the apportionment factor in equation (11) it is possible to define the share of tax base under separate accounting in country c as

(13)
$$\Pi_{ct} = \frac{\sum_1^{n_c} TB_{it}}{\sum_1^{N} TB_{it}}$$

The comparison between the share of the tax base (Π_{ct})and the share of the apportionment factor (Θ_{ct}) in any given country will directly inform whether more or less of the tax base will be apportioned to this country.

Formula apportionment will correct for tax-induced profit shifting and reallocate the corporate tax base away from low-tax jurisdictions.

Under the assumption that under separate accounting MNE groups have managed to allocate the tax base disproportionately to countries with a lower tax rate this will result in a reallocation of the tax base back to countries with higher tax rates. This implies that the overall tax liabilities of MNE groups which successfully shift profits to low tax jurisdictions will increase under unitary

[44]) In all likelihood this is a simplifying assumption because the determination of the tax base under unitary taxation needs to be based on an internationally agreed standard. This will imply a departure from the current tax base definitions in the national tax laws. Without any further knowledge about the basis for tax base determination under unitary taxation it is however impossible to quantify the tax base effect.

[45]) For example, see *Feld and Heckemeyer* (2011) for a meta study on tax effects on FDI, *Feld et al.* (2010) for the impact of corporate taxation on financing decisions and *Heckemeyer and Overesch* (2017) for a review of the empirical literature on profit shifting.

taxation. The flip side of the coin is that the tax revenues in low-tax jurisdictions are likely to decrease as a result of a switch to unitary taxation with formula apportionment. Countries with higher tax rates in contrast are likely to experience an increase in tax revenues.

The extent of this reallocation of the tax base depends crucially on the choice of the apportionment factor. The general definition of the apportionment factor $\emptyset_{it}$ can refer to a single factor formula or to a weighted formula. Under the assumption that all countries use the same apportionment factors the weights will always sum up to unity.

3.2.2 Approach based on unconsolidated firm-level information

The starting point of the analysis is the approach based on unconsolidated firm-level information. This approach follows *Devereux and Loretz* (2008b) and is also broadly consistent with the analysis in *de Mooij et al.* (2021).

The information about the tax liabilities in the unconsolidated accounts (TAX_{it}) is the starting point. Per assumption this reflects the tax liabilities under separate accounting. The tax revenue under separate accounting in country *c* is therefore:

$$T_{ct}^{SA} = \sum_{1}^{n_c} TAX_{it} \tag{14}$$

To model the switch to unitary taxation with formula apportionment information about the corporate tax base is needed. While *Devereux and Loretz* (2008b) approximate by dividing the reported tax liabilities through the statutory tax rate, the approach chosen here approximates the tax base via the profit and losses in the financial accounts ($PLBT_{it}$).[46]) Taking the loss carry forward provisions into account leads to the following approximation of the tax base

$$\widehat{TB}_{it} = max\left[PLBT_{it} + \widehat{LCF}_{it-1}^{SA}, 0\right] \tag{15}$$

where

$$\widehat{LCF}_{it}^{SA} = min\left[PLBT_{it} + \widehat{LCF}_{it-1}^{SA}, 0\right] \tag{16}$$

denotes the approximated loss carry forward under separate accounting.[47])

[46]) See Information box 1 for a comparison of the two approaches to approximate the corporate tax base.

[47]) This approach slightly deviates from *Devereux and Loretz* (2008b) which use earnings before interest and taxation to approximate the taxable losses. Furthermore, it is worth noting that in line with the original *Devereux and Loretz* (2008b) approach domestic loss consolidation is not modelled.

Information box 1: Tax base definition and applicable tax rate

The exact corporate tax base under separate accounting is not reported in financial accounts.[1]) It is therefore necessary to approximate the corporate tax base with available information. Broadly, there are three approaches in the literature to this approximation.

- The book-tax difference is ignored and the balance sheet item 'profit and loss before taxation' is used as an approximation for the corporate tax base. To estimate the tax liabilities/revenues an effective tax rate is used. [2])
- The balance sheet item 'profit and loss before taxation' is corrected for exempted income to approximate for the corporate tax base. To estimate the tax liabilities/revenues the statutory corporate tax rate is used. [3])
- The reported corporate tax liability is used to approximate the corporate tax base. To estimate the tax liabilities/revenues the statutory corporate tax rate is used. [4])

Without additional knowledge about the composition of the profit and losses before taxation it is impossible to know whether parts of the profits are exempted or subject to a reduced corporate tax rate. Applying the statutory corporate tax rate to the tax base derived from profit and losses before taxation is therefore likely to overestimate the tax revenues/liabilities. It is however possible to derive an effective tax rate from the reported corporate tax liability and the profit and losses before taxation and use this effective tax rate to estimate the corporate tax revenues/liabilities. An alternative approach is to estimate the exempted parts of the profit and losses before taxation and exclude them from the tax base. To the extent this estimation is correct the application of the statutory corporate tax rate will produce correct estimates for the tax liability. In contrast, if the tax base is approximated directly from the reported tax liabilities the statutory tax rate can be applied because the approximation implicitly accounts for exempted income or preferential tax treatment. However, this approach comes at the cost of an artificial tax base definition which transforms the book-tax differences into rescaled tax bases.

[1]) In the accounting literature this is also discussed as the book-tax difference, see *Hanlon and Shevlin* (2005).
[2]) See *Palanský and Schulz* (2024) for such an approach.
[3]) See *Oestreicher and Koch* (2011) for such an approach.
[4]) See *Devereux and Loretz* (2008b) for such an approach.

The switch to unitary taxation with formula apportionment will affect the overall tax base and the loss carry forward because of the group-wide consolidation. The group wide tax base is

$$\widehat{TB}_t^{FA} = max\left[\sum_1^N PLBT_{it} + LCF_{t-1}^{FA}, 0\right] \tag{17}$$

where the loss carry forward calculated at the group level amounts to

(18) $$\widehat{LCF}_t^{FA} = min\left[\sum_1^N PLBT_{it} + LCF_{t-1}^{FA}, 0\right]$$

The consolidated tax base will be allocated to the countries based on apportionment factors. These are approximated through the corresponding balance sheet items. $ASSETS_{it}$ is the balance sheet item tangible assets, EMP_{it} the number of employees, PAY_{it} the costs of employees, REV_{it} the operating revenues. In addition to the single apportionment factor the share of the adjusted Massachusetts formula of the CCCTB proposal is modelled. Correspondingly, the apportionment factor is

(19) $$\widehat{\Theta}_{ct} = \frac{\sum_1^{n_c} \widehat{\emptyset}_{it}}{\sum_1^N \widehat{\emptyset}_{it}}$$

where $\widehat{\emptyset}_{it}$ is $(\frac{1}{3}ASSETS_{it} + \frac{1}{3}REV_{it} + \frac{1}{6}EMP_{it} + \frac{1}{6}PAY_{it})$, REV_{it}, $ASSETS_{it}$, EMP_{it} or PAY_{it}.

The tax liability in a given country under unitary taxation and formula apportionment is then

(20) $$\widehat{TB}_{ct}^{FA} = \widehat{\Theta}_{ct}\widehat{TB}_t^{FA}$$

The tax liability in a country can be approximated by the multiplication of the allocated tax base with the statutory tax rate τ_{ct}.

(21) $$\hat{T}_{ct}^{FA} = \tau_{ct}\widehat{TB}_{ct}^{FA}$$

Following the discussion in the Information box 1, this is likely to overestimate the tax liabilities. However, if one compares the simulated tax revenues in equation (21) to the simulated tax revenues under separate accounting ($\sum_1^{n_c} \tau_{ct}\widehat{TB}_{it}$) rather than to the aggregated tax liabilities in equation (14) the bias should largely cancel out.

3.2.3 Approach based on aggregate CbCR data

The information contained in the aggregated CbCR data can be used to approximate the revenue consequences of a switch to unitary taxation. The information contained in the aggregated data is at the bilateral level, i.e. the sums for MNEs headquartered in country c by subsidiary countries j.[48]) For some headquarter countries the information is even further aggregated, in which case we use a gravity estimation to break down the apportionment factors to subsidiary countries (see Information box 2).

[48]) The term 'subsidiary' is used here despite the fact that this also includes the activities in the headquarter countries, i.e. domestic subsidiaries and the headquarter.

Information box 2: Estimation of distribution of apportionment factors

For several headquarter countries the information about activities in the subsidiaries is only available for selected countries or at continent level. In these cases, the existing information is used to calculate shares of apportionment factors, taxes paid and profit and losses. For the apportionment factors we replace negative values with zeros, while for tax paid and profit and losses negative values are kept. These are then matched on the CEPII gravity data and information about the statutory corporate tax rates.[1]) Subsequently a gravity equation using GDP, population and statutory tax rates of headquarter and subsidiary country, the bilateral distance and a dummy for domestic shares is estimated. The estimated shares are then reweighted by the information available from the CbCR data to ensure that the sum of the apportionment sums to unity.[2])

[1]) See *Conte et al.* (2023) for a description of the dataset.
[2]) Negative estimates are set to zero.

In a first step the tax revenues under separate reporting are approximated by the sum of tax paid in each subsidiary country j.

(22) $$\hat{T}_{jt}^{SA} = \sum_{1}^{C} \widehat{TAX\_PAID}_{jct}$$

where C denotes the number of headquarter countries in the dataset.[49]) The corresponding tax base in country j under separate accounting can be defined analogously

(23) $$\widehat{TB}_{jt}^{SA} = \sum_{1}^{C} \widehat{PLBT}_{jct}$$

Based on the tax paid and the tax base it is possible derive an effective tax rate as

(24) $$\widehat{ETR}_{jt}^{SA} = \frac{\hat{T}_{jt}^{SA}}{\widehat{TB}_{jt}^{SA}}$$

Under unitary taxation with formula apportionment the tax base is approximated with the profit and loss reported by the MNEs headquartered in country c, summed over all subsidiaries in countries j

(25) $$\widehat{TB}_{ct}^{FA} = \sum_{1}^{J} TAX\_PAID_{jct}$$

This tax base is then apportioned to the countries according to the share of the apportionment factors in each country j

[49]) Note that we denote $\widehat{TAX\_PAID}_{jct}$ with hat because the values for this variable are partially estimated.

(26) $$\widehat{\Theta}_{jt} = \frac{\widehat{\emptyset}_{jct}}{\sum_1^J \widehat{\emptyset}_{jct}}$$

and the tax base in country j is

(27) $$\widehat{TB}_{jt}^{FA} = \sum_1^C \widehat{\Theta}_{jt}\, \widehat{TB}_{ct}^{FA}$$

To arrive at an estimate of the tax liabilities under unitary taxation and formula apportionment it is necessary to apply a tax rate in country j. Following the discussion in Information box 1 it is possible to use either the statutory tax rate or an effective tax rate as defined in equation *(24)*. Generally denoting the tax rate in country j as $\hat{t}_{jt}$ the tax revenues under unitary taxation with formula apportionment can be written as:

(28) $$\hat{T}_{jt}^{FA} = \hat{t}_{jt}\widehat{TB}_{jt}^{FA}$$

Given that the information included in the aggregate CbCR data is increasing over time, and the information in a given year might be compromised by external shocks like the COVID-19 pandemic, the approach outlined here is also executed with the aggregated CbCR data averaged over time.

3.2.4 Hybrid approaches based on firm-level and aggregate CbCR data

The approach based on unconsolidated accounts will produce biased results if the information is missing on a non-random basis. Additionally, the unconsolidated accounts include intra-firm transactions and therefore are not fully informative about the distribution of revenue-based apportionment factors. The approach based on aggregate data in contrast does not allow for an estimate of the tax base reduction because of implicit international loss consolidation. Additionally, the fact that for a substantial number of countries the aggregate information is only available for country groups implies that the distribution of the taxable profit and the apportionment factors need to be estimated which can lead to imprecise results. Furthermore, the aggregate information does not allow for a firm-level analysis. Whether all MNEs see a moderate change to their tax liabilities or a few MNEs see substantial changes to their tax liabilities will have very different implications.

To overcome some of these shortcomings it is possible to combine information from ORBIS with the information from the aggregate CbCR report. There are different levels of complexity to combine the information. Starting point is to use the firm-level information about profit and losses before taxation at the consolidated level to approximate the MNE-level tax base,

(29) $$\widehat{TB}_{gt}^{FA} = max\left[PLBT_{gt} + \widehat{LCF}_{gt-1}^{FA}, 0\right]$$

where $\widehat{LCF}_{gt}^{FA}$ describes the loss carry forward at the MNE level

(30) $$\widehat{LCF}_{gt}^{FA} = min\left[PLBT_{gt} + \widehat{LCF}_{gt-1}^{SA}, 0\right]$$

and g indexes the corporate group.

In the simplest hybrid approach the MNE group level information is combined with the estimated shares of the apportionment factors from the aggregated CbCR data as specified in equation (26). Denote the number of MNEs in scope of unitary taxation as G the tax base in country j can be approximated as

(31) $$\widehat{TB}_{jt}^{FA} = \sum_{1}^{G} \widehat{\Theta}_{jt} \widehat{TB}_{gt}^{FA}$$

Additionally, the information about the location of the subsidiaries can be used. Define a dummy variable $\hat{\delta}_j$ denoting the presence in a country and reweight the share of the apportionment factors to maintain that the sum is unity the estimation can be adjusted to

(32) $$\widehat{TB}'^{FA}_{jt} = \sum_{1}^{G} \hat{\delta}_j \widehat{\Theta}'_{jt} \widehat{TB}_{gt}^{FA}$$

One complication of the hybrid approach is that there is no straightforward comparison of tax base distribution or tax liabilities under separate accounting. The sum of the unconsolidated tax liability or the approximated tax base as defined in equations (14) and (15) can serve as a benchmark, but is potentially misleading if the unconsolidated accounts are only incomplete.

One additional reason for a hybrid approach based on firm-level data in combination with aggregate data is that there is no readily available information about firm-level sales by destination. The information in the firm financial accounts reflects sales by origin and includes intragroup sales. As such this is not a very precise approximation of the potential apportionment factor sales by destination to unrelated parties. The aggregate information contained in the CbCR data does distinguish between total revenues and revenues from sales to unrelated parties. However, since there is no information that this variable measures sales by destination, it is more likely that firms report sales by origin as this is standardly reported.

The *OECD* (2020) and *Barake and Pouhaër* (2023) investigate the potential impact of Pillar 1 and approximate sales by destination based on the analytical Activities of MNEs (AMNE) database provided by the OECD. Based on the aggregated industry-level information of output and exports of domestically and foreign owned MNEs sales by destination are approximated.

Information box 3: Approximation of sales by destination

Following the *OECD* (2020) sales by destination are approximated by an 'output minus exports' approach at the sector level. For the headquarter country the output less exports of the domestically owned MNEs is used, while for the subsidiary countries we use the output minus exports of the foreign owned MNEs. The latest version of the analytical AMNE database contains information for 41 industries and 76 countries plus a rest of the world region over the period 2000-2019. For the remaining countries we split the values for the rest of the world region according to the estimates of a gravity equation based on the CEPII gravity data and information about the statutory corporate tax rates.[2]) The estimated sales are then reweighted by the information available from the analytical AMNE data to ensure that the sum of the rest of the world is met.

Once the sales by destinations for each headquarter country-industry combination are approximated we match the data on the ownership structure of our ORBIS dataset and only keep the sales in jurisdictions where the MNE has some presence. [3]) The sales by destination shares are then reweighted to ensure that the sum of the apportionment factor is unity.

As an alternative the nexus is completely ignored, and taxing rights are allocated to all countries whenever the estimated sales by destinations are positive. In this case no reweighting is necessary.

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[1]) https://www.oecd.org/en/data/datasets/multinational-enterprises-and-global-value-chains.html.
[2]) GDP, population and statutory tax rates of headquarter and subsidiary country, the bilateral distance and a dummy for domestic shares are used as predictors.
[3]) This model a throwback rule in the case of no nexus. Absent any knowledge of detailed information about activities which can result in a nexus in a jurisdiction the existence of a subsidiary or branch is used to approximate the nexus.

4. Results

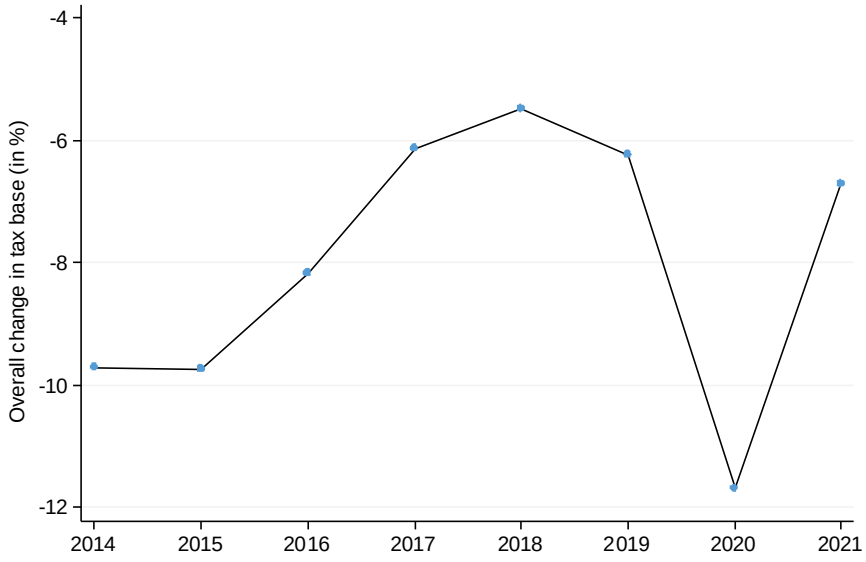
Given the fact that there is no existing policy proposal for unitary taxation and formula apportionment there is also no common agreement on the factor(s) used in the formula apportionment. Therefore, the analysis in this study is repeated for a number of potential apportionment formulas. Together with the fact that there are several different empirical approaches to estimate the impact of a switch to unitary taxation this results in a multitude of possible ways to present the results. In consequence, the only overviews of the results are presented in the main text, while more tables with more detailed country results are presented in Appendix A.2. Given that there are three different methodological approaches based on different data sources a final comparison section aims to highlight the most relevant and consistent patterns emerging.

4.1 Analysis based on unconsolidated ORBIS data

4.1.1 Impact of international loss consolidation

The first step of unitary taxation is to calculate the corporate tax base at the corporate group level. This implies international loss consolidation for MNEs which are overall profitable, but incurring losses in some countries. This is in contrast to the current practice of separate accounting, where losses in some countries can only be carried forward against future profits in these countries. To get an impression of the extent of the tax base reduction through this implicit international loss consolidation Figure 1 plots the change in the overall tax base resulting from a switch to unitary taxation for our sample.

Figure 1: **Tax base reduction because of international loss consolidation 2014-2021**
Based on unconsolidated ORBIS data



Source: Moodys, own estimation.

The initial drop of the tax base is close to 10%. However, after a few years the tax base reduction is getting progressively smaller and reduces to approximately 6%. The COVID-19 pandemic and its economic consequences then dramatically increase the prevalence of losses in our sample and correspondingly the impact of loss consolidation.

International loss consolidation will reduce the overall tax base under unitary taxation. Initially and during economic crises the extent of the tax base reduction will be larger, but likely still below the 10% reduction found in the literature.

Overall, the results show that the impact of loss consolidation is less than the approximately 10% reduction found in the literature, which is likely due to the restriction of the sample to the largest MNEs. The finding that the loss consolidation is more relevant during economic crisis is in line with the insurance argument of *Gérard and Weiner* (2003).

4.1.2 Changes to the distribution of the tax base

Formula apportionment will result in a redistribution of the corporate tax base because of two linked and partially inseparable reasons. First, formula apportionment will correct for tax-induced profit shifting. Second, formula apportionment will also redistribute away from countries with higher labour or capital productivity to countries with less labour or capital productivity. The latter is due to the fact that production factors which are used as apportionment factors will inevitably vary in their contribution to the corporate tax base across countries.

To focus on the impact of the profit shifting correction rather than the effects of different productivity of the apportionment factors the results for a weighted formula are shown first. Therefore, Figure 2 first shows the overall tax base redistribution by countries because of formula apportionment based on the CCCTB formula.[50]) Out of the 40 countries with a sufficiently large coverage[51]), the following nine countries see a tax base reduction in all years: Luxembourg, the Netherlands, Denmark, Sweden, Norway, Japan, Taiwan, Finland and Germany. At the other end of the spectrum there are 16 countries which see an increase in the tax base in all years, namely Italy, India, Greece, Czechia, Slovenia, Poland, Croatia, Slovakia, New Zealand, Romania, Latvia, Estonia, Serbia, Bulgaria, Ukraine and Bosnia and Herzegovina.

The analysis on unconsolidated ORBIS data finds clear redistribution of tax base away from the investment hubs Luxembourg and the Netherlands towards Eastern European countries.

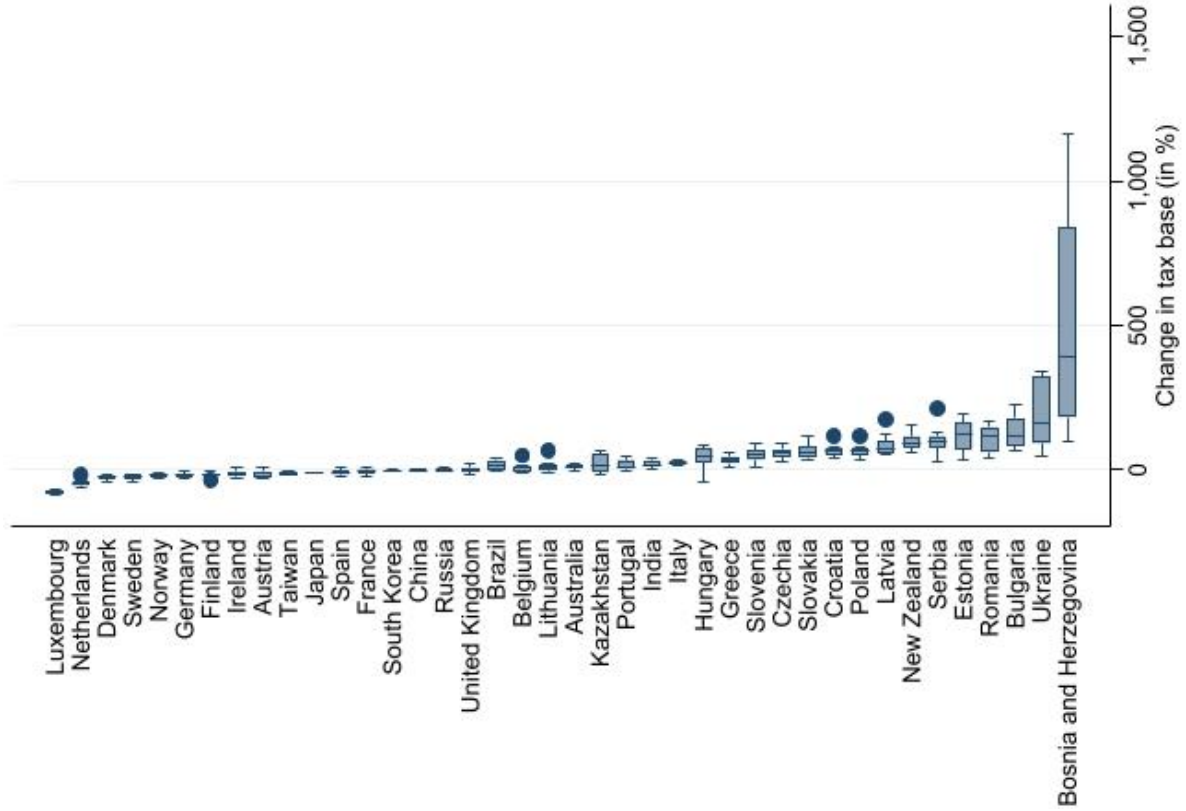
A first broader picture thus emerges from these results. The biggest tax base losses are by far recorded in the investment hubs Luxembourg and the Netherlands, while by and large Eastern European countries tend to see more tax base allocated to them. This shift of tax base away

[50]) The 'CCCTB formula' refers to the adjusted Massachusetts formula with 1/3 assets, 1/3 sales and 1/6 number of employees and 1/6 costs of employees.

[51]) A threshold of at least 50 entities is used as criterion for a 'sufficient' number of observations here. While this might be insufficient to completely rule out the impact of single large companies, this should at least reduce the impact of single observations.

from investment hubs is in line with previous findings and consistent with the notion that unitary taxation will correct for profit shifting. However, there are aspects which indicate that a future introduction of unitary taxation will result in less redistribution of tax base. In recent years the anti-avoidance directive has been implemented in the EU Member States which should already reduce the extent of profit shifting and in consequence the redistribution of corporate tax base because on an introduction of unitary taxation.

Figure 2: **Overall tax base redistribution because of unitary taxation, 2014-2021**
Based on unconsolidated ORBIS data, formula apportionment by CCCTB formula

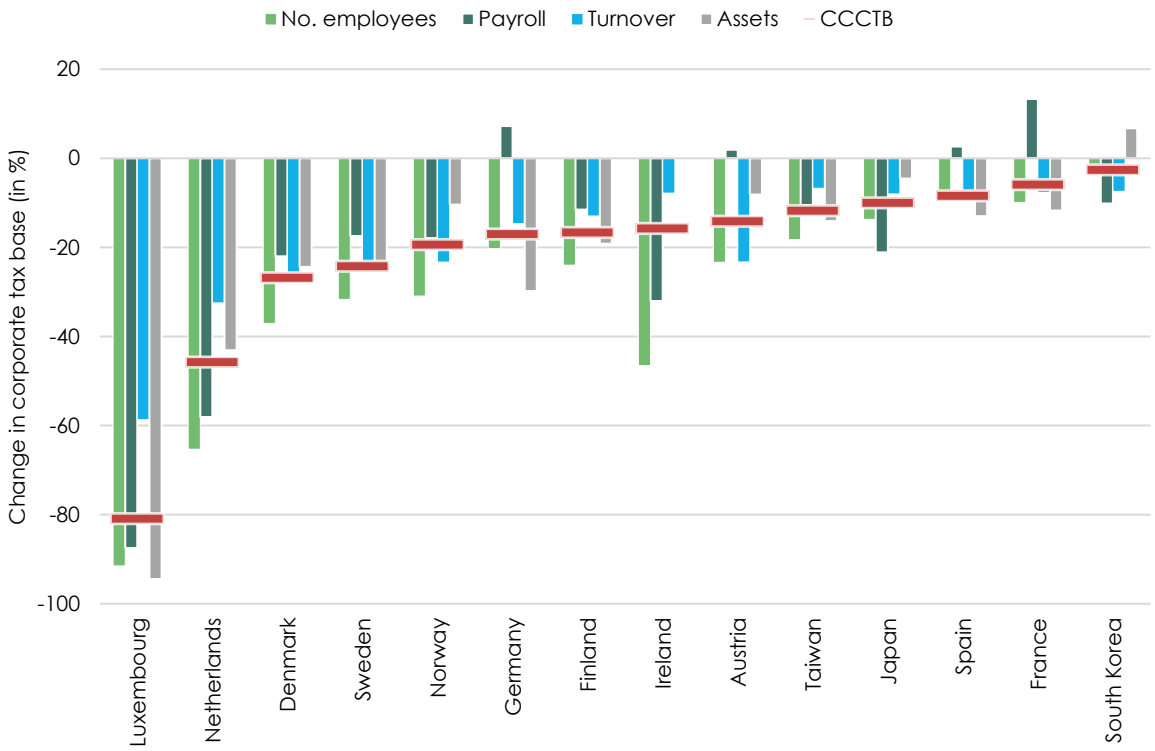


Source: Moodys, own estimation.

Figure 3, Figure 4 and Figure 5 aggregate over the full time period and compare the impact of the choice of the apportionment factor on the tax base redistribution.[52])

[52]) See Table A 3 for detailed tax base results for individual apportionment factors and Table A 4 for the detailed results for the weighted formulas.

Figure 3: **Change in corporate tax base, by apportionment factors (1/3)**
Based on unconsolidated ORBIS data, aggregates over 2014 to 2021



Source: Moody's, own estimation.

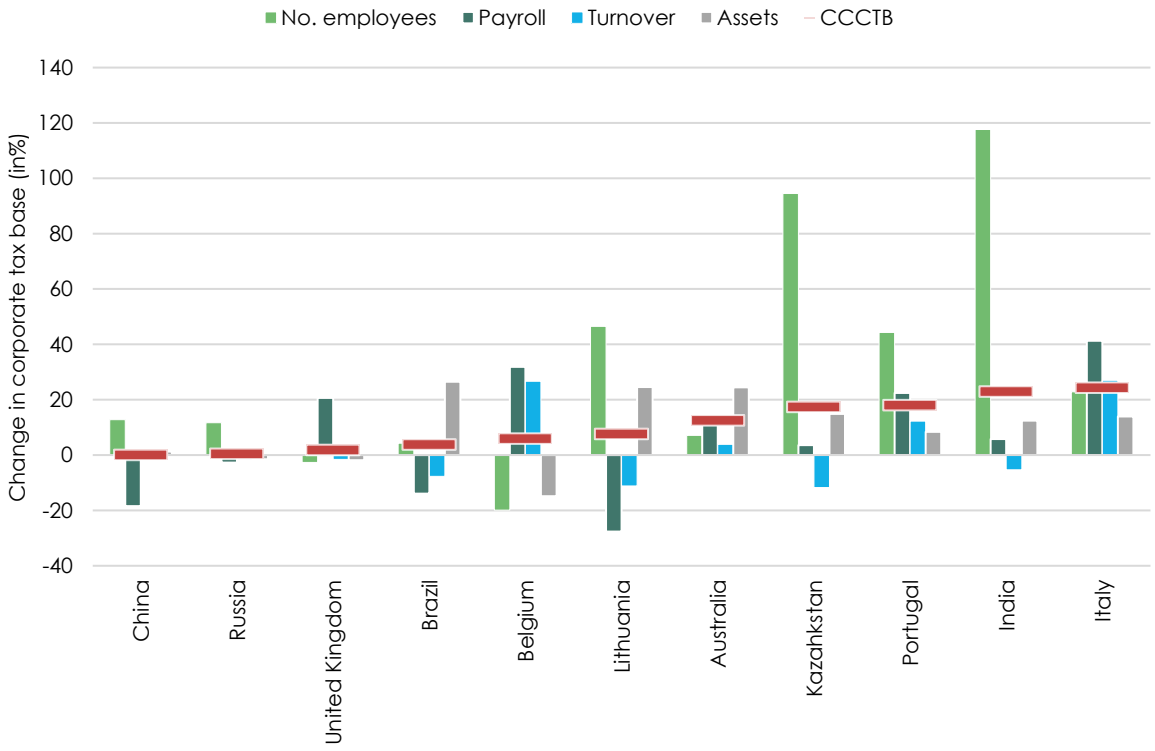
Starting with the countries which are losing tax base under formulary apportionment based on the CCCTB formula in Figure 3, Figure 4 presents the results for the countries where the CCCTB formula would result in a moderate tax base increase while Figure 5 shows the results for those countries where the tax base would substantially increase with the CCCTB formula.

Formula apportionment based on number of employees leads to substantially larger tax base reallocation.

