Global Minimum Tax and Profit Shifting

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July 16, 2024

Abstract

We address the question of how the global minimum tax introduced in 2024 changes incentives for multinationals to shift profits. We study it using 34 thousand multinational-country observations from tax returns, financial statements and country-by-country reports of all multinationals active in Slovakia. We find that the global minimum tax leads to lower incentives to shift profits for most multinationals, which are on average likely to pay higher effective tax rates in most countries worldwide after the reform. Moreover, we develop a methodology to decompose the tax revenue impact of the global minimum tax into several components and quantify the role of profit shifting. We find that Slovak corporate tax revenues will increase by 4%, with half of the increase due to its minimum top-up taxes. The other half of the increase is corporate income tax on profits that will no longer be shifted out of it. Profit shifting will decrease by half.
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Keywords: Global Minimum Tax, Profit Shifting, Multinational, Tax Avoidance

JEL: H25, H26

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1   Introduction

The global minimum tax reform—agreed by more than 135 countries in 2021 accounting for more than 90 percent of the global economy and in effect in the European Union and several other countries since January 2024—is the biggest change in taxing multinationals in decades if not a century, but will it be successful at reducing profit shifting? The reform comes in the wake of sizeable and increasing tax avoidance (Álvarez-Martínez et al.; 2021; Clausing; 2016; Garcia-Bernardo and Janský; 2024; Riedel; 2018) and a decade of not-so-successful attempts by governments to reduce it (Clausing; 2020; Garcia-Bernardo, Janský and Zucman; 2022; Wier and Zucman; 2022). The effects of the global minimum tax on the firms and governments are far from clear due to the reform's complexity, uncertainty about how firms and governments will respond to it, and unavailability of suitable data; i.e., three challenges that we address in this paper with a thorough understanding of the reform, transparent assumptions about the behaviour of firms and governments on the basis of the best available evidence, and rich administrative data combining tax returns, financial statements and country-by-country reports of multinationals.

In this paper, we study the overall impact of the global minimum tax reform on tax revenue in Slovakia, considering the contribution of new top-up taxes versus existing corporate income taxes, and the reduction in profit shifting. We proceed in three steps which are aimed at answering the following three research questions. First, how much more tax revenue will Slovakia collect as a consequence of the reform? Second, how much of it is through the new top-up taxes and how much is through existing corporate income taxes? Third and finally, how much profit shifting will be reduced?

To address our research questions, we develop a methodology to decompose the impact of the global minimum tax on government revenues into seven components. The components differ along three dimensions: whether the change in revenue arises from existing corporate income taxation or new minimum top-up taxes, from what specific top-up tax and in what country. We apply the methodology to a dataset comprising 34 thousand country-firm observations combined from corporate tax returns, financial statements and country-by-country reports of all multinationals active in Slovakia in 2020. Using the merged dataset from the Slovak tax authority that includes information on multinationals headquartered in many countries worldwide, we simulate the effects of the global minimum tax rules. Specifically, we identify affiliates of multinationals that are currently taxed at rates below the global minimum tax rate of 15% in Slovakia and thereby are likely to pay more in taxes after the reform becomes effective from 2024 on. We quantify how the global minimum tax affects

profit shifting in and out of Slovakia, which has crucial implications for its tax revenues.

The first of our three main findings reveals that Slovak corporate tax revenues will increase by around 4% or EUR 117 million. We arrive at this estimate by aggregating from the bottom up: for each affected multinational we estimate how their profits and taxes are likely to be affected in each country by each global minimum top-up tax. The revenue gain is higher than other previous estimates for Slovakia by Baraké et al. (2022), which report no corporate tax increase using the 2017 aggregate country-by-country reporting data published by the OECD, while our replication of their method using the 2020 data yields an estimate of EUR 16 million. While all the estimates carry a degree of uncertainty, a comparison of the assumptions needed to arrive at each set of estimates suggests the superior power of administrative micro-level data and country-specific approaches which we use here. The data available to us in Slovakia enable more detailed analysis and accurate estimates than the relatively aggregate, cross-country analyses that have thus far provided these estimates for Slovakia, and, for that matter, most other countries.

Second, the estimated revenue increase arises due to both new Slovak top-up taxes and existing corporate income taxation. Let us start with the top-up taxes. Specifically, 45% (EUR 53 million) of the increase are two types of top-up taxes, domestic and third country, on undertaxed profits, of which 38% (EUR 44 million) is the tax on profits currently reported in Slovakia, which will newly be taxed at a 15% rate. The remaining 7% (EUR 9 million) is the tax on profits currently reported in countries that are not likely to implement the global minimum tax but are participating in it and thereby Slovakia will be able to tax these profits with a top-up tax.

We find that a total of 73 multinationals are likely to pay a domestic top-up tax in Slovakia, with the bulk of the top-up tax paid contributed by a relatively small amount of firms. Three companies are likely to pay 75% of the top-up tax revenue, and the top thirteen companies are likely to pay 94% of the top-up tax revenue. This is in line with earlier estimates on the heavy concentration of profit shifting in a relatively small number of multinationals (Martin et al.; 2022; Wier and Erasmus; 2022). The largest contributors to the top-up tax in Slovakia are headquartered in Austria, the United Kingdom, and South Korea, and they are active in various industry sectors, including manufacturing, financial and insurance services, real estate, and retail.

The other 55% (EUR 64 million) of the tax revenue increase originates from corporate income tax collected due to a reduction in profit shifting. The corporate income tax will raise more revenue due to less profit shifting out of Slovakia as a result top-up taxes applied by other countries, which will discourage profit shifting out of Slovakia. We decompose it

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into three parts: 34 % of the tax revenue increase will be collected by taxing profit that will no longer be shifted out of Slovakia because the domestic top-up tax will be applied by other countries on affiliates there; 14% will be collected thanks to countries introducing so-called headquarter top-up taxes on multinationals headquartered there; and 7% will be collected as a result of countries applying third country top-up taxes on countries which have not implemented the reform, but multinationals have their presence there. Separately, we estimate that the tax loss for Slovakia from reduced profit shifting into Slovakia—due to Slovakia introducing its top-up taxes—will be negligible and will mainly affect the amount of top-up taxes and not the corporate income tax.

Third, we estimate that the global minimum tax will reduce profit shifting out of Slovakia by 49%. The profit shifting that is likely to continue after the reform is driven by profit shifting to few European Union member states in spite of them implementing the reform. Indeed, we also find that a majority of profits are shifted out of Slovakia into few European Union member states, both before and after the reform. While profit shifting will be reduced by more than a half to a majority of countries, we show that for few countries, typically with higher effective tax rates, the reduction will be comparatively lower. Separately, it is a similar case with Slovakia itself, into which the profit shifting will be reduced only by 31%.

Overall, our findings highlight the importance of interactions between the global minimum tax and profit shifting for tax revenue. We identify a variety of mechanisms of the tax revenue impacts of the reform. We exploit the administrative data available to us to empirically estimate the scale of these individual mechanisms. We find that some profit shifting is reduced, but not all, similar to what seems to have happened with the global minimum tax provision of the 2017 U.S. tax reform (Clausing; 2020; Garcia-Bernardo, Janský and Zucman; 2022; Wier and Zucman; 2022). Our findings also enable the Slovak government—and its financial administration in particular—to understand the post-reform new environment for profit shifting, which should be instrumental for them, for example, to better target tax audits (Tørsløv et al.; 2023a).

With our findings, we contribute to several streams of literature. First, we add to an expanding body of research on the global minimum tax, both its empirical (Baraké et al.; 2022; Cobham et al.; 2022; Gomez Cram and Olbert; 2023; OECD; 2020) and theoretical aspects (Devereux; 2023; Hebous and Keen; 2023; Johannesen; 2022; Schjelderup and Stähler; 2023). Second, we advance our understanding of the heterogeneity of multinational firms that shift profits to decrease their taxation (Bachas et al.; 2023; Garcia-Bernardo, Janský and Tørsløv; 2022; Wier and Erasmus; 2022). Third, we are among the first researchers to use administrative country-by-country data at the firm-level to study multinationals' profit

shifting to tax havens, complementing similar recent efforts in Germany (Fuest, Greil, Hugger and Neumeier; 2022; Fuest, Hugger and Neumeier; 2022), Italy (Bratta et al.; 2021) and the United States (Nessa et al.; 2022) and building on the approaches that have mostly used aggregate data thus far (Álvarez-Martínez et al.; 2021; De Mooij et al.; 2019; Garcia-Bernardo and Janský; 2024; Janský and Palanský; 2019; Tørsløv et al.; 2023b).