There are a number of clear patterns visible in these three graphs. First, there is the confirmation that the Netherlands and Luxembourg would see a large share of the tax base reallocated away regardless the choice of the apportionment factor. This reflects the disproportionate share of profits located in these investment hubs. Second, apportionment according to number of employees tends to imply the largest redistribution of tax base. This is in stark contrast to the results for the formula based on payroll. For several countries the results reverse if instead of the number of employees the costs of employees are used as apportionment factor. There

appears to be a pattern in these countries, namely that the countries are both high wage countries and countries with a large tax wedge on personal income.[53])

Figure 4: **Change in corporate tax base, by apportionment factors (2/3)**
Based on unconsolidated ORBIS data, aggregates over 2014 to 2021



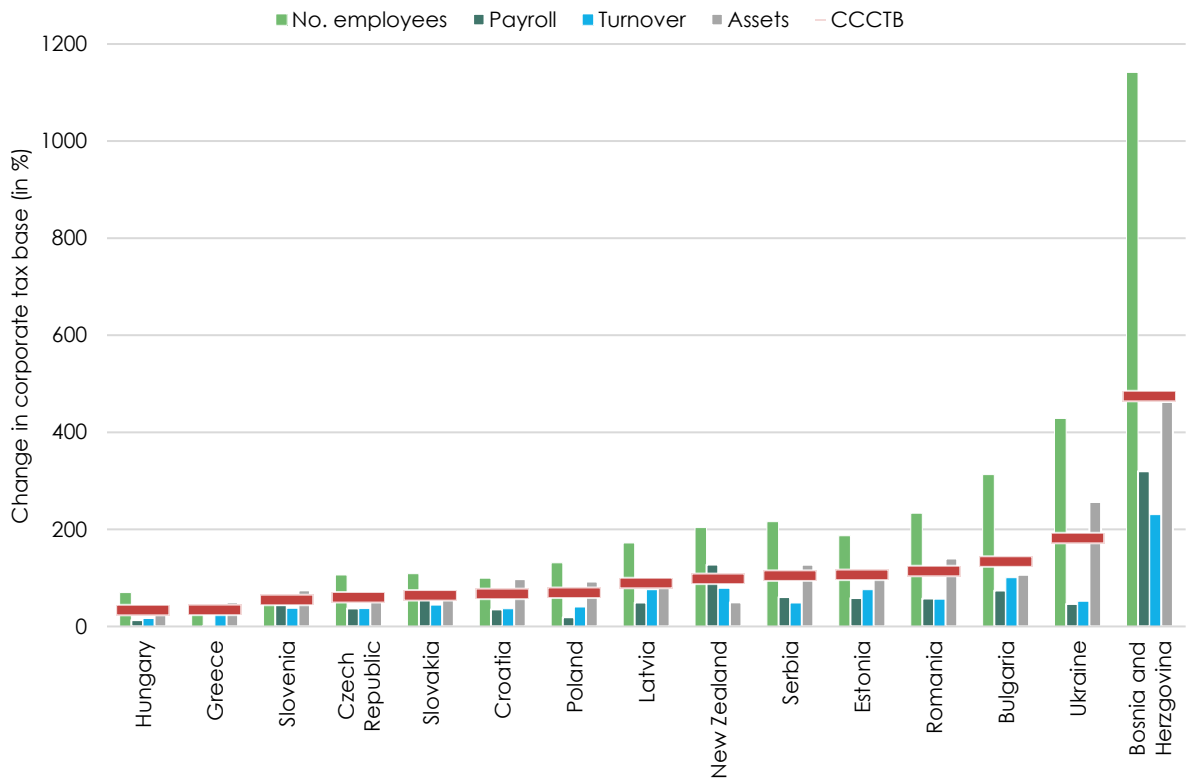
Source: Moody's, own estimation.

Figure 5 shows the countries with the biggest tax base increases. However, there is the caveat that for some of the countries, most notably for Bosnia and Herzegovina, the strong tax base increase is mainly due a small baseline tax base under separate accounting.[54]) Looking at these countries which gain relatively most tax base under unitary taxation with formula apportionment there is also clear pattern. Eastern European countries would see much more tax base allocated to them if the number of employees is used as apportionment factor. Using tangible assets as apportionment factor is also resulting in relatively strong tax base redistribution, whereas the use of payroll or sales would only imply a more moderate tax base redistribution.

[53]) Belgium, Austria, France, and Germany are the 4 countries with the highest tax wedge in 2023 according to the OECD (2024b).

[54]) See Table A 3 for the detailed results.

Figure 5: **Change in corporate tax base, by apportionment factors (3/3)**
Based on unconsolidated ORBIS data, aggregates over 2014 to 2021



Source: Moody's, own estimation.

4.1.3 Changes to the tax liabilities

The reallocation of the corporate tax base implies also a change in corporate tax liabilities. The exact extent of this change is largely depending on the assumption about the applicable tax rate. In line with *Devereux and Loretz* (2008b) the statutory tax rate is used to approximate the change in the tax liabilities.[55]) However, given that the tax base is directly approximated through the profit and losses before taxation rather than indirectly through the tax liabilities, there is a less clear comparison to the tax liabilities under separate accounting.

The simulation of unitary taxation with formula apportionment does not allow for tax refunds or loss-carry back. In consequence no negative tax liabilities are modelled while there are substantial negative tax liabilities in the unconsolidated accounts. A simple comparison between the modelled tax liabilities and the tax liabilities would therefore indicate an overall increase in the tax liabilities of more than 50%. Table 3 therefore first compares the sum of the reported tax liabilities in the unconsolidated accounts with modelled tax revenues under separate accounting. This step eliminates negative tax liabilities by nationally consolidating the tax base.

[55]) See Table A 9 for the statutory tax rates used in the analysis.

Table 3: **Tax revenue effects modelled with unconsolidated ORBIS data 2014-2021**

	Tax revenues (in bn. Euros)				
			Unitary taxation with CCCTB formula		
Country	Tax liabilities unconsolidated accounts	Separate accounting modelled	Statutory tax rate	Effective tax rate	Statutory with 25% GLoBE
Bosnia and Herzegovina	0.1	0.1	0.4	0.4	1.0
Latvia	0.2	0.6	1.1	0.5	1.5
Estonia	0.3	0.6	1.3	0.7	1.6
Kazakhstan	0.6	6.0	7.1	3.4	8.8
Bulgaria	0.7	0.7	1.6	1.9	4.0
Slovenia	0.8	1.1	1.7	1.4	2.3
Serbia	0.9	1.2	2.4	2.3	4.0
Lithuania	1.0	1.7	1.8	1.1	3.0
New Zealand	1.1	1.8	3.6	4.0	3.6
Croatia	1.5	1.9	3.1	2.8	4.2
Ukraine	2.9	2.9	8.1	9.6	11.3
Greece	3.5	4.4	5.8	7.0	5.9
Austria	4.7	20.4	17.5	5.8	17.5
Hungary	5.3	7.7	9.2	8.3	19.2
Romania	5.4	5.6	12.0	14.1	18.7
Slovakia	6.6	7.0	11.4	11.4	13.4
Portugal	8.8	19.0	22.5	12.9	22.5
Czechia	12.1	14.5	23.2	21.2	30.5
Brazil	12.8	23.5	24.3	17.2	24.3
Finland	14.2	24.7	20.6	16.4	25.8
Russia	19.9	140.3	140.9	60.6	176.1
Poland	20.0	24.3	41.2	44.7	54.1
Belgium	26.4	76.6	80.9	32.6	80.9
Sweden	30.5	72.9	55.1	26.4	63.9
Denmark	30.5	53.0	38.8	24.1	43.4
Ireland	33.7	47.9	40.3	40.5	80.7
Taiwan	40.0	66.7	59.0	36.1	78.3
India	41.2	60.0	73.3	76.0	73.3
Netherlands	41.7	89.3	48.4	24.5	48.4
Spain	44.6	144.9	132.2	52.8	132.2
France	69.7	319.0	298.4	87.3	298.4
Italy	70.0	114.4	142.2	117.8	142.2
United Kingdom	77.6	192.4	195.4	119.4	252.0
Norway	95.0	77.9	62.8	80.5	67.3
Germany	118.9	261.5	217.0	123.6	217.0
Luxembourg	137.7	160.7	30.9	30.7	30.9
South Korea	156.2	196.7	191.7	180.3	194.4
China	156.9	204.4	204.5	166.2	204.5
Australia	190.7	202.5	227.8	255.4	227.8
Japan	431.6	639.4	575.7	404.2	575.7
Sum	**1,916.2**	**3,289.8**	**3,035.2**	**2,125.7**	**3,264.7**

Source: Moody's, own calculation

Furthermore, the strict application of the statutory tax rate eliminates reductions in the tax liabilities because of exempted income or preferential rates. As such the simulated tax burden under separate accounting overestimates the tax liabilities but is a fair comparison to the modelled tax liabilities under formula apportionment in the third column of Table 3. Following the discussion in Information box 1 the fourth column in Table 3 shows the estimated tax revenues based on the effective tax rates in the respective jurisdictions. (See Information box 4 for the exact derivation of effective tax rates.) This allows a comparison between the tax revenues under the current system in column one in principle, although one needs to keep in mind that this still does not allow for negative tax liabilities under the simulated unitary taxation approach.

Information box 4: Derivation of effective tax rates

The application of the statutory tax rate may result in distorted estimates of potential tax revenues if substantial parts of the pre-tax profits are subject to a preferential tax treatment or fully exempted. Furthermore, the tax treatment of losses (i.e. losses are carried forward and do not result in immediate tax refunds) also results in situations where the statutory tax rate is not applicable. An alternative approach is to use backward-looking effective tax rates which are derived from observed tax liabilities and pre-tax profits.[1]) By and large preferential tax treatments and exemptions should result in an effective tax rate below the statutory tax rate, while non-taxation of losses and loss-carry forwards can result lower or higher effective tax rates depending on the exact definition.[2]) This results in a situation where the resulting backward-looking effective tax rates can lies outside a realistic range if the loss making firms dominate. The approach to derive the effective tax rates for the simulation therefore rules out extreme values for the effective tax rate.

Starting point is the weighted average of the ratio between taxes paid in a jurisdiction and the pre-tax profit in the jurisdiction.[3]) Based on the aggregated CbCR data the effective tax rate is therefore defined as:

$$ETR_{ct} = \frac{\widehat{TAX\_PAID}_{jct}}{\sum_1^C \widehat{PLBT}_{jct}}$$

This effective tax rate is not used whenever it is higher than the statutory tax rate or below zero. In these instances, the statutory tax rate τ_{ct} is used. This reflects the interpretation that primarily the presence of substantial losses is resulting in effective tax rates outside the range of zero and τ_{ct}.

[1]) The terminology 'backward-looking' is used for effective tax rate which are derived from realised outcomes in the past.
[2]) Unweighted averages of effective tax rates tend to be lowered in the presence of losses, while weighted averages tend to be increased.
[3]) Table A 9 shows both the weighted and unweighted averages.

The comparison between the second and third column shows a marked increase in tax revenues in Poland and Italy, while there is a strong decline in Japan, Germany, Luxembourg and

the Netherlands.[56]) Overall, the tax liabilities/revenues are moderately decreasing by 7.7% from 3,289.8 to 3,035.2 bn. Euros. This is broadly in line with the overall tax base reduction found. This result is driven by the fact that the statutory tax rate is used to model the tax revenues under separate accounting, which implies a substantial increase of the tax liabilities compared to the reported tax liabilities in the unconsolidated accounts.

There are further limitations in the analysis based on the unconsolidated ORBIS data. The strong bias in the coverage towards European countries and a distinct lack of unconsolidated accounts from low-tax jurisdictions results in a situation where Eastern European countries emerge as the country group which gain most tax base and consequently also tax revenues. Since the Eastern European countries tend to levy moderate statutory tax rates the overall tax revenue effect is dominated by the tax base reduction because of international loss consolidation.

The simulation based on effective tax rates produces somewhat different results with an overall increase of tax liabilities/revenues of 10.9% from 1,916.2 to 2,125.7 bn. Euros.[57]) The pattern of countries losing tax revenues is similar with Norway, the Netherlands, Japan and Luxembourg. Likewise, the pattern of winning countries is similar with Australia, Italy, the United Kingdom and Russia emerging as the biggest winners in absolute values.

The last column in Table 3 shows the simulated tax revenues/liabilities if in addition to the switch to unitary taxation a global minimum income tax rate of 25% is applied.[58]) This results in an increase of 7.6 % compared to the simulation without the global minimum income tax rate.[59]) For countries with high statutory tax rates (Luxembourg, Germany and Japan) this would not change the reduction in tax revenues. In contrast, there are now larger absolute increases in tax revenues now found in the United Kingdom, Russia and Ireland which is primarily due to the substantially higher tax rate applied in these countries in this simulation.

For a subsample which mainly consists of European countries, the result of increasing tax revenues therefore crucially hinges on the assumptions about the tax rate applied to the apportioned profits and the absence of negative tax liabilities. Applying the statutory tax rate to all apportioned profits would imply a significant increase compared to the observed tax revenues but a reduction compared to the simulated tax revenues. In contrast, using the effective tax rates for the simulation, both the overall tax revenues increase and the number of countries which see an increase in tax liabilities increases. This reflects that the tax base reallocation is by and large from lower tax jurisdictions towards countries with a higher (effective) tax rate. Finally, the simulation with the statutory tax rate in combination with a 25% global minimum tax further increases the tax revenues and leaves some initially low tax countries (e.g. Ireland) with higher tax revenues in comparison to the status quo. Hence, whether the tax revenues increase or

[56]) Measured in absolute values, these countries lose more than 40 bn. Euros. In relative terms, the biggest losses (more than 20%) are recorded in Sweden, Denmark, Netherlands and Luxembourg.

[57]) Visible in Table 3 between a comparison between the first and the fourth column.

[58]) The use of a 25% global minimum tax rate is mainly for illustrative purposes. We use 25% mainly because a 15% global minimum tax would be relevant for only a few countries. The implementation is simply the use of the maximum of the statutory tax rate or the assumed global minimum tax to tax the allocated tax base.

[59]) Visible in Table 3 between a comparison between the fourth and the fifth column. Compared to the simulate tax revenues under separate accounting this represents a very modest decrease in tax liabilities of -0.8%

decrease crucially depends on the assumption about the tax rate applied to the apportioned tax base.

Comparing the tax liabilities at the MNE group level the same caveats apply. The modelling of unitary taxation does not allow for negative tax liabilities. Therefore, the comparison to the sum of the unconsolidated tax liabilities with negative values is overestimating the number of MNE groups which would see a tax increase because of a switch to unitary taxation. In our sample more than 70% of MNE groups see an increase in the tax liabilities if the modelled tax liability under formula apportionment is compared to the sum of the reported tax liabilities.[60]) In contrast, if the tax liabilities under unitary taxation and formula apportionment are compared to the modelled separate accounting tax liabilities only approximately 1/7 of the MNE groups see an increase in the tax burden.[61])

The simulation with the statutory tax rate in combination with the global minimum tax of 25% substantially increases the number of MNE groups which would face a higher tax burden. Roughly 1/3 of the MNE groups in our dataset would see an increase in their tax liabilities, even after accounting for the negative reported tax liabilities in the unconsolidated accounts.

[60]) E.g. for the CCCTB formula 4,764 out of 6,648 MNEs have larger modelled tax liabilities.

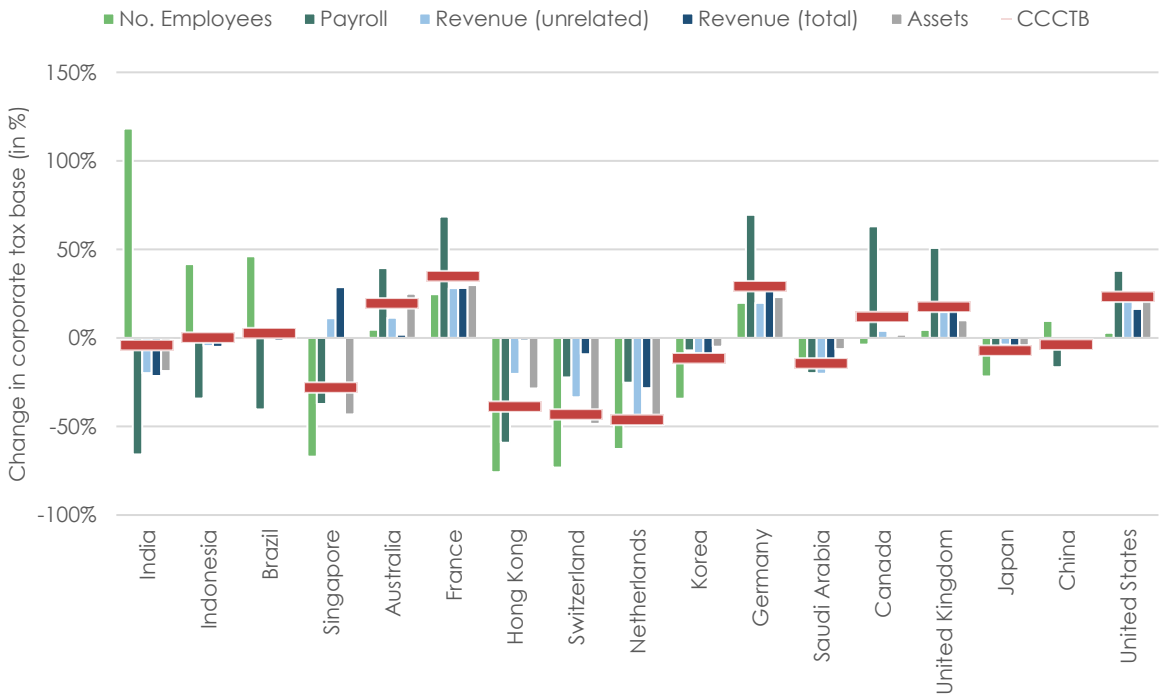
[61]) E.g. for the CCCTB formula 899 out of 6,648 MNEs have larger modelled tax liabilities.

4.2 Analysis based on aggregate CbCR data

4.2.1 Changes to the distribution of the tax base

Based on the aggregated CbCR data the change in corporate tax base for almost all countries in the world is estimated. While the aggregated CbCR is only available for 56 headquarter countries, the detailed breakdown by jurisdiction allows to estimate the tax base effect for 225 jurisdictions. Table A 5 and Table A 6 in the appendix show the detailed results for all countries, sorted by the estimated tax base under separate accounting. For some jurisdictions, the overall estimated tax base under separate accounting is negative, indicating that the aggregated CbCR data is dominated by large loss making MNEs. While for some smaller jurisdictions this could be an artefact from the estimated share of the profits and losses, this is directly due to the large negative values reported for other countries. Most notably, there are large overall losses reported in Luxembourg.[62])

Figure 6: **Change in tax base, by apportionment factors, largest absolute tax bases**
Based on aggregated CbCR data, sums 2016 to 2021



Source: OECD, own estimation.

[62]) The large negative values for profits are not due to the modelling of the loss carry forward at the group level. Table A **7** and Table A **8** report the results for a cross-sectional analysis of the aggregated CbCR data, where no loss carry forward is modelled, but rather the sums over the time period 2016 to 2021 are used for the analysis.

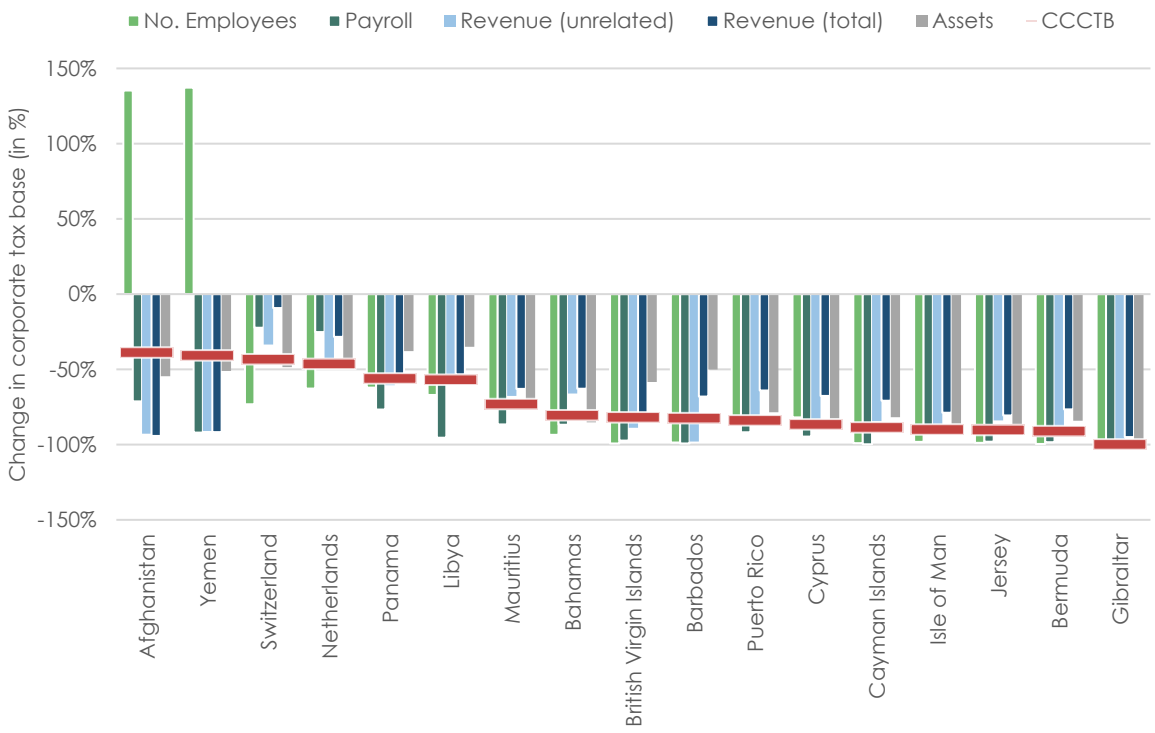
Figure 6 therefore only reports the changes in the corporate tax base for the jurisdictions with the largest absolute values of tax base under separate accounting.[63])

Out of the largest countries, the United States, the United Kingdom, Germany, France and Australia all emerge as gaining corporate tax base through a shift to unitary taxation with formula apportionment. In contrast, Hongkong, the Netherlands and Switzerland, South Korea and Saudi Arabia see a reduction of the corporate tax base regardless of the choice of the apportionment factor.

The second observation is that using the number of employees will see a large shift of the corporate tax base towards countries with low wages, most notably India, Indonesia and Brazil. In contrast, using the cost of employees as apportionment factor will allocate substantially more tax base to France, Germany, Canada and the United Kingdom.

Figure 7 shows the tax base changes for the jurisdictions with the largest relative losses.[64])

Figure 7: **Change in corporate tax base, by apportionment factors, largest relative losses**
Based on aggregated CbCR data, sums 2016 to 2021



Source: OECD, own estimation.

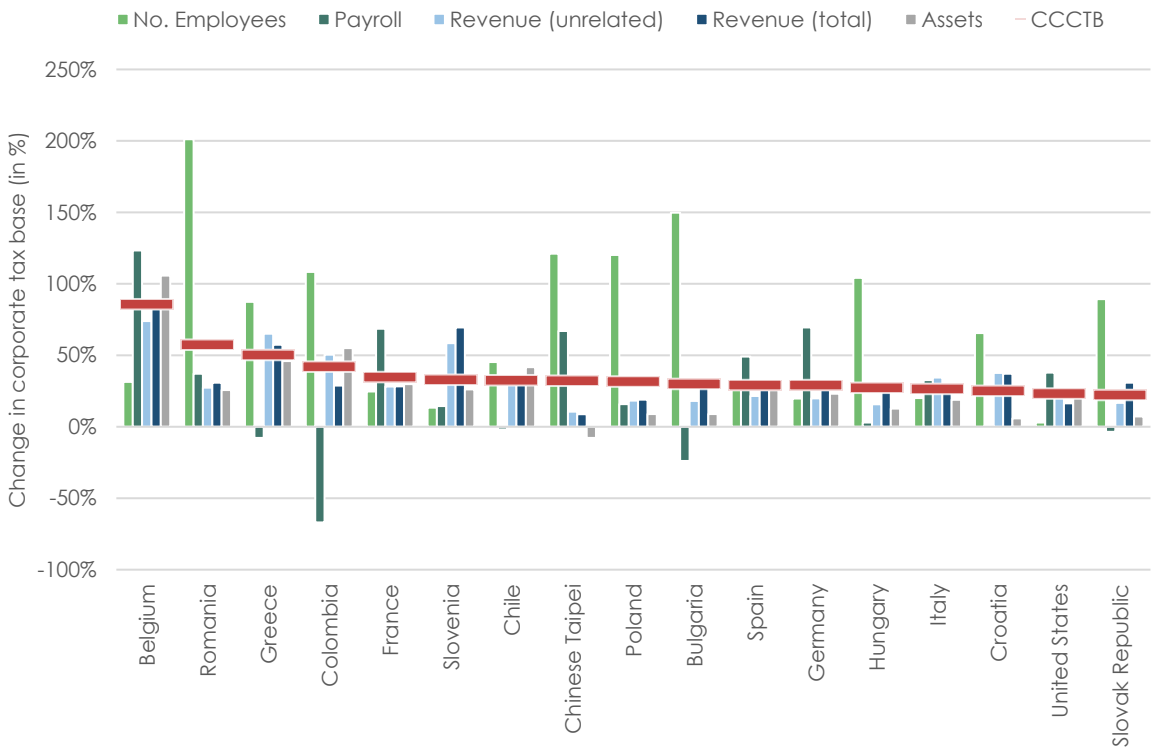
[63]) The cut off value for Figure 6 is 500 bn. USD over the time period 2016 to 2021.

[64]) To avoid that the relative changes are inflated by a small tax base under separate accounting only jurisdictions with more than 10 bn. USD tax base are considered for Figure 7 and Figure 8.

The countries in Figure 7 are either investment hubs or countries where there are very little economic activities which has resulted in small estimated shares of apportionment factors.[65]) Most investment hubs see a reduction of their tax base of 80 to 90% with the CCCTB formula. Only the use of total revenues rather than unrelated party revenues would mitigate the tax base reduction.

Figure 8 shows the tax base changes for the jurisdictions with the largest relative increases. Interestingly Belgium sees a dramatic increase in the tax base. This is the result of large reported losses by MNEs headquartered in Luxembourg. The reallocation of these large losses results in a substantial increase in the tax base in Belgium. The other countries in Figure 8 partially correspond to the countries benefitting from an increase of tax base in the analysis based on unconsolidated ORBIS data. Eastern European countries like Romania, Bulgaria, Poland and Hungary are confirmed to see a large tax base allocated to them. Additionally larger European countries with higher tax rates like Spain, Germany, France and Italy are also experiencing an increase in their corporate tax base.

Figure 8: **Change in corporate tax base, by apportionment factors, largest relative gains**
Based on aggregated CbCR data, sums 2016 to 2021



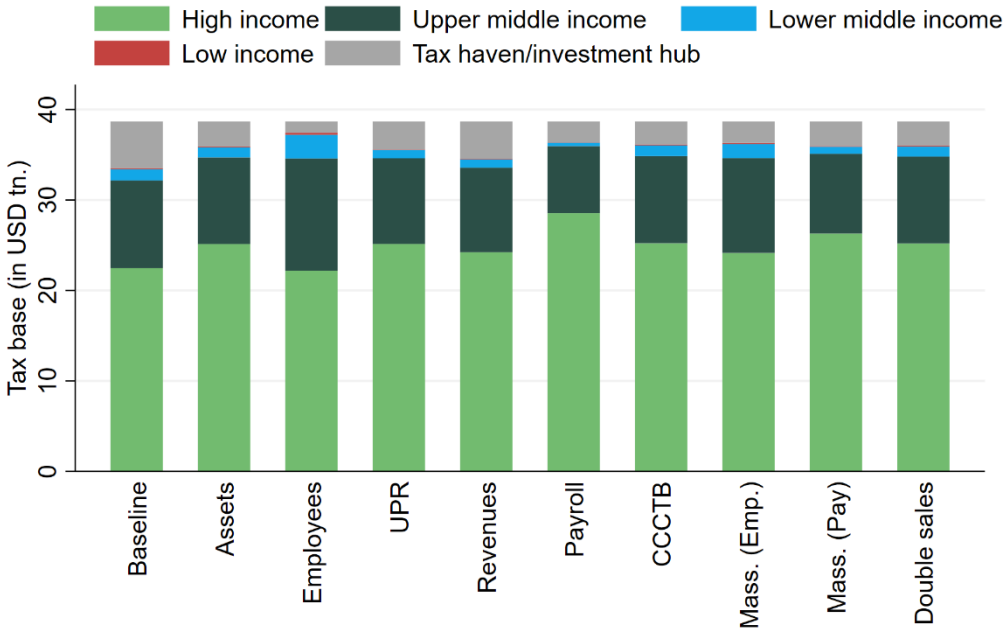
Source: OECD, own estimation.

[65]) Gibraltar, Yemen and Afghanistan fall under this category.

Figure 9 summarises the main findings for the tax base reallocation by country groups.[66]) The first bar in Figure 9 shows the baseline, i.e. tax base allocation under the current system of separate accounting. The other nine bars show the simulated tax base distribution under various apportionment formulas. In contrast to the analysis based on unconsolidated accounts, the overall sum of the corporate tax base remains constant because the implicit loss consolidation is not modelled in this approach.[67])

There are two clear messages which can be seen even at this aggregate level. First, unitary taxation with formula apportionment will imply a reallocation of tax base away from tax havens/investment hubs. The extent of this reallocation is least pronounced if total revenues from sales is used as a single apportionment factor and most pronounced if the number of employees is used as a single apportionment factor.[68]) The second clear finding is that apportionment based on the number of employees related factor implies a stronger tax base reallocation. Apportionment based solely on the number of employees sees the strongest tax base reallocation towards low income countries while apportionment based only on payroll sees a strong tax base reallocation towards high income countries.

Figure 9: **CBCR data -Tax base allocation, by apportionment factors, by country groups**
Based on aggregated CbCR data, sums 2016 to 2021



Source: OECD, own estimation. See Table A 5 and Table A 6 for detailed results.

[66]) Note that the CbCR data is in USD, while the Moodys data is in EUR.

[67]) As such the tax revenue estimates in the following subsection might be moderately too optimistic.

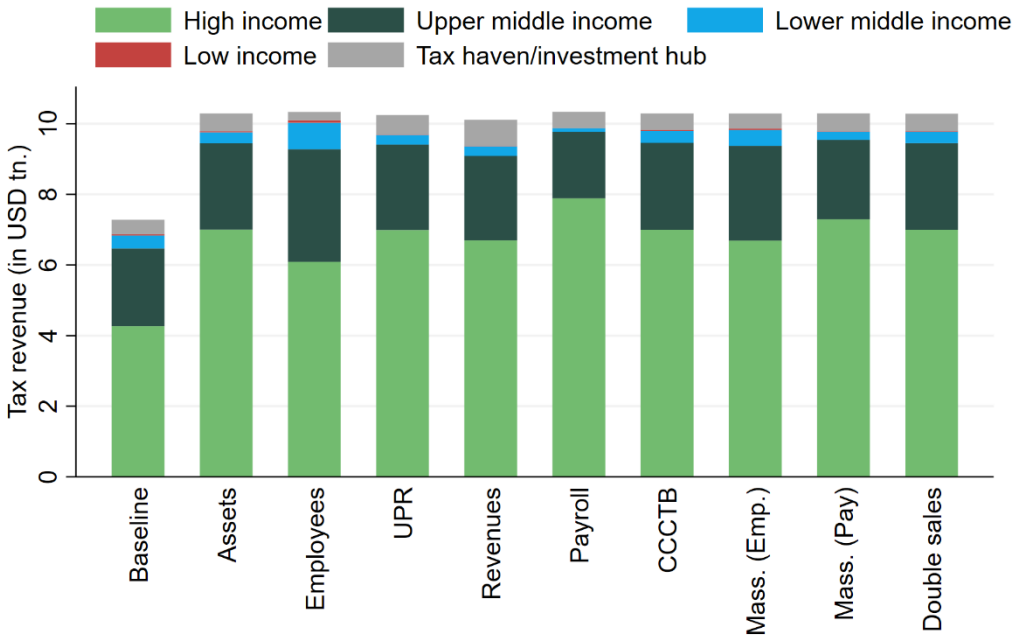
[68]) This follows the notation of the CbCR data which denotes sales as total revenues or unrelated party revenues (UPR).