In the rest of the paper, we provide a brief background on the global minimum tax reform with a focus on top-up taxes and country participation in Section 2, we outline our thinking about the main mechanisms of how the global minimum tax impacts tax revenue and profit shifting and how we can estimate it in Section 3, and present the data in Section 4. We describe the results in detail in Section 5, and we conclude in Section 6.

2   Institutional context: global minimum tax

Before proceeding to discuss how the global minimum reform affects profit shifting and tax revenue, we provide a brief description of the most relevant parts of the reform, coordinated by OECD as a part of a two-pillar solution and also known as Pillar II (but we refer to longer treatments for a fuller description, e.g., the OECD materials such as OECD; 2020). We focus below on briefly answering three questions: what are global minimum top-up taxes, which countries can they apply to, and how do the two previous answers interact?

The reform provides governments with new top-up taxes to raise tax revenue from large multinationals with revenue over EUR 750 million. There are three types of top-up taxes that can bring the total amount of taxes paid on a multinational's profit in a country up to the minimum rate of 15%. (In addition, there is a fourth top-up tax, the subject-to-tax rule or STTR, which applies a 9% minimum tax rate on interest, royalties, and a so-called defined set of other payments, which we neglect in this paper as we do not have the data to analyse it and it is unlikely to be significant for Slovakia.) They apply in this order:

1. Domestic top-up tax. The qualifying domestic minimum top-up tax or QDMTT, allows a country to impose a top-up tax on a subsidiary's profits when the group's profits arising in the country are taxed below the minimum rate of 15%. This rule is optional as each country chooses whether to implement the reform with, as Slovakia did, or without it.

2. Headquarter top-up tax. The income inclusion rule or IRR, allows a country in which a multinational is headquartered to impose a top-up tax on the parent entity in respect

of the low-taxed income of a constituent entity.

3. Third country top-up tax. The undertaxed payments rule or UTPR, allows a country in which a subsidiary of a multinational is located to impose a top-up tax on the low-taxed income of another subsidiary of the multinational located in another country and headquartered in yet another country.

A country decides on its involvement in the global minimum tax reform, i.e., whether it can apply global minimum tax rules and whether other countries can apply them towards it, by choosing one of the following options:

1. Participating country. A country does not apply the rules, but other countries can apply the rules towards it. Around 140 countries, including the United States and headquarter countries of most large multinationals, signed the agreement and are thus participating countries.[2]

2. Implementing country. In addition to participating, a country can apply rules towards other participating countries. We classify implementing countries as those in which the reform has been already implemented and taken effect in 2024: all European Union member countries including Slovakia, Australia, Canada, Japan, Norway, South Korea, and the United Kingdom.

3. Non-participating country. A country does not apply the rules; other countries cannot apply the rules towards it. Any country that is not participating; for example, Nigeria and Kenya, and some other countries with mostly smaller economies.

Country participation interacts with top-up taxes and is crucial for whether countries can apply top-up taxes and other countries can apply top-up taxes to multinationals located there. We show this using a hypothetical example of a multinational headquartered in Germany, a low-tax subsidiary in Luxembourg and a high-tax subsidiary in Slovakia in Figure 1. Any of the three top-up taxes can bring the taxes paid on the multinational's undertaxed profit

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[2]As the June 2023 there were 138 countries. We source the participating countries to the "Members of the OECD/G20 Inclusive Framework on BEPS joining the October 2021 Statement on a Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy as of 9 June 2023": https://www.oecd.org/tax/beps/oecd-g20-inclusive-framework-members-joining-statement-on-two-pillar-solution-to-address-tax-challenges-arising-from-digitalisation-october-2021.pdf

in Luxembourg up to the minimum rate of 15%. Accordingly, any of the three countries can end up receiving the top-up tax depending on whether the countries participated in or implemented the reform, and whether Luxembourg implemented the domestic top-up tax—when, for the sake of discussion, in this example, we abstract away from the fact that they all implemented in reality. For example, in case Luxembourg did not participate, none of the rules would prevail apply the undertaxed profits would remain untaxed.