Finally, regardless of the choice of formula apportionment the vast majority of the corporate tax base will remain in high income of upper middle income countries. This reflects that - despite the economic relevance of the corporate tax base located in tax haven/investment hub countries – the apportionment factors by and large reflect value creation within MNEs.

4.2.2 Changes to the distribution of the tax revenues

To analyse the implications for the tax revenues at the country level three different approaches are followed. First the statutory tax rate is applied to the tax base allocated to the individual countries. Following the discussion in Information box 1 this might overstate the actual tax revenues because the tax base reported in the CbCR data can still include income which is either exempted or subject to a different rate. Therefore, as an alternative we use an effective tax rate measure derived from the aggregate CbCR data.[69]) Finally, as a thought experiment the switch to unitary taxation is combined with a global minimum tax rate of 25%.

Figure 10: **CBCR data - Tax revenues by apportionment factors and country groups**
Based on aggregated CbCR data, sums 2016 to 2021



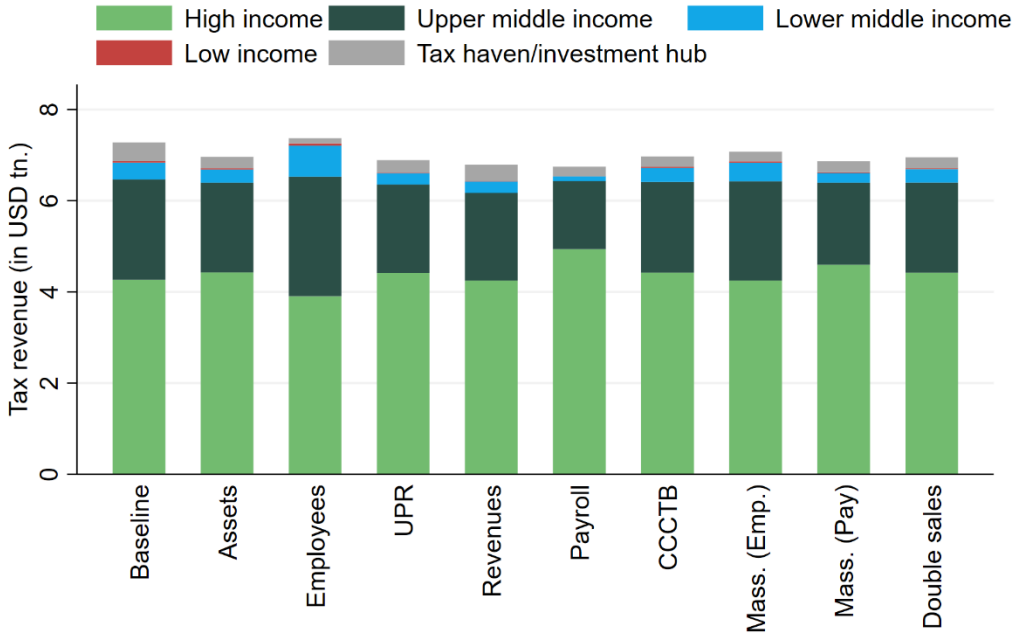
Source: OECD, own estimation, statutory tax rates apply.

[69]) Table A 9 shows the applicable effective tax rate. However, it is also evident from Table A 9 that for several countries the derived effective tax rate is not meaningful. Therefore, we i) recalculate the effective tax burden with only positive tax payments and positive tax base, and ii) bound the effective tax rate with zero and the statutory tax rate. Effective tax rates which are clearly higher than the statutory tax rate could in turn indicate economic relevance of loss-making MNEs.

Starting with Figure 10 one can see that applying the statutory tax rates on the apportioned profits results in a marked increase in tax revenues in most country groups, but most prominently in the high income countries. This increase in overall tax revenues worldwide by approximately 1/3, however, crucially depends on the application of the statutory tax rate.

Figure 11 therefore uses the (adjusted) effective tax rates derived from the CbCR data to simulate the tax revenues. The contrast to the tax revenue result in Figure 10 is striking because the overall increase in tax revenues is no longer visible. The main result that tax havens/investment hubs would lose tax revenues is reestablished, but overall the tax revenues would see a moderate decrease of up to -5.6%. This partly is an indirect reflection of the importance of losses. In some countries the effective tax rate under separate accounting lies above the statutory tax rate because the losses reduce the overall taxable profits in the country. Since the simulation does not use effective tax rates above the statutory tax rates this contributes to the overall reduction in tax revenues.

Figure 11: **CBCR data - Tax revenues, by apportionment factors and country groups**
Based on aggregated CbCR data, sums 2016 to 2021

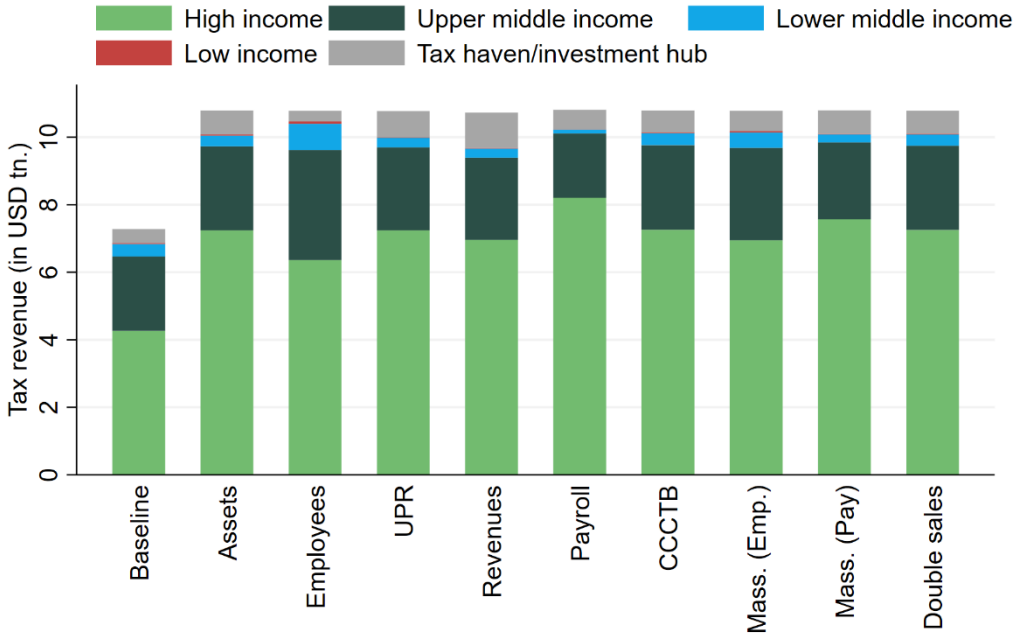


Source: OECD, own estimation, effective tax rates apply.

Finally, Figure 12 shows the simulation results based on the statutory tax rates combined with a global minimum tax rate of 25%. The results broadly follow the results in Figure 10 but differ in

one very important aspect. The application of a 25% minimum tax rate results in tax havens/investment hubs also increasing their tax revenues.[70])

Figure 12: **CBCR data - Tax revenues by apportionment factors and country groups**
Based on aggregated CbCR data, sums 2016 to 2021



Source: OECD, own estimation, statutory tax rates or a minimum tax of 25% apply.

Table 4 compares the tax revenue outcomes under the different tax rate assumptions. A few general results can be observed. First, the assumption about the applicable tax rate is one of the most important determinants of the simulation results. Assuming that the apportioned tax base will be full taxed at the statutory tax rate increases the overall tax revenues, with the largest share of the additional tax revenues accruing in high income countries. In contrast, applying effective tax rates results in a moderate reduction of the overall tax revenues with tax havens/ investment hubs experiencing the strongest reduction. In contrast, combining the statutory tax rate with a global minimum tax of 25% would see a moderate increase in the overall tax revenues. Compared to the simple application of the statutory tax rate the high-income countries would see a moderate increase and the tax haven/investment hubs would see a strong increase in tax revenues.

[70]) Note that this result applies to the country group overall and not necessarily to each individual country. Larger investment hubs such as Switzerland, Ireland etc. have sufficient economic substance that also under unitary taxation some tax base will be allocated to them. For smaller pure tax havens like Bermuda or the Cayman Islands this is not necessarily the case.

Table 4: **Comparison tax revenues under different tax rate assumptions, sum 2016-2021**

	Simulated tax revenue (in bn. USD)					
Scenario	**High income**	**Upper middle income**	**Lower middle income**	**Low income**	**Tax haven/ investment hub**	**Total**
Baseline	4,267.3	2,200.6	366.7	34.3	409.1	7278.0
Simulation unitary taxation with formula apportionment using statutory corporate tax rates						
Assets	6,998.4	2,443.9	313.6	34.6	500.9	10,291.5
Payroll	7,887.0	1,876.6	109.0	5.6	461.0	10,339.3
No. employees	6,088.0	3,187.8	752.9	64.8	241.2	10,334.6
Turnover (unrelated)	6,989.5	2,417.6	269.7	15.6	554.5	10,246.8
Turnover (total)	6,699.4	2,388.6	267.3	14.8	741.4	10,111.4
CCCTB	6,993.1	2,464.5	338.1	28.0	468.3	10,292.0
Massachusetts (employees)	6,691.0	2,684.3	446.0	37.8	431.9	10,291.0
Massachusetts (payroll)	7,294.4	2,245.3	230.5	18.2	504.7	10,293.0
Double Sales weighted	6,992.2	2,452.8	321.0	24.9	489.8	10,280.8
Simulation unitary taxation with formula apportionment using effective tax rates						
Assets	4,429.1	1,967.6	288.9	27.6	250.8	6,964.0
Payroll	4,939.2	1,493.4	99.6	4.5	212.0	6,748.6
No. employees	3,907.0	2,618.1	682.9	51.3	112.6	7,372.0
Turnover (unrelated)	4,413.3	1,943.4	248.1	12.5	273.8	6,891.2
Turnover (total)	4,249.7	1,922.3	246.2	12.0	362.2	6,792.4
CCCTB	4,422.5	1,988.9	309.5	22.3	228.7	6,971.9
Massachusetts (employees)	4,249.4	2,177.4	407.3	30.1	212.2	7,076.3
Massachusetts (payroll)	4,595.3	1,800.8	212.0	14.5	245.1	6,867.7
Double Sales weighted	4,420.2	1,977.5	294.2	19.9	239.9	6,951.7
Simulation unitary taxation with formula apportionment using statutory corporate tax rates and 25 % GLoBE						
Assets	7,243.4	2,483.5	321.3	35.1	703.6	10,786.9
Payroll	8,205.9	1,902.8	113.4	5.8	585.8	10,813.7
No. employees	6,359.3	3,260.3	776.7	67.8	316.8	10,780.9
Turnover (unrelated)	7,244.6	2,456.1	277.2	15.7	781.2	10,774.8
Turnover (total)	6,961.9	2,428.7	274.9	14.9	1047.7	10,727.9
CCCTB	7,258.2	2,507.0	347.9	28.7	644.5	10,786.4
Massachusetts (employees)	6,948.2	2,734.5	459.1	39.0	600.0	10,780.8
Massachusetts (payroll)	7,567.4	2,280.0	237.0	18.5	689.0	10,791.9
Double Sales weighted	7,254.8	2,494.3	330.2	25.5	678.6	10,783.5

Source: OECD, own estimation.

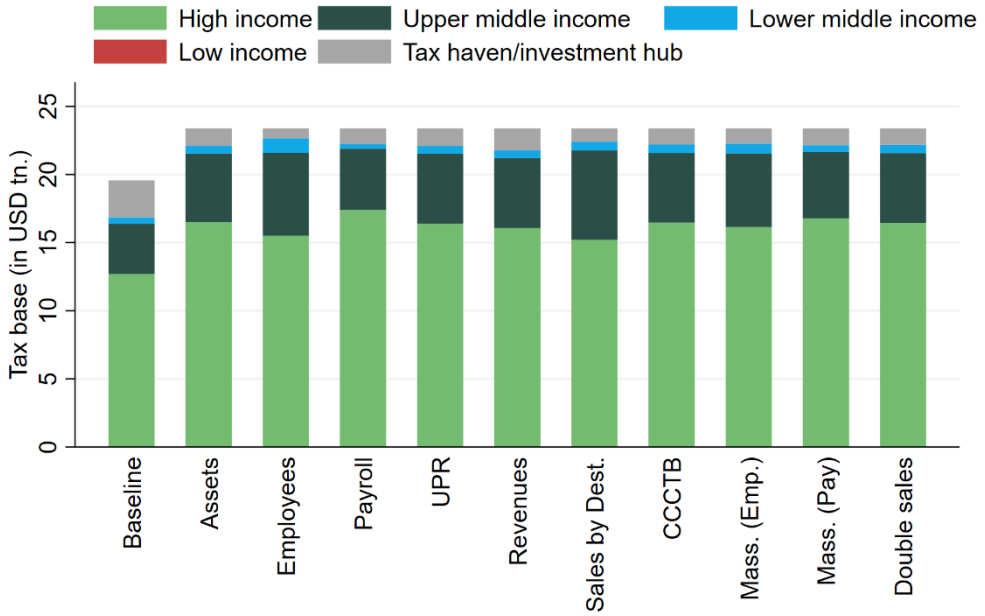
4.3 Analysis based on hybrid approaches with aggregate CbCR data and firm-level information

4.3.1 Impact on distribution of tax base and tax revenues at the country level

Based on the hybrid approach it is possible to identify the impact of unitary taxation and formula apportionment on 7,442 MNE groups with subsidiaries in 161 jurisdictions. In contrast to the two methodological approaches based on a single dataset there is no ideal data for a baseline distribution of tax base or tax revenues. It is possible to compare the simulated values of the corporate tax bases and the tax liabilities to the sum of the unconsolidated accounts, but the incomplete coverage of unconsolidated accounts implies that the percentage changes will be – at least for some countries – meaningless. Therefore, the results are presented in bn. Euros in the appendix in Table A 10 and Table A 12 and only the most important results are discussed here in the main text.

Starting with the reallocation of the corporate tax base, Figure 13 first of all highlights the incompleteness of the unconsolidated accounts. While the consolidated tax base to be apportioned under unitary taxation amounts to 23,811 bn. Euros the sum of the unconsolidated tax base is only 18,069 bn. Euros.[71])

Figure 13: **Hybrid approach -Tax base allocation by apportionment factors, by country groups**
Based on hybrid approach using Moody's and aggregated CbCR data, sums 2014 to 2021



Source: OECD, Moody's, own estimation.

[71]) Notably, this is already the estimated tax base without negative values in the variable profit and loss before taxation.

In Table A 10 and Table A 12 it is clearly visible that this is to large part due to the fact that there is no unconsolidated information available for important countries like the United States, Canada or Switzerland.

Turning to those countries with a reasonable coverage of unconsolidated accounts, the main results of the previous analysis are confirmed. Investment hub countries like the Netherlands, Luxembourg and Ireland see a large fraction of the corporate tax base reallocated to other countries. Secondly, the choice of the apportionment factor crucially influences the reallocation of the corporate tax base. Using the number of employees as apportionment factor implies the largest reallocation of corporate tax base, mostly in favour of countries with low wages. In contrast, using the costs of employees favours countries with high labour costs (due to both high wages and labour taxes).

The comparison between the tax base allocation based on the unrelated revenues and the approximated sales by destination shows that large countries – most prominently China and the United States - tend to benefit disproportionately from apportionment by sales by destination. To which extent this is an artefact of the approximation of sales by destination or an inherent feature of such an apportionment mechanism remains unclear.[72])

Figure 14 illustrates overall results for the tax revenue implications. The first striking feature of Figure 14 is that the baseline tax revenues are substantially higher and absolutely not in line with the simulated tax revenues. This is again due to the lack of unconsolidated accounts for relevant countries.[73]) While this leads to significantly higher tax revenues in the simulation of unitary taxation, comparing the overall tax revenues in Figure 14 shows that the impact of the choice of apportionment factor is only limited. The left-hand side panel shows that applying the statutory tax rate results in overall tax revenues of roughly 6.4 tn. Euros. The middle panel shows that the simulation results based on the effective tax rates lead to approx. 4.3 tn. Euros while the right-hand side panel shows that combining the statutory tax rates with a 25% global minimum tax results in overall tax revenues of approx. 6.7 tn. Euros.[74]

The choice of the apportionment factor influences the distribution of the corporate tax base, but not necessarily substantially affects overall tax revenues.

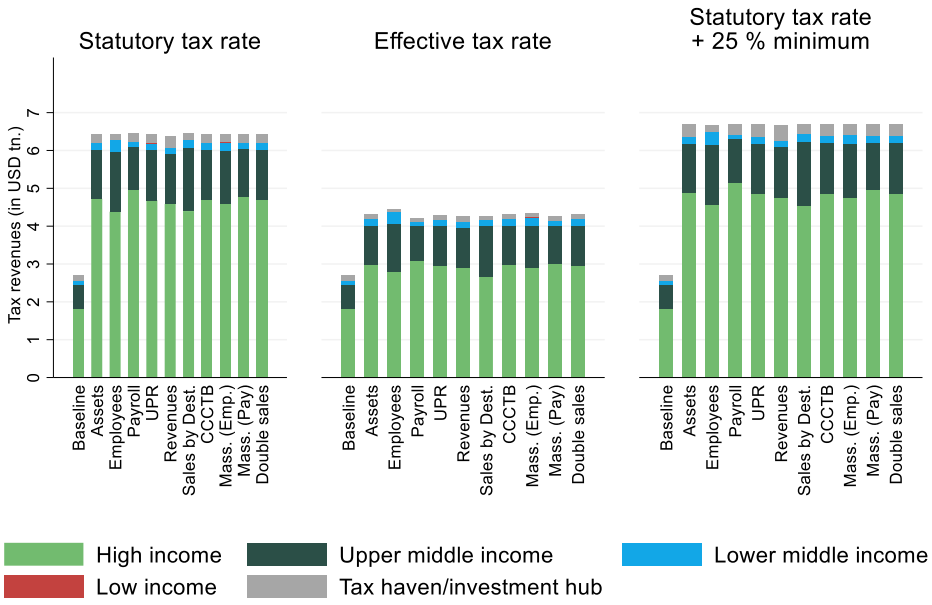
This reflects that not all reallocation of corporate tax base between countries results in substantial changes in overall tax liabilities. The only exception is apportionment by total revenues which results in a moderately lower overall tax revenue.

[72]) There are reasons to believe that large countries will have a larger fraction of tax base allocated to under apportionment by sales by destination, however the extent of the tax base reallocation raises some doubts about the validity of the approximation of sales by destination through the output less exports approach based on the AMNE data.

[73]) This result would change if two Chinese observations with implausibly large tax liabilities were included.

[74]) Note that the effective tax rates derived from the aggregate CbCR data are used because calculating effective tax rates based on consolidated accounts of MNEs does not really reflect the tax burden of their headquarter countries.

Figure 14: **Hybrid approach - Tax revenues, by apportionment factors, by country groups**
Based on hybrid approach using Moody's and aggregated CbCR data, sums 2014 to 2021



Source: OECD, Moody's, own estimation, statutory tax rates are applied.

That said, the choice of apportionment factors reallocates corporate tax base and correspondingly tax revenues between countries as illustrated for the simulation based on the statutory tax rate in Table A 12. For example, the estimated tax revenues in the United States could be up to 440 bn Euros less yearly if apportionment is solely based on the number of employees rather than on sales by destination. The tax base reallocation as depicted in Table A 10 or Table A 11 by and large determines the countries which see their tax revenues increased or decreased. Only the application of the statutory tax rate in combination with a 25% global minimum tax changes this picture substantially. Now some of the tax havens/investment hubs which see a significant fraction of their tax base reallocated away because of unitary taxation would still see an increase in tax revenues because of the much higher tax rate applied.

The use of a sales by destination approach can be modelled without any assumption about a nexus. Given that the sales by destination is approximated based on the AMNE data this would allocate some tax base to almost all countries in the world. Table A 14 compares the tax base outcomes of the hybrid approach with a sales by destination apportionment factor with and without a nexus requirement modelled. Additionally, the tax revenue outcomes under the three different assumptions about the applicable tax rate are reported. A few broader observations can be made when comparing the two different tax base allocations. Not requiring a subsidiary in the country to allocate tax base there, results in a moderately stronger tax base reallocation. The country groups which see a reduction in the tax base are the high income countries and the upper middle income countries while the tax haven and investment hub countries together with the lower middle income and low income countries would see an

increase in their tax base. Given the very small share of corporate tax base allocated to the low income countries otherwise this represents a very substantial relative increase in the tax base.

China would be the countries with the absolute largest difference in the tax base allocation between the two simulation of formula apportionment by sales by destination. This reflects the situation that large companies with substantial profits and economic activities in China tend to have subsidiaries only in few foreign countries. Hence a switch to formula apportionment by sales by destination without a nexus requirement would substantially shift tax base away.

4.3.2 Impact on tax liabilities at the MNE level

The more interesting analysis which is possible with the hybrid approach is to investigate how the tax liabilities for the individual MNEs would change under unitary taxation and formula apportionment. Table 5 summarises the most important outcomes at the MNE group level. Starting with the simulation based on the statutory tax rates in Panel 1A we can see for the full sample of 7,350 MNEs an overall tax increase because of a switch to unitary taxation between 8.7% (apportionment by the total revenues) and 10.1% (apportionment by sales by destination). It is noteworthy that the hybrid approach does not model international loss consolidation. The observable increase in tax liabilities here can therefore be interpreted as primarily due to the reallocation of taxing rights towards countries with higher tax rates. There is an indication of the relevance of loss consolidation in the fact that the simulated tax liabilities will be smaller for a substantial share of the MNEs. The absence of international loss consolidation under separate accounting will – all else equal – drive up the effective tax burden. And the loss consolidation will under unitary taxation will bring the effective tax rate base down.[75])

The overall revenue does no not vary much with different apportionment factors, with apportioning by total revenues resulting in the smallest increase. The Panel 1B of Table 5 shows that this increase is partially driven by the MNE groups in the sample without a positive tax liability. Restricting the dataset to the 6,983 MNEs with a positive tax liability the overall increase in tax liabilities is only approximately 4%. The variation is between an increase of 3.7 % under apportionment by total revenues and 4.9% under apportionment by sales by destination.

The average increase in tax liabilities can be substantially influenced by large increases. Therefore, the second information reported in Table 5 is the median change in tax liabilities. For the whole sample the median change is only a 1.5% increase in tax liabilities. Without the MNEs group with non-positive tax liabilities the median tax increase is only moderately higher at 4%. Overall, about 57.3% of the corporate group in the sample would see an increase in tax liabilities. This is not strongly influenced by the MNE groups without a positive tax liability since for the smaller sample, also only at bit more than half the MNE groups see an increase in tax liabilities.

[75]) Consider a MNE with taxable profits of 100 in country A and a taxable loss of -20 in country B. If both countries tax the profits at 20% the consolidated ETR will be (20+0)/(100-20)=25% under separate accounting. Under unitary taxation the consolidated profit of 80 will – in either country - be taxed at 20%.

Table 5: **Tax liability effects at the MNE level modelled with hybrid approach, 2014-2021**

	Tax liability outcome under apportionment by					
Outcome	**tangible assets**	**No. of employees**	**Revenues (unrelated)**	**Total revenues**	**Cost of employees**	**Sales by destination**
Panel 1A: Simulation with statutory tax rate for all 7,350 MNEs						
Overall change in %	9.5	9.6	9.5	8.7	9.8	10.1
Median change in %	1.5	1.5	1.6	1.4	1.9	2.3
% of MNEs with tax increase	57.4	57.4	57.5	57.3	57.9	58.3
Panel 1B: Simulation with statutory tax rate for 6,983 MNEs with positive tax liability						
Overall change in %	3.9	4.0	3.9	3.1	4.2	4.5
Median change in %	4.0	3.9	4.1	3.7	4.3	4.9
% of MNEs with tax increase	55.0	55.0	55.1	54.9	55.5	55.9
Panel 2A: Simulation with statutory + 25 % minimum tax rate for all 7,350 MNEs						
Overall change in %	14.0	13.6	13.9	13.5	14.0	13.8
Median change in %	5.8	5.4	5.6	5.5	5.7	5.6
% of MNEs with tax increase	61.8	61.4	61.7	61.6	61.4	61.6
Panel 2B: Simulation with statutory + 25 % minimum tax rate for 6,983 MNEs with positive tax liability						
Overall change in %	8.2	7.8	8.1	7.7	8.2	8.0
Median change in %	8.5	8.3	8.6	8.4	8.4	8.7
% of MNEs with tax increase	59.4	59.0	59.3	59.2	59.4	59.2

Source: Moody's, OECD, own estimation.

Panel 2A and 2B in Table **5** repeat the information at the MNE level for the simulation with the statutory corporate tax rate combined with a 25% global minimum tax rate. This amplifies the average (median) tax increase to approximately 13.8% (5.6%) for the full sample or 8.0% (8.5%) for the MNEs with initially positive tax liabilities. Correspondingly the percentage of MNEs groups which experience an increase in tax liabilities increase to approximately 61.5 % of the full sample and 59.2 % percent of the MNE sample with positive tax initially positive tax liabilities.

The differences between the apportionment factors are now less pronounced. This reflects that the allocation of tax base is increasingly irrelevant from the MNE perspective if all countries tax the profits at a higher rate.

5. Conclusion

The fundamental switch in the taxation of MNEs away from separate accounting to unitary taxation with formula apportionment is expected to have substantial impacts on the tax liabilities of companies and the tax revenues of jurisdictions.

The empirical literature so far mostly analysed the revenue implications of unitary taxation with formula apportionment for a subset of European countries. The reallocation of tax revenues away from investment hubs like Luxembourg and the Netherlands towards other Eastern European countries and larger higher tax countries like Italy, Germany and France is a common conclusion of this literature. There is, however, hardly any robust analysis of the impact of global introduction of unitary taxation and formula apportionment. This study sets out to reduce this research gap by investigating potential implications of a global introduction of unitary taxation with formula apportionment.

The combination of different data sources allows to assess several aspects of unitary taxation. The information contained in the unconsolidated accounts in combination with the corporate group structure is primarily useful to learn about the geographical distribution of potential apportionment factors and the relevance of loss consolidation. However, the absence of information about intra-group transactions and missing unconsolidated accounts for many jurisdictions limit the possibilities of a comprehensive analysis.

In contrast, the use of aggregated CbCR data has broader and more comprehensive coverage and intra-group transactions are no longer relevant. At the same time, the aggregation at the country-pair levels does not allow for a detailed firm-level analysis and therefore can result in biased estimates. Additionally, the necessary information to model the effect of loss consolidation and the data for some proposed apportionment factors, most notably payroll costs and sales by destination is not available.

Using a hybrid approach which combines the information from the consolidated financial accounts, the ownership structure, the aggregated CbCR data and the AMNE data it is possible to simulate unitary with formula apportionment at the corporate group level for the vast majority of countries in the world. The remaining limitations are that the geographical distribution of the apportionment factors is still estimated with potential bias based on the aggregated information and it is not possible to model the impact of loss consolidation.

Based on unconsolidated ORBIS data the overall reduction in corporate tax base because of international loss consolidation is found to be below 10%. During economic crises, however, the tax base reduction is likely to be higher.

While the exact results for the reallocation of corporate tax base depend on the data source there are some general findings which are consistently showing up throughout the analysis. The first and most important finding is that unitary taxation with formula apportionment implies a substantial reallocation of corporate tax base away from investment hubs and tax havens towards large countries with higher tax rates and towards Eastern European countries.

A further robust finding is that formula apportionment based on the number of employees results in the strongest reallocation of corporate tax base. The countries which benefit most from such an apportionment formula are those with relatively low wages, i.e. the developing

countries and Eastern European countries. In contrast, using payroll as an apportionment factor largely benefits countries with high wages, especially in combination with high taxes on labour.

Formula apportionment based on tangible assets or sales by origin would result in more moderate reallocation of the corporate tax base, while the comparison between apportionment based on total revenues and unrelated party revenues shows that the reallocation is stronger with unrelated party revenues. This reflects that total revenues are likely to be distorted by transfer pricing considerations. In contrast, using an approximation of sales by destination as apportionment factor implies a strong shift away from the high income countries towards upper-middle income countries. This is largely due to significantly more tax base allocated to China and Brazil at the expense of Japan and Saudi Arabia. If a pure sales by destination apportionment without any nexus requirement is modelled, more tax base is allocated to lower income countries and China attracting less additional tax base.

The tax revenue effects of a switch to unitary taxation crucially depend on the assumption about the tax rate applicable on the apportioned profit. A simple comparison between reported tax liabilities and the implied revenues modelled with the statutory tax rate is likely to overestimate the additional tax revenues because of recorded negative tax liabilities. Furthermore, there are parts of the corporate tax base which are exempted from taxation or subject to a preferential tax rate under the current system. Modelling with a derived backward-looking effective tax rate could in principle approximate the tax revenue effects if the tax base allocated to a country under unitary taxation contains a similar mix of exempted incomes. Since this very unlikely and given the fact the presence of losses is likely to largely determine the backward-looking effective tax rates, the simulation results based on the effective tax rates needs to be interpreted with care. That said, in the analysis based on the unconsolidated accounts where the derived backward-looking effective tax rate is most informative, the overall increase in tax revenues by approximately 10% reflects the broader picture of the shift of tax base from investment hubs and tax havens toward higher tax countries.

Looking at the tax liabilities at the MNE group level, a few things can be noted. First, for the tax liabilities of the MNEs the choice of the apportionment factor plays only a limited role. The increase or decrease in the tax base is primarily driven by the overall change away from low-tax jurisdictions and less by the exact allocation of the tax base. Furthermore, for the majority of MNE groups the tax liabilities will either not increase at all, or only moderately. Modelling unitary taxation with an additional global minimum tax of 25% results in larger tax increases on average but the tax increases will still only be relevant for about 60 % of MNE groups. This reflects that – at least in the dataset available for this research – not all MNE companies have engaged in aggressive tax planning or benefits from preferential tax treatment. In consequence, a shift towards unitary taxation with formula apportionment is likely not resulting in a tax increase for those companies.

The asymmetric tax change has important implications for the expected changes to firm behaviour. The firms which were reacting stronger to the existing tax systems are likely to be the firms which will experience the largest tax increases. While this would suggest strong behavioural responses to the shift to unitary taxation, the costs of tax planning will be substantially increased. Relocating real activities to change the distribution of apportionment factors has stronger repercussions than relocating profits. The overall reaction of firms to the switch to

unitary taxation is unknown, but given the simulation results which show no or only a moderate increase in tax liability for the majority of the firms it can be assumed that the effect at the macro-level is likely only moderate.

The corporate tax incidence literature provides conflicting predictions how a tax increase because of combating tax avoidance will affect wages. Generally, in the economics literature it is found that the wages of unskilled workers tend to bear more of the corporate tax burden. In contrast the accounting literature also finds evidence that primarily executive staff tends to benefit through higher wages because of corporate tax avoidance. Hence, while it is very likely that higher corporate taxes will partially result in lower wages for the employees of the MNEs, it is much less clear whether this will be a correction for executive rewards for previous tax avoidance or wage cuts for more vulnerable workforce.

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Appendix

A.1. Detailed methodological description

A.1.1. Data cleaning ORBIS data

Starting point is a download of the **ownership information**, where we rely on the information contained in the variable guo50c. This variable contains the highest corporate owner with shareholding of at least more than 50% directly or total. This classification of the global ultimate owner establishes unique links between the parent company and subsidiaries.

The unique BvD identifier of the subsidiary and parent company is used to merge the consolidated accounts of the parent company to the unconsolidated accounts of the subsidiary. While it is not possible to replicate the consolidation, the unique link between the unconsolidated subsidiary and the consolidated parent accounts does enable us to aggregate at tax payments, pre-tax profit and losses and apportionment factor at the country-group level.[1]) This link between unconsolidated accounts and the corporate owner will allow the analysis based on the unconsolidated accounts. Additionally, the link between the consolidated accounts of the corporate owner and the information about the location of the subsidiaries forms the basis for the hybrid approach.

Only unconsolidated observations where we have consolidated information about the global ultimate owner are kept in the dataset. The dataset is then restricted to those MNEs which are active in more than one country and have a turnover of at least 750 Mio. Euros. The presence in more than one country is determined by counting the distinct countries where subsidiaries are located. This step is done before any data cleaning because for the hybrid approach missing or unreliable information in the unconsolidated accounts is irrelevant.

All observations with negative values for turnover, number of employees, cost of employees or tangible assets are dropped.

In cases where there is no tax liability reported but the pre-tax profit or loss and the after-tax profit and loss are identical, we impute a zero for the tax. Additionally, obvious outliers with tax liabilities larger than 1 billion Euro at the unconsolidated level are excluded.[2])

For the industry classification the NACE rev. 2 Core classification is used. The use of the core industry classification allocates each company to exactly one industry which will in turn allow to use country-industry-time specific information for the imputation of payroll and employment information.

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[1]) The replication of the consolidation process would require the full coverage of the unconsolidated accounts and additional information about the intra-company transactions.

[2]) This concerns two observations in China which would dominate the results otherwise. .

Table A 1: **Country coverage unconsolidated ORBIS data**

Dataset after cleaning and extrapolation

Subsidiary country	Headquarter country															
	BE	CH	CN	DE	ES	FR	GB	IT	JP	KR	NL	NO	RU	SE	US	other
AU	136	319	418	1049	244	887	1100	200	2141	192	257	131	6	316	3889	3964
BE	4588	510	159	1871	137	3226	1166	206	1260	53	952	162	30	534	3468	2443
CN	171	369	13834	1000	97	688	374	111	2947	391	338	33	5	243	2340	4304
CZ	176	387	257	2652	424	1117	690	192	1080	172	278	96	36	640	2312	2949
DE	244	542	295	6768	274	1353	791	294	2086	218	522	111	6	482	3515	2414
ES	594	1089	550	4486	13897	4618	3157	1352	2163	165	812	191	0	754	5556	4702
FI	106	252	96	878	48	390	549	100	504	13	176	505	46	2759	1579	3843
FR	1483	1915	1300	4712	814	45065	3341	1078	3160	187	1538	237	2	1383	10790	6358
GB	508	882	472	3485	892	3729	12838	613	4266	305	1307	496	29	1768	14915	8220
IN	145	266	279	1144	153	618	626	182	2628	370	160	80	12	155	2382	6648
IT	710	1303	636	3842	524	3156	2022	15259	2438	207	1293	139	39	1127	6834	4213
JP	8	29	115	121	6	130	71	6	52616	97	13	5	0	40	325	362
KR	79	211	206	871	50	499	438	73	2956	11159	140	57	0	277	1839	792
NO	129	411	60	950	120	631	743	177	426	32	360	9151	9	2977	2113	2510
PL	284	583	334	3991	556	1819	1304	452	1234	196	694	230	32	893	3408	7011
PT	134	219	68	1208	1207	1396	651	302	572	20	466	51	4	220	1761	3309
RU	213	369	252	1911	171	848	921	328	1369	297	851	54	12856	249	1892	2549
SE	208	750	212	2361	168	1054	1238	281	1054	86	617	2711	8	13582	3900	4096
other	1466	2605	1037	12003	1297	5766	5582	2242	4736	606	2585	1224	614	3298	14955	25479

Source: Moodys own data manipulation

A.1.2. Imputation payroll and employment information

The starting point is the information from the unconsolidated financial accounts. For all observations where the information about the number of employees and the costs of employees is available, we use this information directly.

In the next step we calculate the average wage per employee for these observations. Based on these available observations we calculated the median average wage at the country-industry-year level. This median wage is windsorised at the 1st and 99th percentile.

Whenever the average wage is still not available it is imputed from the macro-level information. The macro-level information is used in the following order. The information from Eurostat at the country-industry-year level is the preferred choice. If this is not available, the information from the ILO is used. Based on these values we impute country specific average wages whenever the industry-country specific values are not available.

For those observations where the costs of employees are available but not the number of employees, we use the imputed average wages to impute the number of employees. To rule out extreme values we additionally cap the imputed number of employees at extreme values of the employees to total assets ratio.[3])

For the analysis based on the CbCR data and for the hybrid analysis we average the wages at the country-year level. The resulting average wages are shown in Table A 2. Averaged over the years the yearly wages used for the simulation range from less than 500 USD in some countries (Grenada, Somalia, Central African Republic, Malawi and Niger) to more than 90,000 USD in Liechtenstein and Switzerland.

[3]) The cut-off point is set to have a broadly balanced assets to employees ratio between the observations where the number of employees is available and where the number of employees is imputed. The resulting criteria is to discard imputed values where there would be more than 2000 employees with less than 100,000 Euros total assets per employee.

Table A 2: **Average wages (in thousand USD) used for CbCR and hybrid analysis**

Country	Average wage	Country	Average wage	Country	Average wage
Afghanistan	3.0	Central African Republic	0.4	Germany	44.5
Albania	5.3	Chad	2.6	Ghana	2.2
Algeria	4.1	Chile	11.5	Gibraltar	20.8
American Samoa	20.0	China (People's Republic of)	7.4	Greece	13.8
Andorra	60.0	Chinese Taipei	21.7	Greenland	40.0
Angola	3.4	Colombia	4.3	Grenada	0.0
Anguilla	20.0	Comoros	3.0	Guadeloupe	30.0
Antigua and Barbuda	14.9	Congo	2.2	Guam	40.0
Argentina	10.6	Cook Islands	10.0	Guatemala	4.2
Armenia	2.7	Costa Rica	11.0	Guinea	2.0
Aruba	20.0	Croatia	16.7	Guinea-Bissau	2.0
Australia	47.2	Cuba	1.2	Guyana	4.3
Austria	41.9	Curaçao	17.9	Haiti	1.2
Azerbaijan	4.8	Cyprus	26.1	Honduras	4.8
Bahamas	27.6	Czechia	16.9	Hong Kong (China)	25.0
Bahrain	20.4	Cóte d'Ivoire	2.4	Hungary	12.9
Bailiwick of Guernsey	52.0	Democratic People's Republic of Korea	0.6	Iceland	65.8
Bangladesh	1.7	Democratic Republic of the Congo	3.0	India	2.8
Barbados	16.1	Denmark	63.4	Indonesia	1.6
Belarus	5.5	Djibouti	2.8	Iran	6.0
Belgium	52.6	Dominica	7.4	Iraq	5.3
Belize	7.1	Dominican Republic	3.8	Ireland	46.1
Benin	1.1	Ecuador	6.0	Isle of Man	84.5
Bermuda	66.0	Egypt	2.9	Israel	34.1
Bhutan	10.0	El Salvador	4.0	Italy	31.0
Bolivia	11.3	Equatorial Guinea	10.2	Jamaica	5.0
Bosnia and Herzegovina	6.7	Estonia	18.2	Japan	32.2
Botswana	6.2	Eswatini	4.0	Jersey	52.0
Brazil	7.4	Ethiopia	1.2	Jordan	7.5
British Virgin Islands	45.5	Falkland Islands (Malvinas)	13.0	Kazakhstan	6.3
Brunei Darussalam	2.3	Faroe Islands	40.0	Kenya	1.6
Bulgaria	8.1	Fiji	6.1	Kiribati	4.2
Burkina Faso	2.3	Finland	44.2	Korea	37.1
Burundi	2.7	France	41.2	Kosovo	6.0
Cabo Verde	3.9	French Guiana	30.0	Kuwait	13.8
Cambodia	1.4	French Polynesia	30.0	Kyrgyzstan	2.5
Cameroon	1.4	Gabon	7.8	Lao People's Democratic Republic	2.9
Canada	70.0	Gambia	1.0	Latvia	15.7
Cayman Islands	2.6	Georgia	4.5	Lebanon	9.4

Table A 2: **Average wages (in thousand USD) used for CbCR and hybrid analysis (continued)**

Country	Average wage	Country	Average wage	Country	Average wage
Lesotho	2.8	Pakistan	1.8	Sweden	46.6
Liberia	0.6	Palau	14.3	Switzerland	92.8
Libya	3.0	Palestinian Authority or West Bank and Gaza Strip	3.5	Syrian Arab Republic	3.0
Liechtenstein	90.0	Panama	10.0	Tajikistan	1.7
Lithuania	13.9	Papua New Guinea	1.2	Tanzania	2.2
Luxembourg	70.3	Paraguay	4.4	Thailand	4.9
Macau (China)	23.8	Peru	7.9	Timor-Leste	3.8
Madagascar	0.9	Philippines	3.3	Togo	3.0
Malawi	0.5	Poland	14.2	Tonga	7.2
Malaysia	8.0	Portugal	15.1	Trinidad and Tobago	16.7
Maldives	8.7	Puerto Rico	21.0	Tunisia	3.0
Mali	1.5	Qatar	36.5	Turkmenistan	3.6
Malta	28.6	Romania	10.7	Turks and Caicos Islands	27.3
Marshall Islands	9.6	Russia	7.8	TÃ¼rkiye	7.7
Martinique	30.0	Rwanda	0.7	Uganda	1.4
Mauritania	1.5	Réunion	60.0	Ukraine	3.8
Mauritius	6.9	Saint Kitts and Nevis	18.5	United Arab Emirates	69.6
Mexico	6.2	Saint Lucia	9.5	United Kingdom	39.3
Micronesia	3.3	Saint Vincent and the Grenadines	7.5	United States	48.8
Moldova	4.2	Samoa	6.0	United States Virgin Islands	36.9
Monaco	60.0	San Marino	29.3	Uruguay	11.3
Mongolia	5.0	Sao Tome and Principe	1.9	Uzbekistan	4.1
Montenegro	10.0	Saudi Arabia	20.5	Vanuatu	3.0
Morocco	6.0	Senegal	2.9	Venezuela	8.0
Mozambique	2.4	Serbia	5.6	Viet Nam	3.1
Myanmar	1.5	Seychelles	10.9	Wallis and Futuna	10.0
Namibia	6.3	Sierra Leone	3.4	Yemen	1.0
Nauru	11.2	Singapore	40.7	Zambia	5.0
Nepal	2.0	Sint Maarten	40.0	Zimbabwe	1.2
Netherlands	55.5	Slovak Republic	15.7		
New Caledonia	25.0	Slovenia	25.7		
New Zealand	41.0	Solomon Islands	2.2		
Nicaragua	3.2	Somalia	0.4		
Niger	0.5	South Africa	3.1		
Nigeria	1.8	South Sudan	6.0		
North Macedonia	5.7	Spain	29.5		
Northern Mariana Islands	20.7	Sri Lanka	1.8		
Norway	65.1	Sudan	1.6		
Oman	17.1	Suriname	6.4		

Source: Eurostat, ILO and Moody's, own data manipulation.

A.2. Detailed results

Table A 3: **Tax base allocation, unconsolidated ORBIS data – single factors**

Country	Baseline tax base (in Bn. €)	% Change to tax base with formula apportionment by			
		No. employees	Payroll	Turnover	Assets
Bosnia and Herzegovina	0.7	1141.5	319.9	230.5	462.7
Latvia	3.1	172.1	49.3	75.7	82.1
Estonia	3.2	186.8	58.7	75.7	120.3
Slovenia	5.9	58.4	44.5	37.5	74.5
New Zealand	6.5	203.8	127.5	78.7	49.7
Bulgaria	6.8	312.8	74.2	100.4	106.5
Serbia	7.8	216.0	60.6	48.5	127.1
Croatia	10.0	99.5	35.1	36.6	97.6
Lithuania	11.2	46.5	-27.7	-11.1	24.6
Ukraine	16.0	428.7	46.4	52.0	256.4
Greece	16.5	33.7	1.4	34.3	50.2
Kazakhstan	30.2	94.5	3.6	-11.7	14.9
Slovakia	32.7	108.8	56.5	44.2	64.9
Romania	35.0	233.5	57.7	56.4	140.1
Hungary	57.5	69.7	13.0	16.3	43.2
Portugal	61.8	44.3	22.5	12.2	8.4
Brazil	69.0	4.3	-13.9	-7.7	26.5
Czechia	76.2	106.0	37.2	36.9	71.7
Austria	81.5	-23.3	1.9	-23.3	-8.1
Finland	123.7	-24.0	-11.5	-13.0	-19.2
Poland	128.0	131.2	18.9	40.2	92.5
India	181.4	117.6	5.8	-5.3	12.4
Denmark	237.1	-37.1	-22.0	-26.5	-24.4
Belgium	252.7	-19.9	31.9	26.6	-14.9
Norway	329.2	-30.9	-17.9	-23.3	-10.4
Sweden	337.1	-31.7	-17.4	-24.7	-23.4
Taiwan	355.0	-18.2	-10.5	-6.8	-14.1
Netherlands	357.2	-65.3	-58.1	-32.5	-43.1
Ireland	382.8	-46.5	-32.0	-7.8	-0.1
Italy	396.0	22.9	41.3	27.0	13.9
Spain	561.6	-7.8	2.6	-9.7	-13.0
Luxembourg	617.7	-91.5	-87.5	-58.7	-94.4
Australia	674.9	7.1	11.3	3.9	24.4
Russia	701.7	11.7	-2.7	-1.7	-1.5
South Korea	757.8	-4.0	-10.2	-7.4	6.7
China	817.6	12.8	-18.4	1.7	1.3
Germany	871.3	-20.3	7.2	-14.6	-29.8
France	929.4	-9.9	13.3	-7.7	-11.7
United Kingdom	989.8	-2.7	20.6	-1.5	-1.8
Japan	2079.5	-13.7	-21.1	-8.0	-4.6

Source: Moody's, own data manipulation.

Table A 4: **Tax base allocation, unconsolidated ORBIS data – weighted formulas**

Country	Baseline tax base (in Bn. €)	% Change to tax base with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Bosnia and Herzegovina	0.7	474.6	611.6	337.7	413.6
Latvia	3.1	89.5	110.0	69.0	86.0
Estonia	3.2	106.3	127.6	84.9	98.6
Slovenia	5.9	54.5	56.8	52.2	50.2
New Zealand	6.5	98.0	110.8	85.3	93.2
Bulgaria	6.8	133.5	173.2	93.7	125.2
Serbia	7.8	104.6	130.5	78.7	90.6
Croatia	10.0	67.2	77.9	56.4	59.5
Lithuania	11.2	7.6	20.0	-4.7	2.9
Ukraine	16.0	182.0	245.7	118.3	149.5
Greece	16.5	34.0	39.4	28.6	34.1
Kazakhstan	30.2	17.4	32.5	2.2	10.1
Slovakia	32.7	63.9	72.6	55.2	59.0
Romania	35.0	114.0	143.3	84.7	99.6
Hungary	57.5	33.6	43.1	24.1	29.3
Portugal	61.8	18.0	21.6	14.3	16.6
Brazil	69.0	3.8	6.8	0.8	0.6
Czechia	76.2	60.1	71.5	48.6	54.3
Austria	81.5	-14.1	-18.3	-9.9	-16.4
Finland	123.7	-16.6	-18.7	-14.5	-15.7
Poland	128.0	69.3	88.0	50.6	62.0
India	181.4	22.9	41.6	4.3	15.9
Denmark	237.1	-26.8	-29.3	-24.3	-26.7
Belgium	252.7	5.9	-2.7	14.5	11.1
Norway	329.2	-19.4	-21.5	-17.2	-20.4
Sweden	337.1	-24.2	-26.6	-21.8	-24.3
Taiwan	355.0	-11.8	-13.0	-10.5	-10.5
Netherlands	357.2	-45.8	-47.0	-44.5	-42.4
Ireland	382.8	-15.7	-18.2	-13.3	-13.8
Italy	396.0	24.3	21.3	27.4	25.0
Spain	561.6	-8.4	-10.2	-6.7	-8.7
Luxembourg	617.7	-80.9	-81.5	-80.2	-75.3
Australia	674.9	12.5	11.8	13.2	10.3
Russia	701.7	0.4	2.8	-2.0	-0.1
South Korea	757.8	-2.6	-1.6	-3.6	-3.8
China	817.6	0.1	5.3	-5.1	0.5
Germany	871.3	-17.0	-21.6	-12.4	-16.4
France	929.4	-5.9	-9.8	-2.0	-6.4
United Kingdom	989.8	1.8	-2.1	5.7	1.0
Japan	2079.5	-10.0	-8.7	-11.2	-9.5

Notes: 'CCCTB' uses 1/6 number of employees, 1/6 cost of employees, 1/3 tangible assets and 1/3 sales. 'Massachusetts (employees)' uses 1/3 number of employees, 1/3 tangible assets and 1/3 sales. Massachusetts (payroll) ' uses 1/3 cost of employees, 1/3 tangible assets and 1/3 sales. 'Double Sales' uses ½ sales, ¼ tangible assets, 1/8 number of employees, 1/8 cost of employees. Note that in the ORBIS data sales are by origin.

Source: Moody's, own data manipulation.

Table A 5: **Tax base allocation, aggregated CbCR data – single factors**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Venezuela	-356.9	-221.0	8.9	-213.0	-190.8	2.8
Luxembourg	-27.1	219.5	17.9	92.1	149.6	41.6
Mozambique	-8.2	7.4	15.8	3.9	4.1	2.3
Bailiwick of Guernsey	-1.3	2.6	0.9	1.2	1.5	1.4
Congo	-1.2	7.4	1.1	0.8	1.3	0.2
Northern Mariana Islands	-0.3	0.2	0.1	0.1	0.1	0.2
Guyana	-0.3	1.0	0.2	0.2	0.2	0.1
Andorra	-0.2	0.0	0.0	0.0	0.0	0.1
Turks and Caicos Islands	-0.1	0.0	0.1	0.0	0.0	0.1
Montenegro	-0.1	0.6	0.6	0.2	0.1	0.3
Central African Republic	-0.1	0.0	0.1	0.0	0.0	0.0
Vanuatu	-0.1	0.1	0.1	0.0	0.1	0.0
Mauritania	-0.1	0.0	0.3	0.1	0.1	0.0
Cook Islands	-0.0	0.0	0.0	0.0	0.0	0.0
Iceland	-0.0	4.4	1.2	0.8	1.4	2.2
Gambia	-0.0	0.0	0.3	0.1	0.0	0.0
Somalia	-0.0	0.1	0.2	0.0	0.0	0.0
Guinea-Bissau	-0.0	0.0	0.0	0.0	0.0	0.0
Guadeloupe	-0.0	0.0	0.1	0.0	0.0	0.1
Sao Tome and Principe	-0.0	0.0	0.0	0.0	0.0	0.0
Comoros	-0.0	0.0	0.0	0.0	0.0	0.0
Nauru	-0.0	0.0	0.0	0.0	0.0	0.0
Kiribati	0.0	0.0	0.0	0.0	0.0	0.0
Tonga	0.0	0.0	0.0	0.0	0.0	0.0
Grenada	0.0	0.0	0.0	0.0	0.0	0.0
Martinique	0.0	0.0	0.0	0.0	0.0	0.0
Dominica	0.0	0.0	0.0	0.0	0.0	0.0
Falkland Islands (Malvinas)	0.0	0.0	0.0	0.0	0.0	0.0
San Marino	0.0	0.0	0.0	0.0	0.0	0.0
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0	0.0
Wallis and Futuna	0.0	0.0	0.0	0.0	0.0	0.0
Sierra Leone	0.0	0.0	0.4	0.0	0.0	0.1
French Guiana	0.0	0.0	0.0	0.0	0.0	0.0
Djibouti	0.0	0.0	0.0	0.0	0.0	0.0
British Indian Ocean Territory	0.0	0.0	0.0	0.0	0.0	0.0
Réunion	0.0	0.0	0.0	0.0	0.0	0.0
Palau	0.0	0.0	0.0	0.0	0.0	0.0
Burundi	0.0	0.0	0.5	0.0	0.0	0.1
Belize	0.0	0.0	0.0	0.0	0.0	0.0
Bhutan	0.0	0.0	0.0	0.0	0.0	0.0
Liberia	0.0	1.6	1.1	1.7	1.5	0.0

Table A 5: **Tax base allocation, aggregated CbCR data – single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Solomon Islands	0.0	0.0	0.1	0.1	0.1	0.0
Anguilla	0.0	0.0	0.0	0.0	0.0	0.0
Faroe Islands	0.1	0.1	0.0	0.0	0.0	0.1
Maldives	0.1	0.2	0.4	0.1	0.1	0.2
Democratic People's Republic of Korea	0.1	0.0	0.1	0.1	0.1	0.0
Saint Vincent and the Grenadines	0.1	0.1	0.1	0.0	0.0	0.0
Kosovo	0.1	0.0	0.1	0.0	0.0	0.1
South Sudan	0.1	0.1	0.2	0.1	0.1	0.1
Greenland	0.1	0.1	0.1	0.1	0.1	0.2
Suriname	0.1	0.0	0.0	0.0	0.0	0.0
American Samoa	0.1	0.0	0.0	0.2	0.0	0.1
Cabo Verde	0.1	0.2	0.3	0.1	0.1	0.1
Seychelles	0.2	0.0	0.0	0.0	0.1	0.0
Kyrgyzstan	0.2	0.4	3.6	0.2	0.2	0.5
Togo	0.3	0.3	1.4	0.3	0.2	0.2
Saint Lucia	0.3	0.2	0.1	0.1	0.1	0.0
Lesotho	0.3	0.5	1.6	0.4	0.3	0.5
French Polynesia	0.4	0.1	0.3	0.3	0.3	0.3
Guam	0.4	0.6	1.2	0.8	0.6	1.5
Armenia	0.4	0.6	1.3	0.1	0.1	0.1
Aruba	0.5	0.2	0.4	0.3	0.3	0.3
Fiji	0.5	0.6	1.4	0.4	0.4	0.3
Mongolia	0.5	1.0	1.7	0.3	0.5	0.6
Saint Kitts and Nevis	0.5	0.2	0.2	0.1	0.1	0.1
Brunei Darussalam	0.6	1.5	0.9	1.2	0.9	0.2
Samoa	0.6	0.1	0.0	2.1	1.4	0.0
Malta	0.6	7.7	4.2	4.8	6.4	3.6
New Caledonia	0.7	1.0	1.0	2.2	2.0	0.8
Liechtenstein	0.7	0.6	0.8	0.6	0.7	2.0
Moldova	0.7	0.3	3.6	0.2	0.2	0.7
Timor-Leste	0.7	0.2	0.2	0.7	0.6	0.2
Jamaica	0.8	1.4	6.1	1.3	1.2	1.1
North Macedonia	0.9	0.8	4.4	0.4	0.5	1.1
Equatorial Guinea	0.9	1.1	0.3	0.4	0.4	0.1
Palestinian Authority or West Bank and Gaza Strip	1.0	0.2	1.9	0.0	0.0	0.3
Albania	1.1	0.3	2.1	0.2	0.2	0.4
Rwanda	1.2	0.2	2.8	0.2	0.1	0.1
Georgia	1.2	0.7	3.9	1.0	0.8	1.2
Micronesia	1.3	0.0	0.0	0.2	0.3	0.0
Sint Maarten	1.4	0.2	0.0	0.1	0.6	0.0
Namibia	1.6	3.0	4.5	3.2	2.8	2.8

Table A 5: **Tax base allocation, aggregated CbCR data – single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Benin	1.7	0.7	3.8	0.3	0.2	0.2
Tajikistan	1.7	0.4	5.1	0.2	0.2	0.5
Marshall Islands	1.7	4.9	0.5	0.9	1.2	0.3
United States Virgin Islands	1.7	1.0	1.1	1.2	1.0	7.3
Malawi	1.8	0.7	9.1	0.5	0.6	0.3
Botswana	1.8	1.1	3.1	2.1	1.8	1.6
Estonia	1.8	1.9	4.4	4.0	4.3	2.3
Eswatini	2.0	0.4	1.5	0.7	0.9	0.5
Madagascar	2.0	0.6	9.6	0.6	0.5	0.4
Gabon	2.1	4.8	1.4	1.9	1.9	0.5
Turkmenistan	2.1	2.3	5.6	1.7	2.6	0.9
Chad	2.1	2.0	4.9	0.5	0.4	0.6
Zambia	2.6	6.0	13.3	16.4	15.0	4.3
Trinidad and Tobago	2.9	6.5	3.0	3.2	3.0	1.6
Lao People's Democratic Republic	2.9	2.1	5.5	1.3	1.2	1.0
Lebanon	3.0	5.3	11.7	6.5	6.6	4.5
Monaco	3.0	1.0	0.9	1.5	1.4	1.7
Guinea	3.1	1.0	3.9	1.0	0.8	0.4
Syrian Arab Republic	3.3	2.2	7.1	0.5	0.5	0.9
Bosnia and Herzegovina	3.5	1.2	7.6	1.2	1.3	1.8
Paraguay	3.7	4.0	8.0	2.2	2.6	1.5
Latvia	4.1	4.0	5.8	5.9	6.2	3.3
Nicaragua	4.3	1.5	8.8	1.9	1.8	1.0
Burkina Faso	4.5	1.9	9.2	0.8	0.6	1.0
Niger	4.8	3.6	9.0	0.5	0.5	0.2
Curaçao	4.8	0.1	0.2	0.4	1.0	0.2
Mali	4.9	2.7	8.3	0.5	0.3	0.6
Senegal	5.0	4.3	9.3	2.7	2.2	1.2
Zimbabwe	5.4	3.9	9.0	2.3	2.6	0.9
Bahrain	6.0	4.9	6.8	4.6	4.3	6.4
Kuwait	6.1	8.4	10.1	15.0	14.9	6.5
Tunisia	6.8	6.5	23.9	5.7	6.3	2.4
Papua New Guinea	7.1	18.8	8.0	4.8	4.0	0.5
Oman	7.6	12.7	18.8	13.2	13.9	16.7
Cameroon	8.1	7.0	14.4	5.5	4.5	1.1
Cambodia	8.7	5.9	33.5	4.0	3.8	3.6
El Salvador	8.7	4.4	20.1	4.6	4.4	2.4
Haiti	9.7	1.8	11.7	0.7	0.6	0.6
Honduras	9.9	5.1	32.1	4.2	4.2	4.3
Afghanistan	10.0	4.5	24.0	0.7	0.5	2.9
Jordan	10.0	11.7	22.5	7.7	8.3	7.2

Table A 5: **Tax base allocation, aggregated CbCR data – single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Bolivia	10.2	11.5	15.9	3.4	3.5	7.6
Côte d'Ivoire	10.9	10.1	20.0	8.3	8.4	2.0
Slovenia	11.2	14.1	12.7	17.8	19.0	12.8
Yemen	11.3	5.5	27.2	1.0	0.9	0.9
Lithuania	11.4	11.4	17.4	15.2	16.6	9.3
Uruguay	11.6	6.8	9.0	14.5	19.7	5.5
Uganda	11.7	11.6	18.8	4.7	3.8	1.3
Nepal	13.2	7.9	26.7	3.5	3.3	2.3
Qatar	13.2	13.1	8.7	20.7	22.3	14.0
Croatia	14.0	14.7	23.0	19.1	19.0	13.7
Tanzania	14.9	14.8	24.0	9.1	8.2	2.7
Sudan	14.9	17.5	20.3	10.3	9.4	1.6
Azerbaijan	15.1	16.6	23.9	9.3	9.6	9.1
Sri Lanka	15.4	14.6	33.3	13.1	12.7	2.9
Kenya	15.7	17.2	29.3	14.4	13.3	2.4
Cyprus	15.9	2.7	2.8	1.8	5.0	0.8
Serbia	16.3	15.8	42.4	16.8	17.8	8.9
Ghana	18.0	24.0	21.7	12.4	11.6	2.3
Bulgaria	19.4	21.1	48.4	22.8	24.6	14.7
Costa Rica	19.5	14.6	45.6	13.7	16.2	16.0
Libya	19.9	12.7	6.4	9.1	9.1	0.9
Angola	20.2	36.1	18.7	10.2	13.0	2.9
Belarus	20.5	18.4	33.4	18.7	19.1	6.8
Ethiopia	21.2	21.6	34.3	15.5	14.5	1.9
Democratic Republic of the Congo	21.5	27.7	24.4	7.6	8.3	3.6
Uzbekistan	21.8	16.5	38.2	13.0	13.9	6.1
Dominican Republic	24.3	29.0	44.8	28.1	28.0	5.9
Mauritius	25.5	6.6	6.9	7.8	9.0	3.2
Ecuador	25.6	30.9	44.7	31.5	30.0	9.7
Myanmar	26.1	21.1	47.7	13.6	13.2	3.7
Morocco	26.6	25.5	64.8	25.0	25.4	14.7
Guatemala	26.6	28.2	50.0	26.4	25.5	7.9
Greece	28.7	41.6	53.3	47.0	44.8	26.1
Cuba	30.5	21.7	20.3	24.4	25.7	0.9
Algeria	32.4	30.4	32.6	25.0	24.5	5.7
Slovak Republic	35.3	37.7	66.5	41.0	45.9	33.7
Bahamas	35.6	4.9	2.1	11.1	12.2	4.3
Iran	38.5	28.0	40.7	27.1	27.8	9.8
Isle of Man	39.7	5.1	0.7	3.7	8.0	4.0
Iraq	44.7	34.8	49.1	31.9	33.7	11.1
Macau (China)	45.5	34.6	29.4	51.0	50.7	36.9

Table A 5: **Tax base allocation, aggregated CbCR data – single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Nigeria	46.0	77.5	48.0	35.4	38.0	4.0
Barbados	46.6	22.7	0.6	0.9	14.2	0.3
Egypt	50.3	52.5	90.2	43.6	39.4	10.2
Ukraine	51.2	49.0	102.1	47.2	48.2	13.7
Panama	55.5	34.5	21.0	21.9	25.8	12.8
Jersey	55.7	6.4	0.6	8.6	10.5	1.0
Israel	56.8	54.3	54.0	44.7	54.1	68.0
Kazakhstan	58.6	60.8	53.7	33.8	34.4	16.3
Bangladesh	60.0	41.4	73.5	38.7	38.4	5.3
New Zealand	62.5	34.0	66.7	62.3	58.2	85.4
Romania	62.8	75.2	179.4	76.3	78.2	80.7
Hungary	63.3	69.5	125.8	71.3	80.4	63.2
Pakistan	75.4	49.8	92.6	47.2	44.7	7.2
Colombia	76.5	117.9	158.3	114.3	97.8	25.0
Philippines	82.1	71.2	305.2	56.8	64.4	34.9
Portugal	89.0	87.7	120.5	105.6	105.3	78.4
Czechia	94.6	98.0	152.4	101.3	103.4	88.3
Gibraltar	107.2	0.1	0.1	0.5	5.3	0.1
Chinese Taipei	108.0	98.7	224.4	116.7	115.4	167.5
Viet Nam	109.5	65.8	263.1	83.2	83.9	54.7
Finland	113.2	105.8	112.9	117.0	118.0	245.7
Peru	113.7	174.4	144.4	106.2	97.8	58.3
Argentina	119.3	136.7	184.2	151.3	142.7	93.0
United Arab Emirates	131.7	94.3	99.1	126.2	137.7	263.2
Thailand	147.8	144.7	305.1	137.8	158.4	62.0
Türkiye	151.8	121.5	199.9	152.5	146.9	84.9
Poland	156.4	169.9	342.9	184.1	185.3	179.5
British Virgin Islands	159.2	65.4	1.2	17.6	24.1	4.2
Chile	160.3	226.2	231.6	214.1	206.6	155.8
Russia	166.4	150.8	277.2	182.4	164.5	78.0
South Africa	171.5	196.7	286.7	199.8	192.4	68.4
Austria	199.7	181.4	160.7	181.8	186.7	224.8
Puerto Rico	235.7	48.6	30.3	35.8	80.6	17.9
Belgium	247.6	505.0	321.2	425.9	464.3	544.7
Denmark	268.6	222.1	118.3	218.0	226.7	239.3
Norway	295.3	246.3	186.2	258.7	254.1	316.3
Malaysia	300.7	249.5	338.2	229.6	253.6	179.7
Bermuda	329.8	50.2	1.4	31.2	73.8	5.0
Spain	340.9	427.2	446.8	413.4	430.4	504.4
Cayman Islands	355.0	61.4	3.4	52.3	98.3	0.7
Sweden	382.4	311.9	244.7	311.4	322.3	424.4

Table A 5: **Tax base allocation, aggregated CbCR data – single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Italy	409.3	485.2	489.6	549.0	522.9	539.0
Mexico	429.9	408.4	731.2	398.6	417.1	116.0
Ireland	468.7	347.4	114.8	353.8	518.5	179.3
India	543.0	439.1	1185.1	432.3	423.9	184.2
Indonesia	562.2	569.8	795.0	534.7	532.1	368.7
Brazil	604.2	601.3	883.9	642.0	596.2	358.8
Australia	716.6	895.9	746.1	795.7	726.5	990.8
Singapore	729.4	402.6	232.6	786.4	912.6	439.7
France	745.6	967.8	928.5	955.3	955.6	1,251.5
Hong Kong (China)	785.3	557.0	188.5	623.1	771.0	317.0
Switzerland	822.2	413.7	213.8	534.1	730.5	617.0
Netherlands	838.0	441.9	304.7	421.3	589.3	608.4
Korea	847.2	804.5	555.8	772.0	732.9	783.8
Saudi Arabia	1,056.1	989.3	915.9	842.0	868.8	845.8
Germany	1,057.9	1,284.2	1,247.1	1,251.5	1,325.2	1,758.3
Canada	1,301.3	1,324.1	1,246.7	1,349.3	1,292.7	2,099.2
United Kingdom	1,374.4	1,501.9	1,417.3	1,560.2	1,578.8	2,028.4
Japan	2,735.6	2,606.5	2,129.3	2,622.9	2,528.1	2,568.6
China (People's Republic of)	6,821.0	6,555.1	7,467.6	6,520.7	6,428.3	5,674.9
United States	9,157.2	11,025.5	9,030.5	11,122.0	10,261.3	11,875.8
Country group		**Tax base by country group (in bn. USD)**				
High income	22,444.0	25,127.4	22,185.9	25,138.0	24,205.8	28,539.7
Upper middle income	9,702.6	9,572.9	12,391.6	9,455.7	9,359.0	7,399.7
Lower middle income	1,252.3	1,083.5	2,615.6	927.6	920.7	381.8
Low income	107.4	111.9	229.0	50.1	47.2	19.2
Tax haven/investment hub	5,164.0	2,774.5	1,248.1	3,098.9	4,137.6	2,329.8
Total	**38,670.3**	**38,670.3**	**38,670.3**	**38,670.3**	**38,670.3**	**38,670.3**

Source: OECD, own calculations.