Figure 1: A hypothetical example of a multinational's location of subsidiaries
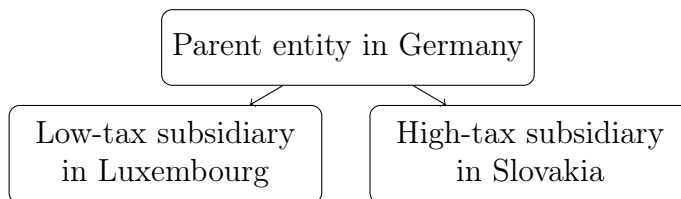
Top-up tax	Luxembourg	Germany	Slovakia	Top-up tax recipient
Domestic top-up tax	Implementing with domestic top-up tax	Participating or implementing	-	Luxembourg
Headquarter top-up tax	Participating or implementing without domestic top-up tax	Implementing	-	Germany
Third country top-up tax	Participating or implementing without domestic top-up tax	Participating	Implementing	Slovakia
None	Non-participating	-	-	-

3 Conceptual framework and methodology

We study the overall impact of the global minimum tax reform on tax revenue and, in this section, we present the building blocks that describe government tax revenue and profit shifting by multinationals before and after the introduction of the reform. We propose a conceptual framework to connect the reform to government decisions to implement the reform and how these choices interact with firm-level profit shifting responses by multinationals. We also use the framework to transparently discuss empirical methodology and the assumptions about the behaviour of firms and governments which we make on the basis of the best available evidence. In the end, we decompose the change in corporate tax revenue into seven components, which we provide estimates of in the subsequent results section that confirm the important consequences of profit shifting.

Empirical evidence suggests that profit shifting is primarily driven by differences in taxation, i.e. profits are shifted away from high-tax countries and to low-tax countries. We express profits reported by multinationals in country j ($\pi_{reported,j,before}$) as "real unobserved profits" ($\pi_{real,j,before}$) minus profits shifted from country j to other countries ($\pi_{out,j,before}$) plus profits shifted to country j from other countries ($\pi_{in,j,before}$), in line with Bilicka et al. (2024) other literature. We neglect the dimension of individual multinationals i in the equations in this section for clarity, although we do work at the country-multinational level in the empirical section.

$$\pi_{reported,j,before} = \pi_{real,j,before} - \pi_{out,j,before} + \pi_{in,j,before} \tag{1}$$

Empirical evidence, starting with, e.g., Hines and Rice (1994), shows that there is a negative correlation between the corporate income tax rate $\tau_{income,j}$ and the amount of outward profit shifting, which, in turn, leads to lower reported profits in country j.

Corporate tax revenue (T) before the global minimum tax consists only of corporate income tax revenue, which we express as the reported profits multiplied by the applicable corporate income tax rate.

$$T_{j,before} = \pi_{reported,j,before} \times \tau_{income,j} \tag{2}$$

Multinationals are likely to respond to the reform with changes in their profit-shifting behaviour, resulting in a change in reported profits in country j. We expect profit shifting out of Slovakia ($\pi_{out,j,after}$) to be reduced due to top-up taxes applied in other countries k of all thre types: domestic ($\pi_{out\&domestic,k,after}$) headquarter ($\pi_{out\&headquarter,k,after}$) and third country ($\pi_{out\&third\ country,k,after}$). Also, due to the Slovak top-up taxes leading to an increase in effective taxation of profits reported in Slovakia, we expect a reduction in profit shifted into Slovakia from other countries ($\pi_{into,j,after}$). The overall effect on reported profits after the reform ($\pi_{reported,j,after}$) is thus ambiguous.

Corporate tax revenue after the global minimum tax consists of the three new top-up taxes and changes in corporate income tax revenue. The domestic and headquarter top-up tax is applied by the government to undertaxed domestically-reported profits of multinationals not headquartered in country j and headquartered in country j, respectively, and third country top-up tax to the the respective share of country j of undertaxed profits reported in another country k when eligible. The top-up tax rate τ levied on the undertaxed profit is the difference between the effective tax rate paid and the minimum rate of 15%. Changes in corporate income tax revenue occurred due to changes in reported profits related to profit

shifting consequences of the three top-up taxes applied by other countries.

$$T_{j,after} = \pi_{reported\&undertaxed\&domestic_j,j,after} \times \tau_{topup,j} + \pi_{reported\&undertaxed\&headquarter_j,j,after} \times \tau_{topup,j}$$

$$+\pi_{reported\&undertaxed\&third\ country_j,k,after} \times \tau_{topup,j} + \pi_{reported,j,after} \times \tau_{income,j}$$

$$(3)$$

In the results section, we show the results for changes in corporate tax revenue ΔT.