Table A 6: **Tax base allocation, aggregated CbCR data – weighted formulas**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Venezuela	-356.9	-142.7	-141.7	-143.7	-160.3
Luxembourg	-27.1	112.9	109.2	116.6	107.7
Mozambique	-8.2	6.8	9.0	4.5	6.1
Bailiwick of Guernsey	-1.3	1.6	1.6	1.7	1.5
Congo	-1.2	3.0	3.1	2.8	2.4
Northern Mariana Islands	-0.3	0.2	0.2	0.2	0.2
Guyana	-0.3	0.4	0.5	0.4	0.4
Andorra	-0.2	0.0	0.0	0.0	0.0
Turks and Caicos Islands	-0.1	0.0	0.0	0.1	0.0
Montenegro	-0.1	0.4	0.5	0.4	0.4
Central African Republic	-0.1	0.0	0.0	0.0	0.0
Vanuatu	-0.1	0.0	0.1	0.0	0.0
Mauritania	-0.1	0.1	0.1	0.0	0.1
Cook Islands	-0.0	0.0	0.0	0.0	0.0
Iceland	-0.0	2.3	2.1	2.4	1.9
Gambia	-0.0	0.1	0.1	0.0	0.1
Somalia	-0.0	0.1	0.1	0.0	0.0
Guinea-Bissau	-0.0	0.0	0.0	0.0	0.0
Guadeloupe	-0.0	0.0	0.0	0.1	0.0
Sao Tome and Principe	-0.0	0.0	0.0	0.0	0.0
Comoros	-0.0	0.0	0.0	0.0	0.0
Nauru	-0.0	0.0	0.0	0.0	0.0
Kiribati	0.0	0.0	0.0	0.0	0.0
Tonga	0.0	0.0	0.0	0.0	0.0
Grenada	0.0	0.0	0.0	0.0	0.0
Martinique	0.0	0.0	0.0	0.0	0.0
Dominica	0.0	0.0	0.0	0.0	0.0
Falkland Islands (Malvinas)	0.0	0.0	0.0	0.0	0.0
San Marino	0.0	0.0	0.0	0.0	0.0
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0
Wallis and Futuna	0.0	0.0	0.0	0.0	0.0
Sierra Leone	0.0	0.1	0.2	0.0	0.1
French Guiana	0.0	0.0	0.0	0.0	0.0
Djibouti	0.0	0.0	0.0	0.0	0.0
British Indian Ocean Territory	0.0	0.0	0.0	0.0	0.0
Réunion	0.0	0.0	0.0	0.0	0.0
Palau	0.0	0.0	0.0	0.0	0.0
Burundi	0.0	0.1	0.2	0.0	0.1
Belize	0.0	0.0	0.0	0.0	0.0
Bhutan	0.0	0.0	0.0	0.0	0.0
Liberia	0.0	1.3	1.5	1.1	1.4

Table A 6: **Tax base allocation, aggregated CbCR data – weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Solomon Islands	0.0	0.0	0.1	0.0	0.1
Anguilla	0.0	0.0	0.0	0.0	0.0
Faroe Islands	0.1	0.1	0.1	0.1	0.1
Maldives	0.1	0.2	0.2	0.2	0.2
Democratic People's Republic of Korea	0.1	0.1	0.1	0.1	0.1
Saint Vincent and the Grenadines	0.1	0.1	0.1	0.1	0.1
Kosovo	0.1	0.1	0.1	0.0	0.1
South Sudan	0.1	0.1	0.1	0.1	0.1
Greenland	0.1	0.1	0.1	0.1	0.1
Suriname	0.1	0.0	0.0	0.0	0.0
American Samoa	0.1	0.1	0.1	0.1	0.1
Cabo Verde	0.1	0.2	0.2	0.1	0.1
Seychelles	0.2	0.0	0.0	0.0	0.0
Kyrgyzstan	0.2	0.9	1.4	0.4	0.7
Togo	0.3	0.4	0.6	0.3	0.4
Saint Lucia	0.3	0.1	0.1	0.1	0.1
Lesotho	0.3	0.6	0.8	0.4	0.6
French Polynesia	0.4	0.2	0.2	0.2	0.3
Guam	0.4	0.9	0.9	1.0	0.9
Armenia	0.4	0.5	0.6	0.3	0.4
Aruba	0.5	0.3	0.3	0.3	0.3
Fiji	0.5	0.6	0.8	0.4	0.6
Mongolia	0.5	0.8	1.0	0.7	0.7
Saint Kitts and Nevis	0.5	0.1	0.2	0.1	0.1
Brunei Darussalam	0.6	1.1	1.2	1.0	1.1
Samoa	0.6	0.7	0.7	0.7	1.1
Malta	0.6	5.5	5.6	5.4	5.3
New Caledonia	0.7	1.4	1.4	1.3	1.6
Liechtenstein	0.7	0.9	0.7	1.1	0.8
Moldova	0.7	0.9	1.4	0.4	0.7
Timor-Leste	0.7	0.4	0.4	0.4	0.5
Jamaica	0.8	2.1	3.0	1.3	1.9
North Macedonia	0.9	1.3	1.9	0.7	1.1
Equatorial Guinea	0.9	0.6	0.6	0.5	0.5
Palestinian Authority or West Bank and Gaza Strip	1.0	0.4	0.7	0.2	0.3
Albania	1.1	0.6	0.9	0.3	0.5
Rwanda	1.2	0.6	1.1	0.2	0.5
Georgia	1.2	1.4	1.9	0.9	1.3
Micronesia	1.3	0.1	0.1	0.1	0.1
Sint Maarten	1.4	0.1	0.1	0.1	0.1
Namibia	1.6	3.3	3.6	3.0	3.3

Table A 6: **Tax base allocation, aggregated CbCR data – weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Benin	1.7	1.0	1.6	0.4	0.8
Tajikistan	1.7	1.1	1.9	0.4	0.9
Marshall Islands	1.7	2.1	2.1	2.0	1.8
United States Virgin Islands	1.7	2.1	1.1	3.2	1.9
Malawi	1.8	1.9	3.3	0.5	1.6
Botswana	1.8	1.8	2.1	1.6	1.9
Estonia	1.8	3.1	3.4	2.7	3.3
Eswatini	2.0	0.7	0.9	0.6	0.7
Madagascar	2.0	2.1	3.6	0.5	1.7
Gabon	2.1	2.6	2.7	2.4	2.4
Turkmenistan	2.1	2.4	3.2	1.6	2.2
Chad	2.1	1.7	2.4	1.0	1.4
Zambia	2.6	10.4	11.9	8.9	11.9
Trinidad and Tobago	2.9	4.0	4.2	3.8	3.8
Lao People's Democratic Republic	2.9	2.2	3.0	1.5	2.0
Lebanon	3.0	6.6	7.8	5.5	6.6
Monaco	3.0	1.3	1.1	1.4	1.3
Guinea	3.1	1.4	1.9	0.8	1.3
Syrian Arab Republic	3.3	2.2	3.3	1.2	1.8
Bosnia and Herzegovina	3.5	2.4	3.3	1.4	2.1
Paraguay	3.7	3.6	4.7	2.6	3.3
Latvia	4.1	4.8	5.2	4.4	5.1
Nicaragua	4.3	2.8	4.1	1.5	2.5
Burkina Faso	4.5	2.5	3.9	1.2	2.1
Niger	4.8	2.9	4.4	1.4	2.3
Curaçao	4.8	0.2	0.2	0.2	0.3
Mali	4.9	2.5	3.8	1.2	2.0
Senegal	5.0	4.1	5.5	2.7	3.8
Zimbabwe	5.4	3.7	5.1	2.3	3.3
Bahrain	6.0	5.4	5.4	5.3	5.2
Kuwait	6.1	10.6	11.2	10.0	11.7
Tunisia	6.8	8.5	12.1	4.9	7.8
Papua New Guinea	7.1	9.2	10.5	8.0	8.1
Oman	7.6	14.5	14.9	14.2	14.2
Cameroon	8.1	6.8	9.0	4.6	6.5
Cambodia	8.7	9.5	14.5	4.5	8.1
El Salvador	8.7	6.8	9.8	3.8	6.3
Haiti	9.7	2.8	4.5	1.0	2.2
Honduras	9.9	9.2	13.9	4.5	7.9
Afghanistan	10.0	6.2	9.7	2.7	4.8
Jordan	10.0	11.4	14.0	8.9	10.5

Table A 6: **Tax base allocation, aggregated CbCR data – weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Bolivia	10.2	9.0	10.4	7.6	7.6
Côte d'Ivoire	10.9	9.8	12.8	6.8	9.4
Slovenia	11.2	14.9	14.9	14.9	15.6
Yemen	11.3	6.7	11.1	2.4	5.3
Lithuania	11.4	13.3	14.7	11.9	13.8
Uruguay	11.6	9.5	10.1	8.9	10.8
Uganda	11.7	8.8	11.7	5.8	7.7
Nepal	13.2	8.6	12.7	4.6	7.4
Qatar	13.2	15.0	14.1	15.9	16.4
Croatia	14.0	17.4	19.0	15.8	17.8
Tanzania	14.9	12.4	16.0	8.9	11.6
Sudan	14.9	12.9	15.9	9.8	12.2
Azerbaijan	15.1	14.1	16.6	11.7	12.9
Sri Lanka	15.4	15.2	20.3	10.2	14.7
Kenya	15.7	15.8	20.3	11.3	15.5
Cyprus	15.9	2.1	2.4	1.8	2.0
Serbia	16.3	19.4	25.0	13.8	18.8
Ghana	18.0	16.1	19.3	12.8	15.2
Bulgaria	19.4	25.2	30.8	19.5	24.6
Costa Rica	19.5	19.8	24.8	14.8	18.3
Libya	19.9	8.4	9.3	7.5	8.5
Angola	20.2	19.0	21.6	16.3	16.8
Belarus	20.5	19.0	23.5	14.6	18.9
Ethiopia	21.2	18.4	23.8	13.0	17.7
Democratic Republic of the Congo	21.5	15.4	18.8	12.0	13.5
Uzbekistan	21.8	17.1	22.4	11.8	16.1
Dominican Republic	24.3	27.5	34.0	21.0	27.6
Mauritius	25.5	6.5	7.1	5.9	6.8
Ecuador	25.6	29.9	35.7	24.0	30.3
Myanmar	26.1	20.1	27.4	12.8	18.5
Morocco	26.6	30.1	38.5	21.7	28.8
Guatemala	26.6	27.8	34.9	20.8	27.5
Greece	28.7	42.8	47.3	38.2	43.8
Cuba	30.5	18.9	22.1	15.6	20.3
Algeria	32.4	24.8	29.3	20.3	24.9
Slovak Republic	35.3	43.0	48.4	37.5	42.5
Bahamas	35.6	6.4	6.1	6.8	7.6
Iran	38.5	26.8	32.0	21.6	26.9
Isle of Man	39.7	3.7	3.2	4.3	3.7
Iraq	44.7	32.2	38.6	25.9	32.1
Macau (China)	45.5	39.5	38.3	40.7	42.4

Table A 6: **Tax base allocation, aggregated CbCR data – weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Nigeria	46.0	46.1	53.5	38.7	43.4
Barbados	46.6	7.9	8.0	7.8	6.2
Egypt	50.3	48.7	62.1	35.4	47.4
Ukraine	51.2	51.4	66.1	36.6	50.3
Panama	55.5	24.4	25.8	23.0	23.7
Jersey	55.7	5.3	5.2	5.3	6.1
Israel	56.8	53.3	51.0	55.7	51.2
Kazakhstan	58.6	43.1	49.4	36.9	40.8
Bangladesh	60.0	39.8	51.2	28.5	39.6
New Zealand	62.5	57.5	54.3	60.6	58.7
Romania	62.8	93.9	110.4	77.4	89.5
Hungary	63.3	78.5	88.9	68.0	76.7
Pakistan	75.4	49.0	63.2	34.7	48.5
Colombia	76.5	107.9	130.2	85.6	109.5
Philippines	82.1	99.5	144.9	54.3	88.8
Portugal	89.0	97.6	104.6	90.6	99.6
Czechia	94.6	106.6	117.3	95.9	105.3
Gibraltar	107.2	0.2	0.2	0.2	0.3
Chinese Taipei	108.0	137.5	147.0	128.1	132.3
Viet Nam	109.5	102.6	137.4	67.9	97.8
Finland	113.2	134.0	111.9	156.2	129.8
Peru	113.7	127.3	141.8	112.8	122.0
Argentina	119.3	142.2	157.5	126.9	144.5
United Arab Emirates	131.7	133.9	106.5	161.3	132.0
Thailand	147.8	155.3	196.0	114.7	150.9
Türkiye	151.8	138.8	158.0	119.6	142.2
Poland	156.4	205.2	232.5	177.9	199.9
British Virgin Islands	159.2	28.6	28.1	29.0	25.8
Chile	160.3	211.3	224.0	198.6	212.0
Russia	166.4	170.2	203.6	136.9	173.3
South Africa	171.5	191.3	227.9	154.9	193.5
Austria	199.7	185.3	174.6	196.0	184.4
Puerto Rico	235.7	36.1	38.2	33.9	36.0
Belgium	247.6	454.5	417.2	491.7	447.3
Denmark	268.6	206.3	186.1	226.5	209.3
Norway	295.3	252.0	230.3	273.7	253.7
Malaysia	300.7	246.0	272.5	219.5	241.9
Bermuda	329.8	28.0	27.5	28.6	28.8
Spain	340.9	438.9	429.3	448.5	432.5
Cayman Islands	355.0	38.5	39.0	38.0	41.9
Sweden	382.4	319.3	289.3	349.3	317.3

Table A 6: **Tax base allocation, aggregated CbCR data – weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Italy	409.3	516.2	508.0	524.4	524.4
Mexico	429.9	410.3	514.0	307.2	407.4
Ireland	468.7	282.0	271.6	292.5	299.9
India	543.0	519.3	687.4	351.7	497.6
Indonesia	562.2	561.9	633.1	490.8	555.1
Brazil	604.2	621.4	709.4	533.5	626.5
Singapore	716.6	853.1	812.3	893.9	838.8
Australia	729.4	508.1	473.8	542.4	577.6
France	745.6	1,004.7	950.7	1058.6	992.3
Hong Kong (China)	785.3	477.4	456.2	498.7	513.8
Switzerland	822.2	454.2	387.0	521.3	474.1
Netherlands	838.0	439.7	389.0	490.2	435.1
Korea	847.2	748.8	710.8	786.8	754.6
Germany	1,056.1	904.0	915.7	892.3	888.5
Saudi Arabia	1,057.9	1,346.8	1,261.3	1,432.3	1,323.0
Canada	1,301.3	1,450.4	1,306.9	1,593.5	1,425.1
United Kingdom	1,374.4	1,594.9	1,493.0	1,696.7	1,586.3
Japan	2,735.6	2,526.3	2,453.2	2,599.4	2,550.4
China (People´s Republic of)	6,821.0	6,549.3	6,849.6	6,249.5	6,542.2
United States	9,157.2	10,868.6	10,388.3	11,346.6	10,931.9
Country group		**Tax base by country group (in bn. USD)**			
High income	22,444.0	25,214.0	24,147.6	26,277.7	25,195.0
Upper middle income	9,702.6	9,641.4	10,477.9	8,806.7	9,595.0
Lower middle income	1,252.3	1,170.0	1,544.3	796.7	1,109.5
Low income	107.4	93.9	128.6	59.2	83.0
Tax haven/investment hub	5,164.0	2,551.0	2,371.9	2,730.0	2,687.8
Total	**38,670.3**	**38,670.3**	**38,670.3**	**38,670.3**	**38,670.3**

Notes: 'CCCTB' uses 1/6 number of employees, 1/6 cost of employees, 1/3 tangible assets and 1/3 sales. 'Massachusetts (employees)' uses 1/3 number of employees, 1/3 tangible assets and 1/3 sales. Massachusetts (payroll) ' uses 1/3 cost of employees, 1/3 tangible assets and 1/3 sales. 'Double Sales' uses ½ sales, ¼ tangible assets, 1/8 number of employees, 1/8 cost of employees. Note, that the public CBCR data sales to unrelated parties are not explicitly defined, therefore likely to be by origin.

Source: OECD, own calculations.

Table A 7: **Tax base allocation, aggregated CbCR data (cross-section)– single factors**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Venezuela	-357.0	-18.5	9.0	-16.6	-11.4	2.9
Luxembourg	-36.6	217.4	18.5	95.0	157.3	43.3
Mozambique	-10.1	8.0	13.9	3.9	4.0	1.9
Kosovo	-2.6	0.0	0.2	0.0	0.0	0.1
Congo	-1.3	7.6	1.2	0.8	1.3	0.2
Bailiwick of Guernsey	-1.2	2.6	1.0	1.3	1.5	1.7
Guyana	-0.4	1.0	0.2	0.2	0.2	0.1
Northern Mariana Islands	-0.3	0.2	0.1	0.1	0.1	0.2
Zambia	-0.3	7.1	12.1	17.2	15.7	3.8
Andorra	-0.2	0.0	0.0	0.0	0.0	0.1
Turks and Caicos Islands	-0.1	0.0	0.1	0.0	0.0	0.1
Cook Islands	0.0	0.0	0.0	0.0	0.0	0.0
Sierra Leone	0.0	0.0	0.3	0.0	0.0	0.1
Somalia	0.0	0.1	0.2	0.0	0.0	0.0
Guadeloupe	0.0	0.0	0.1	0.0	0.0	0.1
Sao Tome and Principe	0.0	0.0	0.0	0.0	0.0	0.0
Guinea-Bissau	0.0	0.0	0.0	0.0	0.0	0.0
Nauru	0.0	0.0	0.0	0.0	0.0	0.0
Kiribati	0.0	0.0	0.0	0.0	0.0	0.0
Tonga	0.0	0.0	0.0	0.0	0.0	0.0
Mauritania	0.0	0.0	0.3	0.1	0.1	0.0
Grenada	0.0	0.0	0.0	0.0	0.0	0.0
Martinique	0.0	0.0	0.0	0.0	0.0	0.0
Dominica	0.0	0.0	0.0	0.0	0.0	0.0
Comoros	0.0	0.0	0.0	0.0	0.0	0.0
Falkland Islands (Malvinas)	0.0	0.0	0.0	0.0	0.0	0.0
San Marino	0.0	0.0	0.0	0.0	0.0	0.0
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0	0.0
Central African Republic	0.0	0.0	0.1	0.0	0.0	0.0
Wallis and Futuna	0.0	0.0	0.0	0.0	0.0	0.0
French Guiana	0.0	0.0	0.0	0.0	0.0	0.0
British Indian Ocean Territory	0.0	0.0	0.0	0.0	0.0	0.0
Réunion	0.0	0.0	0.0	0.0	0.0	0.0
Palau	0.0	0.0	0.0	0.0	0.0	0.0
Djibouti	0.0	0.0	0.0	0.0	0.0	0.0
Belize	0.0	0.0	0.0	0.0	0.0	0.0
Suriname	0.0	0.0	0.0	0.0	0.0	0.0
Gambia	0.0	0.0	0.2	0.1	0.0	0.0
Bhutan	0.0	0.0	0.0	0.0	0.0	0.0
Burundi	0.0	0.0	0.3	0.0	0.0	0.1
Solomon Islands	0.0	0.0	0.1	0.1	0.1	0.0

Table A 7: **Tax base allocation, aggregated CbCR data (cross-section)– single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Anguilla	0.0	0.0	0.0	0.0	0.0	0.0
South Sudan	0.0	0.2	2.9	0.1	0.1	0.8
Faroe Islands	0.1	0.1	0.0	0.0	0.0	0.1
Maldives	0.1	0.2	0.4	0.1	0.1	0.2
Democratic People's Republic of Korea	0.1	0.0	0.1	0.1	0.1	0.0
Saint Vincent and the Grenadines	0.1	0.1	0.1	0.0	0.0	0.0
Greenland	0.1	0.1	0.2	0.1	0.1	0.2
Liberia	0.1	1.6	1.0	1.8	1.6	0.0
Rwanda	0.1	0.2	2.7	0.1	0.1	0.1
American Samoa	0.1	0.0	0.0	0.1	0.1	0.1
Iceland	0.1	4.5	1.2	0.9	1.5	2.2
Cabo Verde	0.1	0.2	0.3	0.1	0.1	0.1
Mongolia	0.2	1.1	1.9	0.3	0.5	0.7
Jamaica	0.2	1.5	6.4	1.2	1.1	1.1
Montenegro	0.2	0.7	0.7	0.2	0.2	0.3
Seychelles	0.2	0.0	0.0	0.1	0.1	0.0
Benin	0.3	0.5	3.2	0.2	0.2	0.2
Saint Lucia	0.3	0.2	0.1	0.1	0.1	0.0
Togo	0.3	0.4	1.2	0.3	0.2	0.2
Lesotho	0.4	0.6	2.8	0.3	0.3	0.7
Chad	0.4	1.8	3.6	0.5	0.4	0.4
French Polynesia	0.4	0.1	0.3	0.3	0.3	0.3
Guam	0.4	0.6	1.3	0.8	0.6	1.5
Aruba	0.5	0.2	0.4	0.3	0.3	0.2
Fiji	0.5	0.7	1.4	0.4	0.4	0.3
Samoa	0.5	0.1	0.1	2.0	1.4	0.0
Saint Kitts and Nevis	0.6	0.2	0.2	0.1	0.1	0.1
Brunei Darussalam	0.6	1.5	0.9	1.2	0.9	0.2
Malawi	0.6	0.9	9.7	0.6	0.6	0.3
New Caledonia	0.7	1.0	1.0	2.3	2.1	0.8
Liechtenstein	0.7	0.6	0.8	0.6	0.7	1.9
Mali	0.7	2.9	6.2	0.3	0.2	0.4
Armenia	0.9	0.9	1.5	0.1	0.1	0.2
Niger	0.9	3.9	6.3	0.5	0.5	0.2
Tajikistan	1.0	0.5	7.0	0.2	0.2	0.6
Equatorial Guinea	1.0	1.2	0.3	0.4	0.4	0.1
Vanuatu	1.1	0.1	0.1	0.0	0.0	0.0
Micronesia	1.3	0.0	0.0	0.2	0.2	0.0
Malta	1.3	7.9	4.1	4.9	6.4	3.6
Sint Maarten	1.4	-0.2	0.0	-0.1	-0.5	0.0
Nicaragua	1.4	1.2	9.5	1.4	1.3	1.0

Table A 7: **Tax base allocation, aggregated CbCR data (cross-section)– single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Guinea	1.6	0.9	3.4	0.9	0.8	0.4
Marshall Islands	1.7	5.2	0.7	1.0	1.3	0.4
Namibia	1.8	2.7	4.2	3.2	2.8	2.1
Cameroon	1.9	5.8	10.6	4.7	3.8	0.8
United States Virgin Islands	1.9	1.1	1.0	1.1	1.0	2.5
Burkina Faso	1.9	1.6	7.0	0.7	0.6	0.8
Botswana	2.0	1.8	4.3	2.1	1.8	2.0
Eswatini	2.0	0.8	3.4	0.7	0.9	1.1
Gabon	2.1	4.8	1.4	1.9	1.9	0.5
Senegal	2.1	4.1	7.5	2.6	2.0	0.9
Syrian Arab Republic	2.2	5.6	26.6	0.9	0.5	3.2
Haiti	2.3	1.5	16.8	1.3	0.9	0.7
Trinidad and Tobago	2.3	6.7	3.1	3.3	3.0	1.7
Lao People's Democratic Republic	2.4	2.1	5.5	1.3	1.2	1.0
Estonia	3.0	2.0	4.6	6.6	6.3	2.5
Monaco	3.0	1.1	0.9	1.5	1.4	1.7
Honduras	3.2	5.5	36.7	4.0	3.9	4.9
Madagascar	3.5	0.6	6.0	0.5	0.4	0.2
El Salvador	3.8	4.9	22.6	4.5	4.2	2.6
Timor-Leste	4.4	0.2	0.1	0.6	0.5	0.1
Sudan	4.6	16.4	13.0	8.9	9.1	1.0
Zimbabwe	4.8	4.0	8.5	2.1	2.5	0.7
CuraÃ§ao	4.9	0.1	0.2	0.4	1.0	0.2
Georgia	4.9	0.7	4.3	1.0	0.8	1.2
Albania	5.2	0.3	5.1	0.2	0.2	1.0
Papua New Guinea	6.0	58.7	7.7	5.2	4.2	0.5
Tunisia	6.1	5.0	21.6	4.3	5.0	2.1
Uganda	6.1	11.9	16.6	4.0	3.2	1.4
Palestinian Authority or West Bank and Gaza Strip	6.4	0.2	2.7	0.1	0.1	0.4
Latvia	7.2	4.9	8.9	13.7	14.6	4.9
North Macedonia	7.9	0.7	5.3	0.4	0.6	1.2
Moldova	8.1	0.3	5.9	0.2	0.2	1.1
Kenya	8.4	11.0	21.6	10.0	9.1	1.9
Democratic Republic of the Congo	8.8	26.7	19.5	6.6	7.6	2.9
Côte d'Ivoire	9.0	7.9	15.3	6.5	6.8	1.5
Nepal	9.0	7.6	21.6	2.4	2.1	1.8
Kyrgyzstan	9.6	0.4	2.9	0.2	0.2	0.4
Cuba	9.8	40.6	40.5	46.3	44.6	1.7
Tanzania	9.9	12.5	16.2	6.9	6.4	1.9
Sri Lanka	9.9	12.0	29.7	11.4	11.1	2.5
Cambodia	11.0	5.7	34.3	3.8	3.6	4.6

Table A 7: **Tax base allocation, aggregated CbCR data (cross-section)– single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Bolivia	11.0	12.9	22.2	3.7	4.1	9.4
Ethiopia	11.2	10.0	20.6	8.2	7.6	1.3
Lebanon	11.5	6.0	12.6	7.1	7.3	4.8
Uruguay	12.2	7.0	8.8	17.2	23.4	5.1
Afghanistan	13.6	5.9	23.6	0.5	0.4	2.6
Costa Rica	14.0	19.3	49.8	21.3	23.1	17.1
Jordan	14.2	12.3	22.0	7.8	8.2	6.9
Slovenia	15.2	18.9	20.9	28.4	28.7	18.6
Ghana	15.9	28.0	16.5	10.2	9.6	1.7
Angola	17.3	35.7	14.5	9.4	12.6	2.3
Croatia	17.8	16.3	29.1	21.9	20.7	16.2
Morocco	17.9	18.6	59.5	18.4	19.5	13.1
Greece	18.2	40.2	50.8	45.8	43.9	25.1
Kuwait	18.7	10.8	14.5	18.9	19.5	8.8
Lithuania	18.9	13.1	23.0	18.4	19.1	11.8
Myanmar	19.3	19.1	41.1	11.0	10.9	4.3
Azerbaijan	19.6	16.5	23.3	10.0	10.0	8.7
Oman	19.7	12.3	19.0	13.5	14.1	15.8
Cyprus	19.7	3.2	5.3	2.9	6.4	4.8
Turkmenistan	21.1	3.6	9.1	3.4	4.9	1.4
Belarus	21.2	33.0	57.6	32.5	31.7	10.0
Yemen	21.3	15.0	39.3	2.3	2.2	1.5
Serbia	21.8	13.3	38.1	13.9	15.1	7.7
Bahrain	22.1	5.1	7.0	5.3	5.5	6.6
Dominican Republic	23.5	32.0	50.9	31.1	30.6	6.3
Libya	24.8	12.7	5.8	7.9	8.2	0.7
Bosnia and Herzegovina	25.1	1.3	23.3	1.2	1.5	4.9
Algeria	25.4	23.6	23.0	17.5	16.5	4.2
Mauritius	25.7	6.2	8.4	6.4	8.0	4.0
Uzbekistan	30.7	13.4	29.8	10.3	11.4	4.5
Qatar	30.8	12.9	11.2	20.5	22.1	17.5
Guatemala	31.7	31.2	53.7	28.7	28.0	7.8
Iran	31.7	28.9	48.9	29.9	30.1	10.9
Bulgaria	31.9	22.5	52.1	24.1	25.4	14.9
Ecuador	33.3	29.6	40.2	28.4	28.0	8.4
Slovak Republic	33.5	32.8	64.4	35.7	40.7	32.0
Bangladesh	36.0	33.1	61.2	28.9	28.7	5.1
Isle of Man	40.8	5.1	1.5	4.1	8.0	10.4
Paraguay	40.9	3.1	10.8	4.4	4.9	2.0
Nigeria	41.4	69.9	32.4	26.2	29.5	2.6
Iraq	41.5	29.3	40.3	25.3	27.0	9.1

Table A 7: **Tax base allocation, aggregated CbCR data (cross-section)– single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Pakistan	42.2	40.6	77.1	36.7	34.4	5.9
Ukraine	42.4	39.7	83.3	35.2	37.3	10.7
Bahamas	43.3	5.0	2.4	10.1	11.3	4.3
Egypt	44.4	42.0	74.8	32.8	29.1	8.2
Macau (China)	47.1	35.2	29.6	54.2	53.4	37.1
Barbados	47.4	22.4	0.6	1.0	14.4	0.4
Israel	49.4	49.5	53.8	38.7	48.1	66.1
Jersey	55.9	6.8	0.7	9.6	11.0	1.0
Kazakhstan	57.2	59.5	50.5	30.1	30.6	14.9
Colombia	59.4	82.4	141.0	80.4	74.9	22.0
Romania	59.6	67.8	170.6	64.8	67.7	77.9
Philippines	63.2	64.5	297.6	48.9	57.2	34.1
Panama	64.2	36.0	19.7	25.6	29.1	9.3
Hungary	67.9	62.4	115.8	63.0	72.5	58.0
New Zealand	71.4	75.8	66.6	122.2	119.5	85.2
Portugal	73.0	76.3	111.5	92.8	93.0	72.2
Czechia	89.9	91.9	144.6	91.7	93.3	81.9
Viet Nam	101.5	57.3	305.5	75.5	79.4	108.6
Argentina	102.2	122.7	170.7	136.6	130.7	87.0
Peru	104.6	152.3	138.3	91.7	86.5	51.8
Chinese Taipei	108.5	85.1	211.4	121.4	119.8	196.2
Gibraltar	115.9	0.1	0.1	0.5	5.4	0.1
Finland	123.2	122.0	143.7	127.3	126.3	279.5
Türkiye	128.6	107.9	182.1	137.6	132.3	78.6
Thailand	140.5	147.2	303.6	140.9	160.9	65.5
Russia	145.0	118.4	233.9	153.7	137.8	62.1
Poland	150.2	162.2	331.6	176.9	178.3	174.6
United Arab Emirates	158.6	93.1	100.7	124.6	138.8	261.8
British Virgin Islands	159.7	57.9	1.2	18.4	24.7	4.0
South Africa	173.3	178.2	258.5	194.5	185.0	49.4
Austria	188.9	169.8	151.5	167.2	172.8	204.9
Chile	193.2	243.6	226.7	202.4	197.6	152.3
Belgium	233.6	502.4	315.7	419.3	462.5	535.6
Puerto Rico	234.4	62.8	37.0	57.0	100.7	21.9
Denmark	262.5	217.8	112.2	207.4	216.4	225.7
Norway	289.0	237.3	182.2	246.6	242.1	315.1
Malaysia	297.5	208.1	334.3	213.3	239.8	179.7
Spain	322.8	408.9	435.3	392.5	411.7	490.0
Bermuda	329.0	52.0	1.4	32.8	75.4	5.0
Cayman Islands	360.5	60.1	3.4	52.6	81.4	0.7
Italy	385.8	466.7	469.5	528.7	503.2	513.8

Table A 7: **Tax base allocation, aggregated CbCR data (cross-section)– single factors (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by				
		Assets	No. employees	Turnover (unrelated)	Turnover (total)	Payroll
Sweden	400.6	318.6	250.9	317.7	327.6	432.4
Mexico	413.1	248.1	725.3	246.3	258.3	108.8
Ireland	485.5	342.1	107.9	349.7	517.5	167.7
India	492.0	426.0	1,176.6	410.6	404.1	183.7
Indonesia	542.2	573.6	677.0	465.9	463.7	188.1
Brazil	585.3	569.3	860.5	609.0	568.2	344.5
France	716.9	956.1	905.1	931.2	935.4	1,213.5
Singapore	752.9	400.7	237.7	781.6	910.0	435.8
Hong Kong (China)	799.5	553.3	188.9	625.8	772.0	316.6
Switzerland	823.5	406.6	205.3	534.3	734.8	586.6
Korea	832.0	797.5	631.9	816.6	787.1	804.2
Netherlands	834.5	440.3	314.9	402.6	572.2	542.2
Australia	883.2	1,098.3	933.6	1,009.6	925.5	1,209.8
Germany	1,030.1	1,264.5	1,229.7	1,230.9	1,306.9	1,723.6
Saudi Arabia	1,043.8	980.2	921.7	833.0	857.9	853.1
Canada	1,293.7	1,296.4	1,246.4	1,326.8	1,269.4	2,076.7
United Kingdom	1,370.5	1,493.4	1,424.5	1,550.6	1,561.4	2,078.2
Japan	2,719.4	2,588.8	2,130.1	2,640.4	2,539.7	2,553.7
China (People's Republic of)	6,787.4	6,554.7	7,486.4	6,510.0	6,428.1	5,704.4
United States	9,367.0	11,223.4	9,202.2	11,322.3	10,450.9	12,071.9
Country group	**Tax base by country group (in bn. USD)**					
High income	22,722.3	25,371.3	22,506.3	25,450.2	24,506.5	28,842.0
Upper middle income	9,601.6	9,450.6	12,208.0	9,314.2	9,223.8	7,219.3
Lower middle income	1,066.6	1,037.7	2,538.6	822.3	824.8	426.3
Low income	66.5	114.0	221.0	41.0	39.6	19.4
Tax haven/investment hub	5,281.6	2,765.0	1,264.7	3,110.9	4,143.9	2,231.5
Total	**38,738.7**	**38,738.7**	**38,738.7**	**38,738.7**	**38738.7**	**38738.7**

Source: OECD, own calculations.

Table A 8: **Tax base allocation, aggregated CbCR data (cross-section)– weighted formulas**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Venezuela	-357.0	-9.7	-8.7	-10.7	-11.4
Luxembourg	-36.6	113.4	109.6	117.3	108.8
Mozambique	-10.1	6.6	8.6	4.6	6.0
Kosovo	-2.6	0.1	0.1	0.1	0.1
Congo	-1.3	3.0	3.2	2.8	2.5
Bailiwick of Guernsey	-1.2	1.7	1.6	1.9	1.6
Guyana	-0.4	0.4	0.5	0.4	0.4
Northern Mariana Islands	-0.3	0.1	0.1	0.1	0.1
Zambia	-0.3	10.7	12.1	9.3	12.3
Andorra	-0.2	0.0	0.0	0.0	0.0
Turks and Caicos Islands	-0.1	0.0	0.0	0.1	0.0
Cook Islands	0.0	0.0	0.0	0.0	0.0
Sierra Leone	0.0	0.1	0.1	0.0	0.1
Somalia	0.0	0.1	0.1	0.0	0.0
Guadeloupe	0.0	0.0	0.0	0.1	0.0
Sao Tome and Principe	0.0	0.0	0.0	0.0	0.0
Guinea-Bissau	0.0	0.0	0.0	0.0	0.0
Nauru	0.0	0.0	0.0	0.0	0.0
Kiribati	0.0	0.0	0.0	0.0	0.0
Tonga	0.0	0.0	0.0	0.0	0.0
Mauritania	0.0	0.1	0.1	0.0	0.1
Grenada	0.0	0.0	0.0	0.0	0.0
Martinique	0.0	0.0	0.0	0.0	0.0
Dominica	0.0	0.0	0.0	0.0	0.0
Comoros	0.0	0.0	0.0	0.0	0.0
Falkland Islands (Malvinas)	0.0	0.0	0.0	0.0	0.0
San Marino	0.0	0.0	0.0	0.0	0.0
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0
Central African Republic	0.0	0.0	0.0	0.0	0.0
Wallis and Futuna	0.0	0.0	0.0	0.0	0.0
French Guiana	0.0	0.0	0.0	0.0	0.0
British Indian Ocean Territory	0.0	0.0	0.0	0.0	0.0
Réunion	0.0	0.0	0.0	0.0	0.0
Palau	0.0	0.0	0.0	0.0	0.0
Djibouti	0.0	0.0	0.0	0.0	0.0
Belize	0.0	0.0	0.0	0.0	0.0
Suriname	0.0	0.0	0.0	0.0	0.0
Gambia	0.0	0.1	0.1	0.0	0.1
Bhutan	0.0	0.0	0.0	0.0	0.0
Burundi	0.0	0.1	0.1	0.0	0.0
Solomon Islands	0.0	0.0	0.1	0.0	0.1

Table A 8: **Tax base allocation, aggregated CbCR data (cross-section)– weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Anguilla	0.0	0.0	0.0	0.0	0.0
South Sudan	0.0	0.7	1.0	0.4	0.5
Faroe Islands	0.1	0.1	0.1	0.1	0.1
Maldives	0.1	0.2	0.2	0.2	0.2
Democratic People's Republic of Korea	0.1	0.1	0.1	0.0	0.1
Saint Vincent and the Grenadines	0.1	0.1	0.1	0.1	0.1
Greenland	0.1	0.1	0.1	0.1	0.1
Liberia	0.1	1.3	1.5	1.1	1.4
Rwanda	0.1	0.6	1.0	0.1	0.5
American Samoa	0.1	0.1	0.1	0.1	0.1
Iceland	0.1	2.3	2.2	2.5	2.0
Cabo Verde	0.1	0.2	0.2	0.1	0.2
Mongolia	0.2	0.9	1.1	0.7	0.8
Jamaica	0.2	2.2	3.1	1.3	1.9
Montenegro	0.2	0.5	0.5	0.4	0.4
Seychelles	0.2	0.0	0.0	0.0	0.1
Benin	0.3	0.8	1.3	0.3	0.7
Saint Lucia	0.3	0.1	0.1	0.1	0.1
Togo	0.3	0.5	0.6	0.3	0.4
Lesotho	0.4	0.9	1.3	0.6	0.8
Chad	0.4	1.4	2.0	0.9	1.2
French Polynesia	0.4	0.3	0.3	0.3	0.3
Guam	0.4	0.9	0.9	1.0	0.9
Aruba	0.5	0.3	0.3	0.3	0.3
Fiji	0.5	0.6	0.8	0.4	0.6
Samoa	0.5	0.7	0.7	0.7	1.0
Saint Kitts and Nevis	0.6	0.2	0.2	0.1	0.1
Brunei Darussalam	0.6	1.1	1.2	1.0	1.1
Malawi	0.6	2.0	3.4	0.6	1.6
New Caledonia	0.7	1.4	1.4	1.4	1.6
Liechtenstein	0.7	0.9	0.7	1.1	0.8
Mali	0.7	2.2	3.2	1.2	1.7
Armenia	0.9	0.6	0.8	0.4	0.5
Niger	0.9	2.5	3.6	1.5	2.0
Tajikistan	1.0	1.2	2.0	0.4	0.9
Equatorial Guinea	1.0	0.6	0.6	0.6	0.5
Vanuatu	1.1	0.0	0.1	0.0	0.0
Micronesia	1.3	0.1	0.1	0.1	0.1
Malta	1.3	5.5	5.6	5.4	5.4
Sint Maarten	1.4	-0.1	-0.1	-0.1	-0.1
Nicaragua	1.4	2.6	4.1	1.2	2.3

Table A 8: **Tax base allocation, aggregated CbCR data (cross-section)– weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Guinea	1.6	1.2	1.7	0.7	1.2
Marshall Islands	1.7	2.2	2.3	2.2	1.9
Namibia	1.8	3.0	3.4	2.7	3.1
Cameroon	1.9	5.4	7.0	3.8	5.2
United States Virgin Islands	1.9	1.3	1.0	1.6	1.3
Burkina Faso	1.9	1.9	2.8	1.0	1.6
Botswana	2.0	2.3	2.7	1.9	2.3
Eswatini	2.0	1.3	1.7	0.9	1.2
Gabon	2.1	2.6	2.7	2.4	2.4
Senegal	2.1	3.6	4.7	2.5	3.4
Syrian Arab Republic	2.2	5.4	8.0	2.9	4.3
Haiti	2.3	3.8	6.5	1.1	3.2
Trinidad and Tobago	2.3	4.1	4.3	3.8	3.9
Lao People's Democratic Republic	2.4	2.2	3.0	1.5	2.0
Estonia	3.0	4.1	4.4	3.7	4.7
Monaco	3.0	1.3	1.2	1.4	1.4
Honduras	3.2	10.1	15.5	4.8	8.6
Madagascar	3.5	1.4	2.4	0.4	1.2
El Salvador	3.8	7.4	10.7	4.0	6.6
Timor-Leste	4.4	0.3	0.3	0.3	0.4
Sudan	4.6	10.7	12.7	8.7	10.3
Zimbabwe	4.8	3.6	4.9	2.2	3.2
Curaçao	4.9	0.2	0.2	0.2	0.3
Georgia	4.9	1.5	2.0	1.0	1.3
Albania	5.2	1.2	1.9	0.5	1.0
Papua New Guinea	6.0	22.6	23.9	21.4	18.3
Tunisia	6.1	7.0	10.3	3.8	6.4
Uganda	6.1	8.3	10.8	5.8	7.2
Palestinian Authority or West Bank and Gaza Strip	6.4	0.6	1.0	0.2	0.5
Latvia	7.2	6.9	7.5	6.2	7.4
North Macedonia	7.9	1.5	2.2	0.8	1.2
Moldova	8.1	1.3	2.1	0.5	1.0
Kenya	8.4	10.9	14.2	7.6	10.6
Democratic Republic of the Congo	8.8	14.8	17.6	12.0	12.8
Côte d'Ivoire	9.0	7.6	9.9	5.3	7.3
Nepal	9.0	7.2	10.6	3.9	6.0
Kyrgyzstan	9.6	0.8	1.2	0.4	0.6
Cuba	9.8	36.0	42.5	29.5	38.5
Tanzania	9.9	9.5	11.9	7.1	8.8
Sri Lanka	9.9	13.2	17.7	8.6	12.7
Cambodia	11.0	9.7	14.6	4.7	8.2

Table A 8: **Tax base allocation, aggregated CbCR data (cross-section)– weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Bolivia	11.0	10.8	12.9	8.6	9.0
Ethiopia	11.2	9.7	12.9	6.5	9.3
Lebanon	11.5	7.2	8.5	5.9	7.2
Uruguay	12.2	10.4	11.0	9.8	12.1
Afghanistan	13.6	6.5	10.0	3.0	5.0
Costa Rica	14.0	24.7	30.3	19.2	23.9
Jordan	14.2	11.5	14.0	9.0	10.6
Slovenia	15.2	22.4	22.8	22.0	23.9
Ghana	15.9	15.7	18.2	13.2	14.4
Angola	17.3	17.7	19.8	15.7	15.6
Croatia	17.8	20.3	22.5	18.1	20.7
Morocco	17.9	24.5	32.2	16.7	22.9
Greece	18.2	41.3	45.6	37.0	42.4
Kuwait	18.7	13.8	14.7	12.8	15.0
Lithuania	18.9	16.3	18.2	14.4	16.8
Myanmar	19.3	17.6	23.7	11.4	15.9
Azerbaijan	19.6	14.1	16.6	11.7	13.1
Oman	19.7	14.4	14.9	13.8	14.1
Cyprus	19.7	3.7	3.8	3.6	3.5
Turkmenistan	21.1	4.1	5.4	2.8	3.9
Belarus	21.2	33.0	40.9	25.1	32.9
Yemen	21.3	7.5	11.2	3.8	6.2
Serbia	21.8	16.7	21.8	11.6	16.0
Bahrain	22.1	5.7	5.8	5.7	5.6
Dominican Republic	23.5	30.5	38.0	23.1	30.7
Libya	24.8	7.9	8.8	7.1	7.9
Bosnia and Herzegovina	25.1	3.8	5.7	1.9	3.1
Algeria	25.4	18.2	21.4	15.1	18.0
Mauritius	25.7	6.3	7.0	5.5	6.3
Uzbekistan	30.7	13.6	17.8	9.4	12.8
Qatar	30.8	15.9	14.9	16.9	17.1
Guatemala	31.7	30.2	37.9	22.5	29.8
Iran	31.7	29.5	35.9	23.2	29.6
Bulgaria	31.9	26.7	32.9	20.5	26.1
Ecuador	33.3	27.4	32.7	22.1	27.6
Slovak Republic	33.5	38.9	44.4	33.5	38.1
Bangladesh	36.0	31.6	41.0	22.3	30.9
Isle of Man	40.8	5.1	3.6	6.6	4.8
Paraguay	40.9	4.6	6.1	3.2	4.6
Nigeria	41.4	37.6	42.7	32.6	34.8
Iraq	41.5	26.4	31.6	21.1	26.1

Table A 8: **Tax base allocation, aggregated CbCR data (cross-section)– weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Pakistan	42.2	39.5	51.5	27.6	38.8
Ukraine	42.4	40.5	52.8	28.4	39.2
Bahamas	43.3	6.1	5.8	6.5	7.1
Egypt	44.4	38.7	49.9	27.5	37.2
Macau (China)	47.1	40.8	39.6	42.1	44.2
Barbados	47.4	7.8	7.9	7.8	6.1
Israel	49.4	49.4	47.3	51.4	46.7
Jersey	55.9	5.7	5.7	5.8	6.7
Kazakhstan	57.2	40.7	46.7	34.7	38.0
Colombia	59.4	81.3	101.4	61.3	81.1
Romania	59.6	85.6	101.2	70.1	80.4
Philippines	63.2	93.3	137.8	49.1	82.2
Panama	64.2	25.3	27.1	23.6	25.4
Hungary	67.9	70.7	80.5	61.1	68.8
New Zealand	71.4	91.4	88.3	94.5	99.1
Portugal	73.0	86.9	93.6	80.3	88.4
Czechia	89.9	99.0	109.6	88.5	97.2
Viet Nam	101.5	113.2	146.3	80.3	103.8
Argentina	102.2	129.3	143.5	115.3	131.1
Peru	104.6	112.6	127.2	98.0	107.3
Chinese Taipei	108.5	137.2	139.8	134.6	133.2
Gibraltar	115.9	0.2	0.2	0.2	0.3
Finland	123.2	154.0	131.1	176.7	147.4
Türkiye	128.6	125.2	142.6	107.9	128.3
Thailand	140.5	157.5	197.6	117.6	153.3
Russia	145.0	139.9	169.0	111.0	143.3
Poland	150.2	197.5	224.0	171.2	192.4
United Arab Emirates	158.6	133.1	106.1	160.1	131.0
British Virgin Islands	159.7	26.3	25.8	26.8	24.3
South Africa	173.3	175.0	210.6	139.7	179.8
Austria	188.9	171.8	162.8	180.7	170.6
Chile	193.2	211.8	224.4	199.2	209.4
Belgium	233.6	449.2	412.4	485.9	441.7
Puerto Rico	234.4	49.6	52.2	47.0	51.4
Denmark	262.5	198.2	179.1	217.2	200.5
Norway	289.0	244.4	222.0	266.6	244.9
Malaysia	297.5	226.1	252.1	200.2	222.9
Spain	322.8	421.6	412.5	430.7	414.3
Bermuda	329.0	29.1	28.6	29.7	30.0
Cayman Islands	360.5	38.1	38.6	37.6	41.7
Italy	385.8	495.9	488.5	503.2	504.1

Table A 8: **Tax base allocation, aggregated CbCR data (cross-section)– weighted formulas (continued)**

Country	Baseline tax base (in Bn. USD)	Tax base (in bn. USD) with formula apportionment by			
		CCCTB	Massachusetts (employees)	Massachusetts (payroll)	Double Sales weighted
Sweden	400.6	326.6	296.2	356.4	324.4
Mexico	413.1	303.9	408.2	200.3	289.5
Ireland	485.5	275.7	266.2	285.3	294.1
India	492.0	506.4	673.9	339.8	482.5
Indonesia	542.2	490.5	572.4	408.7	484.3
Brazil	585.3	593.4	680.3	506.8	597.3
France	716.9	983.3	931.8	1,034.6	970.2
Singapore	752.9	506.1	473.4	538.8	574.9
Hong Kong (China)	799.5	477.1	456.1	498.2	514.3
Switzerland	823.5	445.7	381.8	509.3	467.8
Korea	832.0	777.5	748.8	806.2	787.3
Netherlands	834.5	423.8	385.8	461.7	418.5
Australia	883.2	1,060.3	1,014.0	1,106.5	1,047.7
Germany	1,030.1	1,325.2	1,242.3	1,408.0	1,301.7
Saudi Arabia	1,043.8	900.2	911.7	888.7	883.4
Canada	1,293.7	1,430.8	1,290.2	1,570.7	1,404.8
United Kingdom	1,370.5	1,599.1	1,489.6	1,708.3	1,587.0
Japan	2,719.4	2,528.8	2,461.0	2,596.2	2,556.6
China (People's Republic of)	6,787.4	6,555.1	6,854.4	6,256.6	6,544.9
United States	9,367.0	11,062.2	10,576.2	11,544.7	11,127.2
Country group		**Tax base by country group (in bn. USD)**			
High income	22,722.3	25,511.0	24,447.5	26,569.3	25,494.8
Upper middle income	9,601.6	9,490.9	10,329.6	8,655.9	9,447.7
Lower middle income	1,066.6	1,114.0	1,469.3	760.4	1,041.2
Low income	66.5	84.4	113.8	55.0	73.6
Tax haven/investment hub	5,281.6	2,538.4	2,378.4	2,698.1	2,681.4
Total	**38,738.7**	**38,738.7**	**38,738.7**	**38,738.7**	**38,738.7**

Notes: 'CCCTB' uses 1/6 number of employees, 1/6 cost of employees, 1/3 tangible assets and 1/3 sales. 'Massachusetts (employees)' uses 1/3 number of employees, 1/3 tangible assets and 1/3 sales. Massachusetts (payroll) ' uses 1/3 cost of employees, 1/3 tangible assets and 1/3 sales. 'Double Sales' uses ½ sales, ¼ tangible assets, 1/8 number of employees, 1/8 cost of employees. Note, that the public CBCR data sales to unrelated parties are not explicitly defined, therefore likely to be by origin.

Source: OECD, own calculations.

Table A 9: **Statutory and effective tax rates, average over 2014 to 2021**

Country	Effective tax rate in %			Statutory tax rate in %
	weighted	unweighted	used for simulation	
Afghanistan	39.9	8.4	20.0	20.0
Albania	45.0	58.8	15.0	15.0
Algeria	39.6	54.5	26.0	26.0
American Samoa	10.0	11.1	10.0	35.7
Andorra	-1.2	1.4	6.2	10.0
Angola	47.3	-56.9	29.2	29.2
Anguilla	0.0	0.0	0.0	0.0
Antigua and Barbuda	1.5	9.0	5.3	25.0
Argentina	25.1	37.2	25.1	32.5
Armenia	12.2	228.9	12.2	19.3
Aruba	15.2	-4.3	16.7	25.0
Australia	23.3	23.5	23.3	30.0
Austria	11.0	11.0	11.0	25.0
Azerbaijan	29.0	34.0	20.0	20.0
Bahamas	1.8	22.9	0.0	0.0
Bahrain	53.6	68.2	0.0	0.0
Bailiwick of Guernsey	-15.0	5.9	0.0	0.0
Bangladesh	25.8	26.4	25.1	26.2
Barbados	1.1	1.2	1.1	16.1
Belarus	23.6	23.5	18.0	18.0
Belgium	18.2	18.5	18.2	29.5
Belize	39.8	1,057,148.0	16.7	16.7
Benin	5.0	-1.8	8.8	30.0
Bermuda	1.4	4.7	0.0	0.0
Bhutan	22.4	15.6	22.9	29.2
Bolivia	2.4	3.4	18.1	25.0
Bosnia and Herzegovina	63.4	68.5	10.0	10.0
Botswana	20.2	21.2	20.2	22.0
Brazil	27.4	29.1	27.4	34.0
British Indian Ocean Territory	3.6	3.6	3.6	0.0
British Virgin Islands	0.9	0.8	0.0	0.0
Brunei Darussalam	8.1	-14.6	9.0	18.5
Bulgaria	31.5	32.2	10.0	10.0
Burkina Faso	18.7	19.1	18.7	27.8
Burundi	32.4	-1.9	16.2	30.0
Cabo Verde	15.1	8.1	12.5	23.7
Cambodia	36.3	36.4	20.0	20.0
Cameroon	18.8	21.3	18.8	33.0
Canada	12.8	13.4	12.8	26.6
Cayman Islands	1.1	-0.4	0.0	0.0
Central African Republic	-6.9	-35.0	21.0	30.0

Table A 9: **Statutory and effective tax rates, average over 2014 to 2021 (continued)**

Country	Effective tax rate in %			Statutory tax rate in %
	weighted	unweighted	used for simulation	
Chad	10.7	5.1	12.7	35.0
Chile	23.8	24.6	21.5	22.3
China (People's Republic of)	19.2	19.1	19.2	25.0
Chinese Taipei	20.2	20.8	19.0	19.0
Colombia	37.9	21.2	30.6	31.3
Comoros	-53.0	-18.3	25.0	50.0
Congo	-135.1	-40.7	29.7	29.7
Cook Islands	-0.1	-0.1	20.0	20.0
Costa Rica	5.1	3.9	12.6	30.0
Croatia	19.8	20.3	18.3	18.3
Cuba	1.1	-0.8	6.8	35.0
Curaçao	0.8	1.9	0.8	22.0
Cyprus	4.9	-1.3	6.1	12.5
Czechia	17.7	17.9	17.7	19.0
Cóte d'Ivoire	28.8	29.7	25.0	25.0
Democratic People's Republic of Korea	23.8	25.5	23.8	0.0
Democratic Republic of the Congo	28.9	13.1	29.9	34.2
Denmark	13.1	13.4	13.1	22.0
Djibouti	58.0	-33.1	25.0	25.0
Dominica	36.3	7.3	25.0	25.0
Dominican Republic	11.8	12.3	11.8	27.0
Ecuador	27.6	31.3	24.0	24.0
Egypt	30.1	34.0	22.6	22.6
El Salvador	8.2	8.5	8.2	30.0
Equatorial Guinea	33.0	-6.4	30.0	35.0
Estonia	7.5	6.0	7.3	20.0
Eswatini	8.7	14.0	8.7	27.6
Ethiopia	33.2	34.9	30.0	30.0
Falkland Islands (Malvinas)	21.1	21.1	21.1	26.0
Faroe Islands	6.0	5.4	8.7	18.0
Fiji	20.5	22.3	20.0	20.0
Finland	16.8	17.3	16.8	20.0
France	22.8	23.8	22.8	33.0
French Guiana	39.2	19.2	39.0	0.0
French Polynesia	35.6	52.2	28.6	27.2
Gabon	66.1	-89.9	30.0	30.0
Gambia	-53.9	-7.1	25.9	30.2
Georgia	60.2	69.5	15.0	15.0
Germany	19.4	21.3	19.4	30.0
Ghana	24.8	27.2	24.8	25.0
Gibraltar	0.1	2.4	0.1	10.4

Table A 9: **Statutory and effective tax rates, average over 2014 to 2021 (continued)**

Country	Effective tax rate in %			Statutory tax rate in %
	weighted	unweighted	used for simulation	
Greece	28.9	51.3	26.4	26.5
Greenland	26.2	14.7	27.8	30.0
Grenada	36.6	-75.8	5.6	29.0
Guadeloupe	-10.8	-20.8	0.0	0.0
Guam	26.6	30.8	22.9	25.7
Guatemala	16.4	17.0	16.4	25.0
Guinea	11.9	12.4	11.9	35.0
Guinea-Bissau	2.5	20.3	21.2	25.0
Guyana	-17.2	24.7	24.7	26.7
Haiti	0.8	0.6	0.8	30.0
Honduras	4.7	5.6	4.7	30.0
Hong Kong (China)	9.1	9.8	9.1	16.5
Hungary	24.6	-3.7	10.7	10.7
Iceland	332.4	-5.3	14.9	20.0
India	32.5	34.2	31.3	32.4
Indonesia	28.8	27.0	24.5	24.5
Iran	22.3	16.5	22.8	25.0
Iraq	34.5	35.2	15.0	15.0
Ireland	15.8	15.9	12.5	12.5
Isle of Man	0.3	-0.7	0.0	0.0
Israel	24.0	23.7	23.3	23.5
Italy	24.4	29.8	24.4	28.4
Jamaica	38.9	-5.0	18.9	25.0
Japan	23.5	24.1	23.5	29.8
Jersey	1.3	-3.1	0.0	0.0
Jordan	33.5	32.0	20.0	20.0
Kazakhstan	21.6	21.8	20.0	20.0
Kenya	31.4	33.0	30.0	30.0
Kiribati	0.0	0.0	34.2	34.2
Korea	22.1	23.3	22.1	26.4
Kosovo	287.1	7588.2	10.0	10.0
Kuwait	37.1	40.3	15.0	15.0
Kyrgyzstan	746.8	367.5	10.0	10.0
Lao People's Democratic Republic	26.8	59.6	23.3	23.3
Latvia	8.6	11.6	8.6	18.3
Lebanon	80.5	54.8	16.0	16.0
Lesotho	29.4	33.4	25.0	25.0
Liberia	95.8	-0.5	13.1	25.0
Libya	80.5	108.8	20.0	20.0
Liechtenstein	19.1	20.0	12.5	12.5
Lithuania	17.4	18.8	15.0	15.0

Table A 9: **Statutory and effective tax rates, average over 2014 to 2021 (continued)**

Country	Effective tax rate in %			Statutory tax rate in %
	weighted	unweighted	used for simulation	
Luxembourg	-49.5	2.8	17.2	26.2
Macau (China)	22.9	27.6	12.0	12.0
Madagascar	70.0	871.4	20.0	20.0
Malawi	11.5	29.8	11.5	30.0
Malaysia	19.4	20.2	19.4	24.0
Maldives	34.4	27.3	15.0	15.0
Mali	16.1	18.6	16.1	30.0
Malta	49.1	5.1	10.4	35.0
Marshall Islands	0.3	0.5	0.3	0.0
Martinique	-49.8	-25.5	0.0	0.0
Mauritania	-60.6	13.8	13.2	25.0
Mauritius	10.6	-11.7	10.7	15.0
Mexico	33.4	49.0	30.0	30.0
Micronesia	33.1	-17.5	21.1	24.0
Moldova	95.7	253.8	12.0	12.0
Monaco	12.2	12.1	12.2	30.9
Mongolia	25.7	7.4	17.4	25.0
Montenegro	-25.5	22.3	9.0	9.0
Morocco	25.2	26.5	25.2	31.0
Mozambique	-22.7	38.8	31.9	32.0
Myanmar	27.6	27.0	25.0	25.0
Namibia	31.5	45.3	31.5	32.0
Nauru	0.0	0.0	21.7	21.7
Nepal	28.8	27.8	25.0	25.0
Netherlands	9.8	12.5	9.8	25.0
New Caledonia	53.3	-1.5	30.0	30.0
New Zealand	24.2	24.0	24.2	28.0
Nicaragua	12.3	12.8	12.3	30.0
Niger	18.5	20.9	18.5	30.0
Nigeria	39.4	49.6	30.0	30.0
North Macedonia	80.7	966.6	10.0	10.0
Northern Mariana Islands	-0.3	-0.1	12.8	25.7
Norway	22.8	25.1	22.4	23.0
Oman	70.3	-157.8	14.0	14.0
Pakistan	24.4	24.1	24.4	30.0
Palau	0.0	0.0	0.0	0.0
Palestinian Authority	90.2	115.5	15.0	15.0
Panama	2.8	7.1	2.8	25.0
Papua New Guinea	10.8	-40.2	14.6	30.0
Paraguay	90.5	64.0	10.0	10.0
Peru	24.8	33.3	24.8	29.2

Table A 9: **Statutory and effective tax rates, average over 2014 to 2021 (continued)**

Country	Effective tax rate in %			Statutory tax rate in %
	weighted	unweighted	used for simulation	
Philippines	22.9	22.9	22.9	29.2
Poland	22.2	22.2	19.0	19.0
Portugal	12.1	15.9	12.1	30.8
Puerto Rico	2.1	2.1	2.1	38.2
Qatar	51.0	53.9	10.0	10.0
Romania	23.0	23.1	16.0	16.0
Russia	28.7	28.4	20.0	20.0
Rwanda	1.5	-0.4	16.1	30.0
Réunion	58.6	58.6	47.2	33.3
Saint Kitts and Nevis	6.7	7.4	6.7	33.0
Saint Lucia	3.0	3.0	3.0	30.6
Saint Vincent and the Grenadines	25.6	29.1	23.2	31.3
Samoa	6.7	130.5	9.5	27.0
San Marino	19.6	19.6	17.0	17.0
Sao Tome and Principe	0.0	0.0	25.0	25.0
Saudi Arabia	39.3	36.5	20.0	20.0
Senegal	19.4	23.5	19.4	30.0
Serbia	24.6	25.7	15.0	15.0
Seychelles	3.3	6.3	3.3	30.0
Sierra Leone	252.8	-28.3	15.8	30.0
Singapore	7.6	8.0	7.6	17.0
Sint Maarten	0.3	0.1	17.7	34.8
Slovak Republic	13.7	14.1	13.7	21.2
Slovenia	23.2	21.7	18.7	18.7
Solomon Islands	32.8	35.4	30.0	30.0
Somalia	-6.6	83.7	30.0	30.0.
South Africa	35.5	33.6	28.0	28.0
South Sudan	40.7	72.4	24.2	24.2
Spain	17.7	26.5	17.7	25.0
Sri Lanka	22.5	22.1	22.5	27.3
Sudan	19.5	20.1	19.5	35.0
Suriname	5.3	5.7	5.3	36.0
Sweden	12.1	12.8	12.1	21.6
Switzerland	9.2	13.6	9.2	20.9
Syrian Arab Republic	8.5	9.2	11.7	28.0
Tajikistan	20.4	18.8	20.4	23.2
Tanzania	30.3	31.8	30.0	30.0
Thailand	25.8	-5.9	20.0	20.0
Timor-Leste	41.7	11.7	10.0	10.0
Togo	23.0	15.5	15.3	28.0
Tonga	27.0	27.0	25.0	25.0

Table A 9: **Statutory and effective tax rates, average over 2014 to 2021 (continued)**

Country	Effective tax rate in %			Statutory tax rate in %
	weighted	unweighted	used for simulation	
Trinidad and Tobago	40.1	28.8	27.0	29.2
Tunisia	35.8	41.8	23.3	23.3
Turkmenistan	135.8	126.4	8.0	8.0
Turks and Caicos Islands	0.0	0.0	0.0	0.0
Türkiye	29.7	27.5	21.0	21.0
Tuvalu	n.a.	n.a.	30.0	30.0
Uganda	23.1	25.2	23.1	30.0
Ukraine	25.4	25.5	18.0	18.0
United Arab Emirates	39.2	48.7	0.0	0.0
United Kingdom	13.7	18.3	13.7	19.2
United States	16.8	17.6	16.8	30.2
United States Virgin Islands	2.7	14.4	2.5	2.8
Uruguay	12.6	13.0	12.6	25.0
Uzbekistan	48.9	49.3	11.8	11.8
Vanuatu	-0.7	0.1	0.0	0.0
Venezuela	-0.3	0.2	34.0	34.0
Viet Nam	23.8	24.3	20.3	20.3
Wallis and Futuna	0.0	0.0	0.0	0.0
Yemen	43.4	43.7	20.0	20.0
Zambia	29.1	17.7	20.1	35.0
Zimbabwe	27.2	32.7	25.4	25.4

Source: OECD CbCR data, Tax Foundation, own calculations.

Table A 10: **Tax base allocation, hybrid approach, 2014 to 2021 – single factors**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Angola	0.0	1.3	0.8	0.1	0.4	0.5	0.9
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aruba	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Azerbaijan	0.0	0.2	0.3	0.1	0.2	0.2	0.1
Bahamas	0.0	0.1	0.1	0.1	0.0	0.1	0.1
Bahrain	0.0	1.1	1.1	1.1	1.0	1.1	1.0
Barbados	0.0	0.2	0.0	0.0	0.0	0.1	0.0
Benin	0.0	0.0	0.1	0.0	0.0	0.0	0.0
British Virgin Islands	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Brunei Darussalam	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burkina Faso	0.0	0.1	0.5	0.0	0.1	0.1	0.1
Burundi	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cabo Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cambodia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cameroon	0.0	0.3	0.5	0.0	0.3	0.2	0.4
Cayman Islands	0.0	34.3	0.4	0.1	28.1	21.4	6.4
Congo	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Costa Rica	0.0	1.3	3.7	1.1	1.9	1.9	1.8
Cuba	0.0	1.4	1.5	0.1	1.7	1.5	0.7
Curaçao	0.0	0.0	0.0	0.0	0.1	0.2	0.1
Coté d'Ivoire	0.0	0.5	1.0	0.1	0.4	0.4	0.5
Congo (Dem. Rep. of)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dominica	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dominican Republic	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Eswatini	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ethiopia	0.0	0.6	1.2	0.1	0.5	0.4	0.8
Fiji	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gambia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gibraltar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guatemala	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Honduras	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indonesia	0.0	53.5	70.5	38.3	51.7	52.2	50.5
Kenya	0.0	1.3	2.3	0.3	1.1	1.1	1.9
Kuwait	0.0	0.0	0.1	0.0	0.1	0.0	0.5
Lesotho	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Liberia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Liechtenstein	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Madagascar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mali	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Marshall Islands	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Mauritania	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A 10: **Tax base allocation, hybrid approach, 2014 to 2021 single factors (continued)**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Moldova	0.0	0.0	0.0	0.0	0.0	0.0	0.9
Monaco	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Mozambique	0.0	0.1	0.4	0.1	0.1	0.1	0.0
Myanmar	0.0	2.0	4.2	0.3	1.2	1.1	0.1
Nepal	0.0	0.1	0.3	0.0	0.0	0.0	0.1
Nicaragua	0.0	0.1	0.3	0.1	0.1	0.1	1.0
Nigeria	0.0	5.9	3.0	0.2	2.3	2.5	0.0
Palestinian Authority	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Papua New Guinea	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Paraguay	0.0	0.2	0.5	0.1	0.2	0.2	0.0
Qatar	0.0	0.4	0.2	0.3	0.6	0.7	0.1
Rwanda	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saint Kitts and Nevis	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sudan	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Syrian Arab Republic	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Tajikistan	0.0	0.0	0.0	0.0	0.0	0.0	6.4
Tonga	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uganda	0.0	0.4	0.8	0.2	0.1	0.1	1.8
Venezuela	0.0	0.5	0.8	0.3	0.6	0.5	0.7
Yemen	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Uzbekistan	0.0	0.4	0.7	0.1	0.2	0.2	0.5
Jamaica	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Seychelles	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namibia	0.0	0.1	0.1	0.1	0.1	0.1	0.0
Armenia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guyana	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Lebanon	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Malawi	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canada	0.0	392.0	441.4	670.9	414.7	404.8	472.6
Ghana	0.0	2.9	1.6	0.3	1.0	0.9	0.0
Tunisia	0.1	0.9	2.5	0.5	0.7	0.8	0.0
Bolivia	0.1	0.2	0.6	0.3	0.1	0.1	0.1
Botswana	0.1	0.0	0.0	0.0	0.0	0.0	1.9
Zambia	0.1	0.6	1.0	0.6	0.3	0.3	0.5
Senegal	0.1	0.2	0.4	0.0	0.1	0.1	0.0
Jordan	0.1	0.2	0.9	0.2	0.2	0.2	0.0
El Salvador	0.1	0.0	0.1	0.0	0.1	0.1	0.0
Albania	0.1	0.0	0.2	0.0	0.0	0.0	0.0
Trinidad and Tobago	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Panama	0.2	3.6	3.2	2.4	3.3	3.3	0.0
Tanzania	0.2	0.1	0.2	0.0	0.1	0.1	0.0

Table A 10: **Tax base allocation, hybrid approach, 2014 to 2021 single factors (continued)**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Saudi Arabia	0.3	771.2	722.5	657.3	645.2	666.5	175.1
Montenegro	0.3	0.0	0.0	0.0	0.0	0.0	0.1
Georgia	0.3	0.0	0.1	0.0	0.0	0.0	0.1
Viet Nam	0.4	14.8	61.6	8.8	21.2	20.2	67.2
Oman	0.4	0.3	0.4	0.3	0.4	0.4	0.8
Bosnia and Herzegovina	0.7	0.1	2.8	0.4	0.2	0.2	0.4
Gabon	0.8	0.3	0.1	0.0	0.1	0.1	0.0
Mauritius	0.9	0.9	1.2	0.9	0.7	0.8	0.3
Algeria	0.9	2.2	2.2	0.3	1.5	1.5	1.3
South Africa	0.9	112.7	126.8	51.1	109.0	107.0	93.5
Iraq	1.0	0.3	0.4	0.2	0.3	0.2	0.6
Ecuador	1.1	2.2	3.7	0.8	2.5	2.3	1.3
United Arab Emirates	1.1	31.5	43.2	97.7	42.9	48.0	29.1
Israel	1.2	0.8	1.0	0.9	0.8	0.8	2.0
Sri Lanka	1.9	0.4	0.7	0.1	0.3	0.3	0.4
Chile	2.0	62.4	64.3	40.8	57.6	55.3	42.2
Belarus	2.1	0.1	0.4	0.1	0.2	0.2	0.2
North Macedonia	2.1	0.1	0.3	0.1	0.1	0.1	0.2
Egypt	2.3	11.9	30.5	3.1	9.7	8.5	55.9
Iceland	2.5	0.3	0.1	0.1	0.0	0.1	0.2
Argentina	2.7	28.9	35.8	22.6	30.6	28.6	42.3
Latvia	3.4	1.7	2.3	1.8	2.9	2.7	4.0
Uruguay	3.7	1.0	1.7	1.1	2.3	2.9	2.2
Estonia	4.0	0.3	0.8	0.4	1.2	1.2	2.4
Peru	4.3	7.5	11.2	5.7	8.0	7.6	4.5
Morocco	4.8	7.1	17.0	5.3	8.2	8.1	6.8
Cyprus	5.8	2.2	5.6	8.4	3.3	3.3	0.8
Slovenia	6.0	4.7	5.4	4.8	5.4	5.5	3.0
Bulgaria	7.7	5.4	12.9	3.3	6.2	6.6	9.9
Serbia	8.2	3.2	10.1	1.7	3.7	3.9	2.2
New Zealand	8.8	33.9	40.8	40.6	48.1	47.2	27.4
United States	10.0	6728.0	5935.8	7000.2	6780.0	6460.6	7335.7
Croatia	10.1	3.2	6.2	3.1	4.4	4.2	5.5
Zimbabwe	11.2	0.4	0.8	0.1	0.2	0.2	0.4
Lithuania	11.4	5.8	7.6	5.1	6.4	6.8	4.3
Pakistan	11.7	4.8	8.3	0.4	4.0	3.6	2.9
Bermuda	13.5	27.6	2.0	6.3	17.9	22.1	0.8
Malta	15.9	0.8	0.9	0.6	0.5	0.6	0.6
Greece	16.6	34.0	32.3	26.2	33.8	33.7	9.0
Türkiye	17.5	61.4	83.6	51.3	65.7	64.5	65.1
Ukraine	18.0	11.1	21.9	2.4	9.1	9.4	15.6

Table A 10: **Tax base allocation, hybrid approach, 2014 to 2021 single factors (continued)**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Slovak Republic	34.7	13.0	26.7	12.0	14.9	17.2	22.6
Romania	38.3	27.3	64.0	22.8	27.7	29.2	60.9
Hong Kong (China)	48.5	250.2	99.0	169.9	237.1	272.4	288.7
Thailand	49.2	67.5	140.2	24.8	59.6	70.6	163.2
Philippines	49.2	16.2	59.4	6.0	11.6	13.4	28.0
Kazakhstan	49.5	0.6	0.9	0.2	0.3	0.3	1.7
Iran	60.9	0.2	0.2	0.0	0.2	0.2	0.2
Hungary	62.6	28.1	48.1	22.3	27.9	31.8	29.4
Portugal	69.5	42.9	61.7	41.4	49.4	49.9	31.8
Colombia	75.4	29.0	47.9	7.0	32.9	27.9	33.0
Czechia	79.5	40.4	70.9	35.3	42.2	44.5	72.1
Mexico	94.7	200.9	315.2	129.7	198.8	210.7	170.5
Austria	102.5	67.4	66.0	75.5	65.1	67.1	42.1
Malaysia	111.5	241.1	280.6	200.8	226.7	237.5	176.4
Switzerland	118.4	236.8	133.2	289.4	229.2	304.4	166.7
Finland	127.4	89.8	94.5	106.8	90.2	90.6	43.9
Poland	150.2	94.6	188.1	95.5	103.9	103.6	153.2
Brazil	191.6	312.7	490.6	217.8	352.7	325.8	553.9
Belgium	266.6	147.5	117.8	161.4	138.8	155.9	97.2
Denmark	286.2	155.6	98.9	145.1	146.5	153.3	74.9
India	387.8	507.7	869.5	344.6	491.8	487.6	449.9
Sweden	392.1	261.0	229.3	262.8	259.1	261.4	175.2
Chinese Taipei	414.8	4.8	9.4	6.4	6.2	6.1	10.2
Netherlands	428.9	281.5	245.8	327.7	283.3	359.1	234.3
Norway	545.4	197.5	178.1	215.4	202.3	201.1	144.4
Spain	642.6	385.7	399.3	413.8	364.7	382.7	357.5
Singapore	643.7	154.8	119.4	182.7	268.3	305.7	153.6
Italy	672.5	466.8	469.4	467.1	484.7	473.5	496.4
Luxembourg	683.3	43.6	7.2	13.2	25.4	37.3	12.8
Ireland	740.5	223.6	81.6	105.8	197.2	277.2	105.8
Korea	764.3	860.2	791.7	842.1	867.8	855.8	371.9
Russia	831.7	44.3	94.4	21.9	58.8	52.8	158.1
Germany	918.6	874.3	873.6	1055.4	834.0	885.1	1022.1
France	1095.3	588.4	552.6	656.6	562.5	568.6	539.7
Australia	1137.0	644.4	586.1	652.8	605.9	573.7	542.4
Japan	2084.6	2103.2	1876.6	2045.5	2073.1	2034.3	1304.7
United Kingdom	2310.5	1312.1	1306.0	1493.0	1315.9	1303.5	1351.5
China (People's Republic)	2585.4	3865.3	4427.9	3731.6	3969.7	3969.5	5164.3

Source: OECD CbCR data, Moody's, own calculations.

Table A 11: **Tax base allocation, hybrid approach, 2014 to 2021 – weighted factors**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Angola	0.0	0.7	0.8	0.6	0.6
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0
Aruba	0.0	0.0	0.0	0.0	0.0
Azerbaijan	0.0	0.2	0.2	0.2	0.2
Bahamas	0.0	0.1	0.1	0.1	0.1
Bahrain	0.0	1.1	1.1	1.1	1.1
Barbados	0.0	0.1	0.1	0.1	0.0
Benin	0.0	0.0	0.0	0.0	0.0
British Virgin Islands	0.0	0.0	0.0	0.0	0.0
Brunei Darussalam	0.0	0.0	0.0	0.0	0.0
Burkina Faso	0.0	0.1	0.2	0.1	0.1
Burundi	0.0	0.0	0.0	0.0	0.0
Cabo Verde	0.0	0.0	0.0	0.0	0.0
Cambodia	0.0	0.0	0.0	0.0	0.0
Cameroon	0.0	0.3	0.4	0.2	0.3
Cayman Islands	0.0	22.7	22.6	22.9	24.1
Congo	0.0	0.0	0.0	0.0	0.0
Costa Rica	0.0	1.9	2.3	1.4	1.9
Cuba	0.0	1.2	1.5	1.0	1.3
Curaçao	0.0	0.0	0.0	0.0	0.0
Coté d'Ivoire	0.0	0.4	0.6	0.3	0.4
Congo (Dem. Rep.)	0.0	0.0	0.0	0.0	0.0
Dominica	0.0	0.0	0.0	0.0	0.0
Dominican Republic	0.0	0.0	0.1	0.0	0.0
Eswatini	0.0	0.0	0.0	0.0	0.0
Ethiopia	0.0	0.6	0.8	0.4	0.5
Fiji	0.0	0.0	0.0	0.0	0.0
Gambia	0.0	0.0	0.0	0.0	0.0
Gibraltar	0.0	0.0	0.0	0.0	0.0
Guatemala	0.0	0.0	0.0	0.0	0.0
Honduras	0.0	0.0	0.0	0.0	0.0
Indonesia	0.0	53.2	58.4	48.1	52.8
Kenya	0.0	1.2	1.5	0.9	1.2
Kuwait	0.0	0.0	0.0	0.0	0.0
Lesotho	0.0	0.0	0.0	0.0	0.0
Liberia	0.0	0.0	0.0	0.0	0.0
Liechtenstein	0.0	0.0	0.0	0.0	0.0
Madagascar	0.0	0.0	0.0	0.0	0.0
Mali	0.0	0.0	0.0	0.0	0.0
Marshall Islands	0.0	0.0	0.0	0.0	0.0
Mauritania	0.0	0.0	0.0	0.0	0.0

Table A 11: **Tax base allocation, hybrid approach, 2014 to 2021 weighted factors (continued)**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Moldova	0.0	0.0	0.0	0.0	0.0
Monaco	0.0	0.0	0.0	0.0	0.0
Mozambique	0.0	0.1	0.2	0.1	0.1
Myanmar	0.0	1.8	2.4	1.1	1.6
Nepal	0.0	0.1	0.1	0.0	0.1
Nicaragua	0.0	0.2	0.2	0.1	0.1
Nigeria	0.0	3.2	3.7	2.8	3.0
Palestinian Authority	0.0	0.0	0.0	0.0	0.0
Papua New Guinea	0.0	0.4	0.4	0.3	0.3
Paraguay	0.0	0.2	0.3	0.2	0.2
Qatar	0.0	0.4	0.4	0.4	0.5
Rwanda	0.0	0.0	0.0	0.0	0.0
Saint Kitts and Nevis	0.0	0.0	0.0	0.0	0.0
Sudan	0.0	0.0	0.0	0.0	0.0
Syrian Arab Republic	0.0	0.0	0.0	0.0	0.0
Tajikistan	0.0	0.0	0.0	0.0	0.0
Tonga	0.0	0.0	0.0	0.0	0.0
Uganda	0.0	0.4	0.5	0.2	0.3
Venezuela	0.0	0.6	0.6	0.5	0.6
Yemen	0.0	0.0	0.0	0.0	0.0
Uzbekistan	0.0	0.3	0.4	0.2	0.3
Jamaica	0.0	0.0	0.0	0.0	0.0
Seychelles	0.0	0.0	0.0	0.0	0.0
Namibia	0.0	0.1	0.1	0.1	0.1
Armenia	0.0	0.0	0.0	0.0	0.0
Guyana	0.0	0.0	0.0	0.0	0.0
Lebanon	0.0	0.0	0.0	0.0	0.0
Malawi	0.0	0.0	0.0	0.0	0.0
Canada	0.0	457.3	415.1	497.5	446.7
Ghana	0.0	1.7	1.8	1.6	1.5
Tunisia	0.1	1.0	1.3	0.7	0.9
Bolivia	0.1	0.2	0.3	0.2	0.2
Botswana	0.1	0.0	0.0	0.0	0.0
Zambia	0.1	0.5	0.6	0.5	0.5
Senegal	0.1	0.2	0.3	0.1	0.2
Jordan	0.1	0.3	0.4	0.2	0.3
El Salvador	0.1	0.1	0.1	0.0	0.1
Albania	0.1	0.0	0.1	0.0	0.0
Trinidad and Tobago	0.2	0.0	0.0	0.0	0.0
Panama	0.2	3.3	3.4	3.1	3.3
Tanzania	0.2	0.1	0.1	0.1	0.1

Table A 11: **Tax base allocation, hybrid approach, 2014 to 2021 weighted factors (continued)**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Saudi Arabia	0.3	702.0	712.9	691.3	687.8
Montenegro	0.3	0.0	0.0	0.0	0.0
Georgia	0.3	0.0	0.0	0.0	0.0
Viet Nam	0.4	23.1	31.8	14.7	22.6
Oman	0.4	0.3	0.3	0.3	0.3
Bosnia and Herzegovina	0.7	0.5	0.8	0.2	0.4
Gabon	0.8	0.1	0.1	0.1	0.1
Mauritius	0.9	0.9	1.0	0.8	0.9
Algeria	0.9	1.6	2.0	1.3	1.6
South Africa	0.9	103.9	115.8	91.8	105.3
Iraq	1.0	0.3	0.3	0.2	0.3
Ecuador	1.1	2.3	2.8	1.8	2.3
United Arab Emirates	1.1	48.3	39.2	57.2	47.0
Israel	1.2	0.8	0.9	0.8	0.8
Sri Lanka	1.9	0.4	0.5	0.3	0.4
Chile	2.0	57.1	61.2	53.2	57.2
Belarus	2.1	0.2	0.2	0.1	0.2
North Macedonia	2.1	0.1	0.2	0.1	0.1
Egypt	2.3	12.6	17.2	8.1	11.8
Iceland	2.5	0.2	0.2	0.2	0.1
Argentina	2.7	29.4	31.7	27.2	29.7
Latvia	3.4	2.2	2.3	2.1	2.4
Uruguay	3.7	1.6	1.7	1.4	1.7
Estonia	4.0	0.7	0.8	0.6	0.8
Peru	4.3	7.9	8.9	7.0	8.0
Morocco	4.8	8.7	10.6	6.8	8.5
Cyprus	5.8	4.3	3.8	4.8	4.1
Slovenia	6.0	5.0	5.1	4.9	5.1
Bulgaria	7.7	6.4	8.0	4.8	6.3
Serbia	8.2	4.2	5.6	2.8	4.1
New Zealand	8.8	40.9	41.0	40.8	42.7
United States	10.0	6663.4	6485.7	6836.4	6692.6
Croatia	10.1	4.1	4.6	3.6	4.1
Zimbabwe	11.2	0.3	0.5	0.2	0.3
Lithuania	11.4	6.1	6.6	5.7	6.2
Pakistan	11.7	4.3	5.6	3.0	4.2
Bermuda	13.5	17.8	17.7	18.0	17.8
Malta	15.9	0.7	0.7	0.6	0.6
Greece	16.6	32.2	33.3	31.2	32.6
Türkiye	17.5	64.5	70.0	59.3	64.8
Ukraine	18.0	10.4	13.7	7.4	10.1

Table A 11: **Tax base allocation, hybrid approach, 2014 to 2021 weighted factors (continued)**

Country	Baseline tax base (in EUR bn.)	Tax base (in EUR bn.) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Slovak Republic	34.7	15.5	18.0	13.1	15.3
Romania	38.3	32.3	39.2	25.7	31.2
Hong Kong (China)	48.5	207.3	196.1	219.1	214.6
Thailand	49.2	68.7	87.8	50.2	66.4
Philippines	49.2	19.7	28.6	11.1	17.7
Kazakhstan	49.5	0.4	0.6	0.3	0.4
Iran	60.9	0.1	0.2	0.1	0.2
Hungary	62.6	30.1	34.4	25.9	29.5
Portugal	69.5	47.6	51.0	44.3	48.0
Colombia	75.4	28.9	36.0	22.2	29.8
Czechia	79.5	44.9	50.8	39.2	44.2
Mexico	94.7	205.4	238.2	173.2	203.7
Austria	102.5	67.9	66.3	69.5	67.2
Malaysia	111.5	234.9	248.5	221.9	232.9
Switzerland	118.4	228.0	201.7	253.0	228.4
Finland	127.4	93.6	91.2	95.8	92.8
Poland	150.2	112.1	127.3	97.5	110.0
Brazil	191.6	336.2	382.8	291.6	340.2
Belgium	266.6	142.8	135.3	149.9	141.8
Denmark	286.2	143.3	136.5	149.7	144.1
India	387.8	534.4	619.7	450.9	523.7
Sweden	392.1	255.8	251.0	260.2	256.6
Chinese Taipei	414.8	6.3	6.8	5.8	6.3
Netherlands	428.9	284.5	269.9	298.5	284.2
Norway	545.4	199.3	192.8	205.2	200.0
Spain	642.6	385.9	382.7	389.2	380.7
Singapore	643.7	192.3	182.4	201.8	211.4
Italy	672.5	472.4	472.8	472.2	475.4
Luxembourg	683.3	26.1	25.5	26.6	25.8
Ireland	740.5	174.9	174.6	175.2	180.7
Korea	764.3	849.3	841.6	856.7	853.9
Russia	831.7	52.8	65.3	41.0	54.3
Germany	918.6	892.0	860.2	923.2	877.6
France	1095.3	585.1	566.6	603.1	579.4
Australia	1137.0	622.7	611.8	633.3	618.4
Japan	2084.6	2047.6	2021.0	2073.7	2054.0
United Kingdom	2310.5	1342.5	1310.8	1373.8	1336.1
China (People's Republic of)	2585.4	3964.9	4079.9	3852.2	3966.2

Notes: 'CCCTB' uses 1/6 number of employees, 1/6 cost of employees, 1/3 tangible assets and 1/3 sales. 'Massachusetts (employees)' uses 1/3 number of employees, 1/3 tangible assets and 1/3 sales. Massachusetts (payroll)' uses 1/3 cost of employees, 1/3 tangible assets and 1/3 sales. 'Double Sales' uses ½ sales, ¼ tangible assets, 1/8 number of employees, 1/8 cost of employees. The public CBCR data sales to unrelated parties are likely to be by origin.

Source: OECD CbCR data, OECD AMNE data, Moody's, own calculations.

Table A 12: **Tax revenue simulation, hybrid approach, 2014 to 2021 – single factors**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Albania	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Algeria	0.0	0.6	0.6	0.1	0.4	0.4	0.3
Angola	0.0	0.4	0.2	0.0	0.1	0.2	0.3
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Argentina	0.9	9.7	12.0	7.6	10.3	9.6	14.2
Armenia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aruba	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Australia	246.4	193.3	175.8	195.8	181.8	172.1	162.7
Austria	6.7	16.8	16.5	18.9	16.3	16.8	10.5
Azerbaijan	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Bahamas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bahrain	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Barbados	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Belarus	0.2	0.0	0.1	0.0	0.0	0.0	0.0
Belgium	29.1	44.9	35.8	49.1	42.3	47.4	29.7
Benin	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bermuda	4.9	0.0	0.0	0.0	0.0	0.0	0.0
Bolivia	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Bosnia and Herzegovina	0.1	0.0	0.3	0.0	0.0	0.0	0.0
Botswana	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brazil	33.7	106.3	166.8	74.0	119.9	110.8	188.3
British Virgin Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brunei Darussalam	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulgaria	0.8	0.5	1.3	0.3	0.6	0.7	1.0
Burkina Faso	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Burundi	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cabo Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cambodia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cameroon	0.0	0.1	0.2	0.0	0.1	0.1	0.1
Canada	0.0	103.9	117.0	177.9	109.9	107.3	125.3
Cayman Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chile	0.4	13.1	13.6	8.5	12.1	11.6	9.0
China	478.6	966.3	1,107.0	932.9	992.4	992.4	1,291.1
Chinese Taipei	46.8	0.9	1.8	1.2	1.2	1.1	1.9
Colombia	21.3	8.8	14.4	2.1	9.9	8.4	10.0
Congo	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Costa Rica	0.0	0.4	1.1	0.3	0.6	0.6	0.5
Croatia	1.5	0.6	1.2	0.6	0.8	0.8	1.0
Cuba	0.0	0.5	0.5	0.0	0.6	0.5	0.2
Curaçao	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cyprus	0.4	0.3	0.7	1.1	0.4	0.4	0.1

Table A 12: **Tax revenue simulation, hybrid approach, 2014 to 2021, single factors (continued)**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Czechia	12.6	7.7	13.5	6.7	8.0	8.5	13.7
Cóte d'Ivoire	0.0	0.1	0.3	0.0	0.1	0.1	0.1
Congo (Dem. Rep.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denmark	33.3	34.8	22.1	32.4	32.8	34.3	16.7
Dominica	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dominican Republic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ecuador	0.3	0.5	0.9	0.2	0.6	0.5	0.3
Egypt	0.4	2.7	6.9	0.7	2.2	1.9	12.7
El Salvador	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estonia	0.4	0.1	0.2	0.1	0.2	0.2	0.5
Eswatini	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ethiopia	0.0	0.2	0.4	0.0	0.1	0.1	0.2
Fiji	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finland	14.5	18.0	18.9	21.4	18.0	18.1	8.8
France	80.6	200.0	187.8	223.1	191.2	193.3	183.5
Gabon	0.4	0.1	0.0	0.0	0.0	0.0	0.0
Gambia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Georgia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Germany	126.4	262.5	262.3	316.8	250.4	265.7	306.8
Ghana	0.0	0.7	0.4	0.1	0.2	0.2	0.2
Gibraltar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Greece	3.5	9.0	8.6	7.0	9.0	8.9	2.4
Guatemala	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guyana	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Honduras	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hong Kong (China)	7.4	41.3	16.3	28.0	39.1	45.0	47.6
Hungary	6.0	3.3	5.8	2.6	3.3	3.8	3.6
Iceland	0.4	0.1	0.0	0.0	0.0	0.0	0.0
India	93.1	166.3	284.6	112.9	161.1	159.7	147.0
Indonesia	0.0	13.1	17.3	9.4	12.7	12.8	12.3
Iran	2.4	0.0	0.1	0.0	0.0	0.0	0.0
Iraq	0.3	0.0	0.1	0.0	0.0	0.0	0.1
Ireland	43.5	28.0	10.2	13.2	24.7	34.7	13.2
Israel	0.1	0.2	0.2	0.2	0.2	0.2	0.5
Italy	72.0	135.3	136.0	135.3	140.4	137.2	143.6
Jamaica	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Japan	433.3	647.3	577.4	629.5	638.0	626.0	401.8
Jordan	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Kazakhstan	0.6	0.1	0.2	0.0	0.1	0.1	0.3
Kenya	0.0	0.4	0.7	0.1	0.3	0.3	0.6
Korea	168.3	223.2	205.3	218.4	225.2	222.1	96.4

Table A 12: **Tax revenue simulation, hybrid approach, 2014 to 2021, single factors (continued)**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Kuwait	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Latvia	0.2	0.3	0.4	0.3	0.5	0.5	0.7
Lebanon	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lesotho	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Liberia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Liechtenstein	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithuania	1.0	0.9	1.1	0.8	1.0	1.0	0.7
Luxembourg	7.6	11.7	1.9	3.5	6.8	10.0	3.4
Madagascar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malawi	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malaysia	21.7	58.6	68.2	48.8	55.1	57.7	42.8
Mali	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malta	1.9	0.3	0.3	0.2	0.2	0.2	0.2
Marshall Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mauritania	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mauritius	0.1	0.1	0.2	0.1	0.1	0.1	0.0
Mexico	17.9	60.3	94.6	38.9	59.6	63.2	51.2
Moldova	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monaco	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Montenegro	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Morocco	1.2	2.2	5.2	1.6	2.5	2.5	2.1
Mozambique	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Myanmar	0.0	0.5	1.1	0.1	0.3	0.3	0.4
Namibia	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepal	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Netherlands	54.0	70.4	61.4	81.9	70.8	89.8	58.6
New Zealand	0.4	9.5	11.4	11.4	13.5	13.2	7.7
Nicaragua	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Nigeria	0.0	1.8	0.9	0.1	0.7	0.8	1.5
North Macedonia	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Norway	301.0	46.7	42.1	50.9	47.8	47.5	34.0
Oman	0.1	0.0	0.1	0.0	0.1	0.1	0.1
Pakistan	3.2	1.5	2.5	0.1	1.2	1.1	0.9
Palestinian Authority	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Panama	0.1	0.9	0.8	0.6	0.8	0.8	0.3
Papua New Guinea	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Paraguay	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Peru	1.2	2.2	3.3	1.7	2.4	2.2	1.3
Philippines	10.7	4.8	17.4	1.8	3.4	3.9	8.2
Poland	23.2	18.0	35.7	18.2	19.7	19.7	29.1
Portugal	9.4	13.2	19.0	12.7	15.2	15.3	9.8

Table A 12: **Tax revenue simulation, hybrid approach, 2014 to 2021, single factors (continued)**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by					
		Assets	No. Employees	Payroll	Turnover (unrelated)	Turnover (total)	Sales by destination
Qatar	0,0	0,0	0,0	0,0	0,1	0,1	0,2
Romania	5,9	4,4	10,2	3,7	4,4	4,7	9,7
Russia	29,9	8,9	18,9	4,4	11,8	10,6	31,6
Rwanda	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Saint Kitts and Nevis	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Saudi Arabia	0,0	154,2	144,5	131,5	129,0	133,3	35,0
Senegal	0,0	0,1	0,1	0,0	0,0	0,0	0,0
Serbia	0,9	0,5	1,5	0,3	0,6	0,6	0,3
Seychelles	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Singapore	30,3	26,3	20,3	31,1	45,6	52,0	26,1
Slovak Republic	7,1	2,8	5,7	2,6	3,2	3,7	4,8
Slovenia	0,8	0,9	1,0	0,9	1,0	1,0	0,5
South Africa	0,3	31,6	35,5	14,3	30,5	30,0	26,2
Spain	49,2	99,8	103,3	107,2	94,4	99,0	92,6
Sri Lanka	0,6	0,1	0,2	0,0	0,1	0,1	0,1
Sudan	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Sweden	32,1	56,1	49,3	56,6	55,8	56,2	37,8
Switzerland	1,6	49,4	27,8	60,4	47,8	63,5	34,8
Syrian Arab Republic	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Tajikistan	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Tanzania	0,1	0,0	0,1	0,0	0,0	0,0	0,0
Thailand	5,9	13,5	28,0	5,0	11,9	14,1	32,6
Tonga	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Trinidad and Tobago	0,1	0,0	0,0	0,0	0,0	0,0	0,0
Tunisia	0,0	0,2	0,6	0,1	0,2	0,2	0,7
Türkiye	2,4	12,8	17,4	10,7	13,6	13,4	13,5
Uganda	0,0	0,1	0,3	0,1	0,0	0,0	0,0
Ukraine	3,3	2,0	3,9	0,4	1,6	1,7	2,8
United Arab Emirates	0,0	0,0	0,0	0,0	0,0	0,0	0,0
United Kingdom	112,2	255,3	254,1	290,4	256,0	253,6	263,2
United States	3,0	2,138,5	1,886,3	2,224,3	2,153,5	2,052,3	2,323,6
Uruguay	0,2	0,3	0,4	0,3	0,6	0,7	0,5
Uzbekistan	0,0	0,0	0,1	0,0	0,0	0,0	0,0
Venezuela	0,0	0,2	0,3	0,1	0,2	0,2	0,0
Viet Nam	0,0	3,1	12,7	1,8	4,4	4,2	13,8
Yemen	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Zambia	0,0	0,2	0,3	0,2	0,1	0,1	0,1
Zimbabwe	3,7	0,1	0,2	0,0	0,0	0,1	0,1

Source: OECD CbCR data, OECD AMNE data, Moody's, own calculations. Simulation uses statutory tax rates.

Table A 13: **Tax revenue simulation, hybrid approach, 2014 to 2021 – weighted factors**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Albania	0.0	0.0	0.0	0.0	0.0
Algeria	0.0	0.4	0.5	0.3	0.4
Angola	0.0	0.2	0.2	0.2	0.2
Antigua and Barbuda	0.0	0.0	0.0	0.0	0.0
Argentina	0.9	9.9	10.6	9.1	10.0
Armenia	0.0	0.0	0.0	0.0	0.0
Aruba	0.0	0.0	0.0	0.0	0.0
Australia	246.4	186.8	183.5	190.0	185.5
Austria	6.7	17.0	16.6	17.4	16.8
Azerbaijan	0.0	0.0	0.0	0.0	0.0
Bahamas	0.0	0.0	0.0	0.0	0.0
Bahrain	0.0	0.0	0.0	0.0	0.0
Barbados	0.0	0.0	0.0	0.0	0.0
Belarus	0.2	0.0	0.0	0.0	0.0
Belgium	29.1	43.5	41.2	45.6	43.2
Benin	0.0	0.0	0.0	0.0	0.0
Bermuda	4.9	0.0	0.0	0.0	0.0
Bolivia	0.0	0.1	0.1	0.0	0.0
Bosnia and Herzegovina	0.1	0.0	0.1	0.0	0.0
Botswana	0.0	0.0	0.0	0.0	0.0
Brazil	33.7	114.3	130.1	99.1	115.7
British Virgin Islands	0.0	0.0	0.0	0.0	0.0
Brunei Darussalam	0.0	0.0	0.0	0.0	0.0
Bulgaria	0.8	0.6	0.8	0.5	0.6
Burkina Faso	0.0	0.0	0.1	0.0	0.0
Burundi	0.0	0.0	0.0	0.0	0.0
Cabo Verde	0.0	0.0	0.0	0.0	0.0
Cambodia	0.0	0.0	0.0	0.0	0.0
Cameroon	0.0	0.1	0.1	0.1	0.1
Canada	0.0	121.3	110.1	131.9	118.4
Cayman Islands	0.0	0.0	0.0	0.0	0.0
Chile	0.4	12.0	12.9	11.2	12.0
China (People's Republic of)	478.6	991.2	1,020.0	963.1	991.5
Chinese Taipei	46.8	1.2	1.3	1.1	1.2
Colombia	21.3	8.7	10.8	6.7	9.0
Congo	0.0	0.0	0.0	0.0	0.0
Costa Rica	0.0	0.6	0.7	0.4	0.6
Croatia	1.5	0.8	0.9	0.7	0.8
Cuba	0.0	0.4	0.5	0.3	0.5
Curaçao	0.0	0.0	0.0	0.0	0.0
Cyprus	0.4	0.5	0.5	0.6	0.5

Table A 13: **Tax revenue simulation, hybrid approach, 2014 to 2021, weighted factors (continued)**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Czechia	12.6	8.5	9.7	7.5	8.4
Coté d'Ivoire	0.0	0.1	0.2	0.1	0.1
Democratic Republic of the Congo	0.0	0.0	0.0	0.0	0.0
Denmark	33.3	32.0	30.5	33.5	32.2
Dominica	0.0	0.0	0.0	0.0	0.0
Dominican Republic	0.0	0.0	0.0	0.0	0.0
Ecuador	0.3	0.5	0.6	0.4	0.5
Egypt	0.4	2.9	3.9	1.8	2.7
El Salvador	0.0	0.0	0.0	0.0	0.0
Estonia	0.4	0.1	0.2	0.1	0.2
Eswatini	0.0	0.0	0.0	0.0	0.0
Ethiopia	0.0	0.2	0.2	0.1	0.2
Fiji	0.0	0.0	0.0	0.0	0.0
Finland	14.5	18.7	18.2	19.2	18.6
France	80.6	198.8	192.6	205.0	196.9
Gabon	0.4	0.0	0.0	0.0	0.0
Gambia	0.0	0.0	0.0	0.0	0.0
Georgia	0.0	0.0	0.0	0.0	0.0
Germany	126.4	267.8	258.2	277.2	263.5
Ghana	0.0	0.4	0.5	0.4	0.4
Gibraltar	0.0	0.0	0.0	0.0	0.0
Greece	3.5	8.5	8.8	8.3	8.6
Guatemala	0.0	0.0	0.0	0.0	0.0
Guyana	0.0	0.0	0.0	0.0	0.0
Honduras	0.0	0.0	0.0	0.0	0.0
Hong Kong (China)	7.4	34.2	32.4	36.1	35.4
Hungary	6.0	3.6	4.1	3.0	3.5
Iceland	0.4	0.0	0.0	0.0	0.0
India	93.1	175.0	202.9	147.7	171.5
Indonesia	0.0	13.0	14.3	11.8	12.9
Iran	2.4	0.0	0.0	0.0	0.0
Iraq	0.3	0.0	0.0	0.0	0.0
Ireland	43.5	21.9	21.8	21.9	22.6
Israel	0.1	0.2	0.2	0.2	0.2
Italy	72.0	136.9	137.0	136.8	137.7
Jamaica	0.0	0.0	0.0	0.0	0.0
Japan	433.3	630.1	621.9	638.2	632.1
Jordan	0.0	0.1	0.1	0.0	0.1
Kazakhstan	0.6	0.1	0.1	0.1	0.1
Kenya	0.0	0.4	0.5	0.3	0.4
Korea	168.3	220.3	218.3	222.3	221.6

Table A 13: **Tax revenue simulation, hybrid approach, 2014 to 2021, weighted factors (continued)**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Kuwait	0.0	0.0	0.0	0.0	0.0
Latvia	0.2	0.4	0.4	0.4	0.4
Lebanon	0.0	0.0	0.0	0.0	0.0
Lesotho	0.0	0.0	0.0	0.0	0.0
Liberia	0.0	0.0	0.0	0.0	0.0
Liechtenstein	0.0	0.0	0.0	0.0	0.0
Lithuania	1.0	0.9	1.0	0.9	0.9
Luxembourg	7.6	7.0	6.8	7.1	6.9
Madagascar	0.0	0.0	0.0	0.0	0.0
Malawi	0.0	0.0	0.0	0.0	0.0
Malaysia	21.7	57.1	60.4	53.9	56.6
Mali	0.0	0.0	0.0	0.0	0.0
Malta	1.9	0.2	0.3	0.2	0.2
Marshall Islands	0.0	0.0	0.0	0.0	0.0
Mauritania	0.0	0.0	0.0	0.0	0.0
Mauritius	0.1	0.1	0.1	0.1	0.1
Mexico	17.9	61.6	71.5	52.0	61.1
Moldova	0.0	0.0	0.0	0.0	0.0
Monaco	0.0	0.0	0.0	0.0	0.0
Montenegro	0.0	0.0	0.0	0.0	0.0
Morocco	1.2	2.7	3.3	2.1	2.6
Mozambique	0.0	0.0	0.1	0.0	0.0
Myanmar	0.0	0.4	0.6	0.3	0.4
Namibia	0.0	0.0	0.0	0.0	0.0
Nepal	0.0	0.0	0.0	0.0	0.0
Netherlands	54.0	71.1	67.5	74.6	71.1
New Zealand	0.4	11.4	11.5	11.4	11.9
Nicaragua	0.0	0.0	0.1	0.0	0.0
Nigeria	0.0	1.0	1.1	0.8	0.9
North Macedonia	0.1	0.0	0.0	0.0	0.0
Norway	301.0	47.1	45.6	48.5	47.3
Oman	0.1	0.0	0.0	0.0	0.0
Pakistan	3.2	1.3	1.7	0.9	1.3
Palestinian Authority or West Bank and Gaza Strip	0.0	0.0	0.0	0.0	0.0
Panama	0.1	0.8	0.9	0.8	0.8
Papua New Guinea	0.0	0.1	0.1	0.1	0.1
Paraguay	0.0	0.0	0.0	0.0	0.0
Peru	1.2	2.3	2.6	2.1	2.3
Philippines	10.7	5.8	8.4	3.3	5.2
Poland	23.2	21.3	24.2	18.5	20.9
Portugal	9.4	14.6	15.7	13.6	14.8

Table A 13: **Tax revenue simulation, hybrid approach, 2014 to 2021, weighted factors (continued)**

Country	Baseline tax revenues (in bn. EUR)	Estimated tax revenues (in bn. EUR) with formula apportionment by			
		CCCTB	Massachussets		Double sales weighted
			with employees	with payroll	
Qatar	0.0	0.0	0.0	0.0	0.0
Romania	5.9	5.2	6.3	4.1	5.0
Russia	29.9	10.6	13.1	8.2	10.9
Rwanda	0.0	0.0	0.0	0.0	0.0
Saint Kitts and Nevis	0.0	0.0	0.0	0.0	0.0
Saudi Arabia	0.0	140.4	142.6	138.3	137.6
Senegal	0.0	0.1	0.1	0.0	0.1
Serbia	0.9	0.6	0.8	0.4	0.6
Seychelles	0.0	0.0	0.0	0.0	0.0
Singapore	30.3	32.7	31.0	34.3	35.9
Slovak Republic	7.1	3.3	3.8	2.8	3.3
Slovenia	0.8	0.9	0.9	0.9	0.9
South Africa	0.3	29.1	32.4	25.7	29.5
Spain	49.2	99.9	99.0	100.8	98.6
Sri Lanka	0.6	0.1	0.1	0.1	0.1
Sudan	0.0	0.0	0.0	0.0	0.0
Sweden	32.1	55.0	54.0	56.0	55.2
Switzerland	1.6	47.6	42.1	52.8	47.7
Syrian Arab Republic	0.0	0.0	0.0	0.0	0.0
Tajikistan	0.0	0.0	0.0	0.0	0.0
Tanzania	0.1	0.0	0.0	0.0	0.0
Thailand	5.9	13.7	17.6	10.0	13.3
Tonga	0.0	0.0	0.0	0.0	0.0
Trinidad and Tobago	0.1	0.0	0.0	0.0	0.0
Tunisia	0.0	0.2	0.3	0.2	0.2
Türkiye	2.4	13.4	14.5	12.3	13.5
Uganda	0.0	0.1	0.1	0.1	0.1
Ukraine	3.3	1.9	2.5	1.3	1.8
United Arab Emirates	0.0	0.0	0.0	0.0	0.0
United Kingdom	112.2	261.2	255.0	267.2	259.9
United States	3.0	2,117.3	2,060.8	2,172.2	2,126.3
Uruguay	0.2	0.4	0.4	0.4	0.4
Uzbekistan	0.0	0.0	0.0	0.0	0.0
Venezuela	0.0	0.2	0.2	0.2	0.2
Viet Nam	0.0	4.8	6.6	3.0	4.7
Yemen	0.0	0.0	0.0	0.0	0.0
Zambia	0.0	0.2	0.2	0.2	0.2
Zimbabwe	3.7	0.1	0.1	0.1	0.1

Notes: See previous table notes for exact definition of weights.

Source: OECD CbCR data, OECD AMNE data, Moody's, own calculations. Simulation uses statutory tax rates.

Table A 14: **Simulation results sales by destination, hybrid approach, 2014 to 2021**

	Allocated tax base (in bn. USD) based on Sales by destination		Simulated tax revenue (in bn. USD)		
Scenario	Subsidary as nexus	no nexus	Statutory tax rate	Effective tax rate	Statutory tax rate with 25% minimum tax
Anguilla	n.a.	0.0	0.0	0.0	0.0
British Indian Ocean Territory	n.a.	0.0	0.0	0.0	0.0
Cook Islands	n.a.	0.0	0.0	0.0	0.0
Democratic People's Republic of Korea	n.a.	0.0	0.0	0.0	0.0
Falkland Islands (Malvinas)	n.a.	0.0	0.0	0.0	0.0
French Guiana	n.a.	0.0	0.0	0.0	0.0
Gibraltar	0.0	0.0	0.0	0.0	0.0
Guadeloupe	n.a.	0.0	0.0	0.0	0.0
Martinique	n.a.	0.0	0.0	0.0	0.0
Réunion	n.a.	0.0	0.0	0.0	0.0
Venezuela	0.0	0.0	0.0	0.0	0.0
Wallis and Futuna	n.a.	0.0	0.0	0.0	0.0
Tuvalu	n.a.	0.0	0.0	0.0	0.0
Kiribati	n.a.	0.0	0.0	0.0	0.0
Nauru	n.a.	0.1	0.0	0.0	0.0
Marshall Islands	0.0	0.1	0.0	0.0	0.0
Sao Tome and Principe	n.a.	0.1	0.0	0.0	0.0
Micronesia	n.a.	0.1	0.0	0.0	0.0
Tonga	0.0	0.1	0.0	0.0	0.0
Palau	n.a.	0.1	0.0	0.0	0.0
Vanuatu	n.a.	0.2	0.0	0.0	0.0
Guinea-Bissau	n.a.	0.2	0.0	0.0	0.0
Sint Maarten	n.a.	0.2	0.1	0.0	0.1
Central African Republic	n.a.	0.2	0.1	0.0	0.1
Timor-Leste	n.a.	0.2	0.0	0.0	0.0
American Samoa	n.a.	0.2	0.1	0.0	0.1
South Sudan	n.a.	0.2	0.0	0.0	0.0
Dominica	0.0	0.2	0.1	0.1	0.1
Samoa	n.a.	0.2	0.1	0.0	0.1
Comoros	n.a.	0.2	0.1	0.1	0.1
Gambia	0.0	0.2	0.1	0.1	0.1
Solomon Islands	n.a.	0.2	0.1	0.1	0.1
Bhutan	n.a.	0.3	0.1	0.1	0.1
Northern Mariana Islands	n.a.	0.3	0.1	0.0	0.1
Saint Vincent and the Grenadines	n.a.	0.3	0.1	0.1	0.1
Liberia	0.0	0.3	0.1	0.0	0.1
Turks and Caicos Islands	n.a.	0.3	0.0	0.0	0.1
Lesotho	0.0	0.3	0.1	0.1	0.1
Belize	n.a.	0.4	0.1	0.1	0.1

Table A 14: **Simulation results sales by destination, hybrid approach, 2014 to 2021 (continued)**

	Allocated tax base (in bn. USD) based on Sales by destination		Simulated tax revenue (in bn. USD)		
Scenario	Subsidary as nexus	no nexus	Statutory tax rate	Effective tax rate	Statutory tax rate with 25% minimum tax
Burundi	0.0	0.4	0.1	0.1	0.1
Cabo Verde	0.0	0.4	0.1	0.0	0.1
Djibouti	n.a.	0.4	0.1	0.1	0.1
Grenada	n.a.	0.4	0.1	0.0	0.1
Sierra Leone	n.a.	0.5	0.1	0.1	0.1
Syrian Arab Republic	0.0	0.5	0.1	0.1	0.1
Saint Kitts and Nevis	0.0	0.5	0.2	0.0	0.2
Curaçao	0.1	0.5	0.1	0.0	0.1
San Marino	n.a.	0.5	0.1	0.1	0.1
Somalia	n.a.	0.6	0.0	0.2	0.1
Saint Lucia	n.a.	0.6	0.2	0.0	0.2
Seychelles	0.0	0.6	0.2	0.0	0.2
Antigua and Barbuda	0.0	0.6	0.2	0.0	0.2
Suriname	n.a.	0.6	0.2	0.0	0.2
Mauritania	0.0	0.7	0.2	0.1	0.2
Aruba	0.0	0.7	0.2	0.1	0.2
Greenland	n.a.	0.7	0.2	0.2	0.2
Eswatini	0.0	0.8	0.2	0.1	0.2
Guyana	0.0	0.8	0.2	0.2	0.2
Faroe Islands	n.a.	0.8	0.1	0.1	0.2
Togo	n.a.	0.8	0.2	0.1	0.2
French Polynesia	n.a.	0.8	0.2	0.2	0.2
Kyrgyzstan	n.a.	0.9	0.1	0.1	0.2
Tajikistan	0.0	0.9	0.2	0.2	0.2
Fiji	0.0	0.9	0.2	0.2	0.2
Chad	n.a.	1.0	0.3	0.1	0.3
Niger	n.a.	1.0	0.3	0.2	0.3
British Virgin Islands	0.0	1.0	0.0	0.0	0.2
Montenegro	0.1	1.1	0.1	0.1	0.3
Malawi	0.0	1.1	0.3	0.1	0.3
Andorra	n.a.	1.1	0.1	0.1	0.3
Kosovo	n.a.	1.2	0.1	0.1	0.3
Madagascar	0.0	1.2	0.2	0.2	0.3
Guinea	n.a.	1.2	0.4	0.1	0.4
Congo	0.0	1.3	0.4	0.4	0.4
New Caledonia	n.a.	1.3	0.4	0.4	0.4
Mozambique	0.0	1.3	0.4	0.4	0.4
Bailiwick of Guernsey	n.a.	1.3	0.0	0.0	0.3
Afghanistan	n.a.	1.4	0.3	0.3	0.3

Table A 14: **Simulation results sales by destination, hybrid approach, 2014 to 2021 (continued)**

	Allocated tax base (in bn. USD) based on Sales by destination		Simulated tax revenue (in bn. USD)		
Scenario	Subsidary as nexus	no nexus	Statutory tax rate	Effective tax rate	Statutory tax rate with 25% minimum tax
Mongolia	n.a.	1.4	0.4	0.2	0.4
Mali	0.0	1.4	0.4	0.2	0.4
Rwanda	0.0	1.4	0.4	0.2	0.4
Namibia	0.0	1.4	0.5	0.5	0.5
Maldives	n.a.	1.5	0.2	0.2	0.4
Benin	0.0	1.6	0.5	0.1	0.5
Nicaragua	0.1	1.6	0.5	0.2	0.5
Burkina Faso	0.1	1.7	0.5	0.3	0.5
Moldova	0.0	1.7	0.2	0.2	0.4
Guam	n.a.	1.8	0.5	0.4	0.5
Jersey	n.a.	1.9	0.0	0.0	0.5
Barbados	0.0	1.9	0.3	0.0	0.5
Papua New Guinea	0.0	2.0	0.6	0.3	0.6
Zimbabwe	0.4	2.0	0.5	0.5	0.5
Armenia	0.0	2.1	0.4	0.2	0.5
Botswana	0.0	2.2	0.5	0.4	0.5
Cayman Islands	6.4	2.2	0.0	0.0	0.5
Zambia	0.3	2.2	0.8	0.4	0.8
North Macedonia	0.2	2.2	0.2	0.2	0.5
Haiti	n.a.	2.2	0.7	0.0	0.7
Palestinian Authority or West Bank and Gaza Strip	0.0	2.3	0.3	0.3	0.6
United States Virgin Islands	n.a.	2.3	0.7	0.1	0.7
Gabon	0.0	2.4	0.7	0.7	0.7
Georgia	0.1	2.5	0.4	0.4	0.6
Equatorial Guinea	n.a.	2.5	0.9	0.7	0.9
Albania	0.1	2.5	0.4	0.4	0.6
Yemen	0.0	2.6	0.5	0.5	0.7
Cambodia	0.0	2.7	0.5	0.5	0.7
Iceland	0.2	2.7	0.5	0.4	0.7
Liechtenstein	0.0	2.7	0.3	0.3	0.7
Bermuda	0.8	2.8	0.0	0.0	0.7
Democratic Republic of the Congo	0.0	2.8	0.9	0.8	0.9
Jamaica	0.0	2.8	0.7	0.5	0.7
Isle of Man	n.a.	2.9	0.0	0.0	0.7
Cyprus	0.8	3.1	0.4	0.2	0.8
Senegal	0.1	3.1	0.9	0.6	0.9
Bosnia and Herzegovina	0.4	3.2	0.3	0.3	0.8
Honduras	0.0	3.2	1.0	0.1	1.0
Bahamas	0.1	3.2	0.0	0.0	0.8

Table A 14: **Simulation results sales by destination, hybrid approach, 2014 to 2021 (continued)**

	Allocated tax base (in bn. USD) based on Sales by destination		Simulated tax revenue (in bn. USD)		
Scenario	Subsidary as nexus	no nexus	Statutory tax rate	Effective tax rate	Statutory tax rate with 25% minimum tax
Turkmenistan	n.a.	3,4	0,3	0,3	0,9
Mauritius	0,3	3,5	0,5	0,4	0,9
Nepal	0,0	3,7	0,9	0,9	0,9
Lao People's Democratic Republic	n.a.	3,8	0,9	0,9	1,0
Bolivia	0,1	3,8	1,0	0,7	1,0
Uganda	0,1	3,9	1,2	0,9	1,2
Paraguay	0,4	4,3	0,4	0,4	1,1
Monaco	0,0	4,4	1,4	0,5	1,4
Libya	n.a.	4,5	0,9	0,9	1,1
El Salvador	0,0	4,7	1,4	0,4	1,4
Tanzania	0,1	5,6	1,7	1,7	1,7
Cameroon	0,4	5,6	1,9	1,1	1,9
Malta	0,6	5,7	2,0	0,6	2,0
Sudan	0,0	5,8	2,0	1,1	2,0
Brunei Darussalam	0,0	6,1	1,1	0,6	1,5
Trinidad and Tobago	0,1	6,2	1,8	1,6	1,8
Belarus	0,2	6,3	1,1	1,1	1,6
Uzbekistan	0,1	7,2	0,8	0,8	1,8
Ghana	0,8	7,5	1,9	1,9	1,9
Azerbaijan	0,1	7,6	1,5	1,5	1,9
Serbia	2,2	7,8	1,2	1,2	2,0
Jordan	0,2	8,1	1,6	1,6	2,0
Angola	0,9	8,2	2,4	2,4	2,4
Lebanon	0,1	8,8	1,4	1,4	2,2
Ethiopia	0,8	8,9	2,7	2,7	2,7
Myanmar	1,6	9,7	2,4	2,4	2,4
Cuba	0,7	9,8	3,4	0,7	3,4
Kenya	1,9	9,9	3,0	3,0	3,0
Uruguay	2,2	10,1	2,5	1,2	2,5
Cóte d'Ivoire	0,5	10,2	2,5	2,5	2,5
Costa Rica	1,8	11,0	3,3	1,4	3,3
Guatemala	0,0	11,0	2,8	1,8	2,8
Panama	1,1	11,0	2,8	0,3	2,8
Latvia	4,0	11,1	2,0	1,0	2,8
Estonia	2,4	11,2	2,3	0,8	2,8
Slovenia	3,0	11,8	2,2	2,2	3,0
Oman	0,8	12,9	1,8	1,8	3,2
Puerto Rico	n.a.	13,1	5,0	0,3	5,0
Lithuania	4,3	13,4	2,0	2,0	3,3

Table A 14: **Simulation results sales by destination, hybrid approach, 2014 to 2021 (continued)**

	Allocated tax base (in bn. USD) based on Sales by destination		Simulated tax revenue (in bn. USD)		
Scenario	Subsidary as nexus	no nexus	Statutory tax rate	Effective tax rate	Statutory tax rate with 25% minimum tax
Tunisia	2,9	13,4	3,1	3,1	3,3
Sri Lanka	0,4	13,6	3,7	3,0	3,7
Bahrain	1,0	14,0	0,0	0,0	3,5
Ecuador	1,3	14,3	3,4	3,4	3,6
Dominican Republic	0,0	14,5	3,9	1,7	3,9
Algeria	1,3	16,8	4,3	4,4	4,3
Croatia	5,5	21,2	3,9	3,9	5,3
Kuwait	0,5	22,0	3,3	3,3	5,5
Morocco	6,8	22,4	6,9	5,6	6,9
Iran	0,2	25,1	6,3	5,7	6,3
Bangladesh	n.a.	25,8	6,9	6,5	6,9
Iraq	0,6	26,9	4,0	4,0	6,7
Greece	9,0	27,2	7,1	7,1	7,3
Bulgaria	9,9	28,1	2,8	2,8	7,0
Pakistan	2,9	34,1	10,4	8,3	10,4
Luxembourg	12,8	35,4	9,4	6,0	9,4
Ukraine	15,6	36,8	6,6	6,6	9,2
Nigeria	5,0	37,8	11,3	11,3	11,3
Macau (China)	n.a.	37,9	4,5	4,5	9,5
Peru	4,5	44,7	13,2	11,0	13,2
Slovak Republic	22,6	49,9	10,6	6,8	12,5
Israel	2,0	53,9	12,9	12,4	13,6
Qatar	1,8	58,7	5,9	5,9	14,7
Portugal	31,8	61,4	18,9	7,4	18,9
Hungary	29,4	64,3	7,9	6,8	16,1
New Zealand	27,4	65,1	18,2	15,6	18,2
Finland	43,9	65,1	13,0	10,9	16,3
Colombia	33,0	66,0	19,9	20,0	19,9
Chile	42,2	66,7	14,3	14,2	16,7
Kazakhstan	1,7	70,8	14,2	14,2	17,7
United Arab Emirates	29,1	73,4	0,0	0,0	18,4
Philippines	28,0	78,5	22,9	17,7	22,9
Egypt	55,9	99,8	22,8	22,5	24,9
Denmark	74,9	104,4	23,3	13,7	26,1
Romania	60,9	116,8	18,7	18,7	29,2
Türkiye	65,1	119,2	24,7	25,0	29,8
Austria	42,1	123,1	30,8	13,5	30,8
Czechia	72,1	126,0	23,9	22,0	31,5
Ireland	105,8	131,5	16,4	16,4	32,9

Table A 14: **Simulation results sales by destination, hybrid approach, 2014 to 2021 (continued)**

	Allocated tax base (in bn. USD) based on Sales by destination		Simulated tax revenue (in bn. USD)		
Scenario	Subsidary as nexus	no nexus	Statutory tax rate	Effective tax rate	Statutory tax rate with 25% minimum tax
Argentina	42,3	139,0	46,2	34,7	46,2
Belgium	97,2	139,1	42,5	24,9	42,5
South Africa	93,5	143,6	40,2	40,2	40,2
Malaysia	176,4	148,3	35,9	28,5	37,1
Chinese Taipei	10,2	151,4	28,5	28,6	37,9
Viet Nam	67,2	155,2	31,8	31,6	38,8
Norway	144,4	162,9	38,5	36,5	41,3
Hong Kong (China)	288,7	188,3	31,1	16,9	47,1
Indonesia	50,5	189,8	46,5	46,5	47,4
Sweden	175,2	189,9	41,1	22,9	47,5
Singapore	153,6	191,2	32,5	14,0	47,8
Poland	153,2	208,7	39,7	39,7	52,2
Saudi Arabia	175,1	208,7	41,7	41,7	52,2
Thailand	163,2	232,4	46,5	46,5	58,1
Russia	158,1	255,6	51,1	51,1	63,9
Mexico	170,5	262,3	78,7	78,7	78,7
Korea	371,9	278,3	72,3	61,4	73,3
Netherlands	234,3	281,2	70,3	26,9	70,3
India	449,9	297,7	97,0	92,5	97,0
Switzerland	166,7	302,9	63,3	27,0	75,7
Spain	357,5	376,4	97,3	66,3	97,3
Brazil	553,9	435,2	148,0	118,7	148,0
Italy	496,4	506,9	147,2	122,7	147,2
Australia	542,4	543,5	163,0	125,7	163,0
Canada	472,6	574,1	152,3	72,5	152,3
France	539,7	600,0	204,2	136,5	204,2
Japan	1304,7	1105,4	340,5	258,7	340,5
United Kingdom	1351,5	1115,8	217,3	150,1	278,9
Germany	1022,1	1145,4	343,9	218,4	343,9
China (People's Republic of)	5164,3	3804,6	951,1	726,7	951,1
United States	7335,7	6506,5	2059,3	1032,2	2059,3
Results by country group					
High income	15,209,6	15,111,6	4,283,5	2,636,9	4,465,0
Upper middle income	6,554,4	6,042,1	1,544,3	1,259,9	1,586,7
Lower middle income	626,9	895,4	246,6	227,1	258,4
Low income	1,2	39,4	11,5	8,9	11,9
Tax haven/investment hub	983,0	1,286,5	245,9	119,2	324,9
Total	**23,375,0**	**23,375,0**	**6,331,7**	**4,252,0**	**6,646,9**

Source: OECD CbCR data, OECD AMNE data, Moody's, own calculations.