$$\Delta T_{j,change} = T_{j,before} - T_{j,after} \tag{4}$$

We leverage the administrative data to empirically decompose the change in corporate tax revenue along the individual dimensions discussed above: whether the revenue comes from a corporate income tax or a top-up tax, what type of top-up tax it is, and what change in profit shifting occurred. Specifically, we estimate the following components of the change in government tax revenue:

$$\Delta T_{corporate,j} =$$
$$+ \underbrace{\pi_{reported\&undertaxed\&domestic_j,j,after} \times \tau_{topup,j}}_{\text{Domestic top-up tax}}$$
$$+ \underbrace{\pi_{reported\&undertaxed\&headquartered_j,j,after} \times \tau_{topup,j}}_{\text{Headquarter top-up tax}}$$
$$+ \underbrace{\pi_{reported\&undertaxed\&third\ country_j,share_j,k,after} \times \tau_{topup,j}}_{\text{Third country top-up tax}}$$
$$+ \underbrace{\Delta\pi_{out\&domestic_k,j} \times \tau_{income,j}}_{\text{Income tax domestic}}$$
$$+ \underbrace{\Delta\pi_{out\&headquarter_k,j} \times \tau_{income,j}}_{\text{Income tax headquarter}}$$
$$+ \underbrace{\Delta\pi_{out\&third-country_k,j} \times \tau_{income,j}}_{\text{Income tax third country}}$$
$$- \underbrace{\Delta\pi_{in,j} \times \tau_{income,j}}_{\text{Income tax decrease}}$$
$$(5)$$

We label these seven components of the overall change in tax revenue as:

1. Domestic top-up tax: A top-up tax on undertaxed profits in Slovakia of multinationals

not headquartered in Slovakia.

2. Headquarter top-up tax: A top-up tax on undertaxed profits in Slovakia of multinationals headquartered in Slovakia.

3. Third country top-up tax: A top-up tax on undertaxed profits in third countries, not in Slovakia.

4. Income tax domestic: Corporate income tax increase due to less profit shifting out of Slovakia to countries applying domestic top-up taxes.

5. Income tax headquarter: Corporate income tax increase due to less profit shifting out of Slovakia to countries applying headquarter top-up taxes.

6. Income tax third country: Corporate income tax increase due to less profit shifting out of Slovakia to countries applying third country top-up taxes.

7. Income tax decrease: Corporate income tax decrease due to less profit shifting from other countries into Slovakia.

We now turn to how we estimate top-up taxes and the other components. For the fourth, fifth and sixth component, estimation of profit shifting is important and we describe how we do so using the standard tax semi-elasticity methodology in section A.2. The estimation of the three types of top-up taxes—corresponding to the first three components of the overall change in tax revenue above and applied in this order—follow a similar logic and are a multiple of undertaxed profits, $\pi_{undertaxed}$, and a tax rate, τ, which is the difference between the effective tax rate and the minimum rate of 15%. For the first component, domestic top-up tax, for example, we can rewrite a part of equation 3 to reflect the fact that both the top-up tax payments and our estimations of them occur at the multinational-country level of individual multinationals i, which results into:

$$T_{i,j,after} = \pi_{i,reported\&undertaxed\&domestic_j,j,after} \times (15\% - \tau_{i,topup,j}) \tag{6}$$

where $\pi_{i,reported\&undertaxed\&domestic_j,j,after}$ is the tax base relevant for the top-up tax, which does not correspond to profit or loss before taxation but, for example, can be lowered by deductibles, as we discuss in detail in section A.3. Last, we maintain that component 3 - Third country top-up tax - and component 6 - Income tax third country - are mutually exclusive. Thus, the amount of income raised from one will be proportional to the second. Therefore, we propose that only 25% of the component 3 will be raised. Similarly, only 75% of the component 6 will be raised.

In general, we make assumptions about behavioural responses by both governments and multinationals and we outline them in more detail in a related section A in the appendix.

First, governments can choose to participate or implement the reform and its domestic top-up tax and in this we rely on the information available as of January 2024. We assume that governments have not changed any statutory corporate income tax rates in response to the reform as our estimates are focused on 2024, but more changes might occur in forthcoming years. We also assume that governments do not change other relevant provisions such as tax credits or investment subsidies, which might also be crafted to serve as loopholes, for example, for governments to transfer the newly tax revenues collected from multinationals due to the reform back to these multinationals. Relatedly, we assume multinationals will not exploit the similar already existing loopholes more intensively. Multinationals are likely to change where they report profits in response to the top-up taxes. For example, multinationals are likely to voluntarily pay higher effective tax rates closer to the minimum, which would increase corporate income tax revenue and decrease expected top-up tax revenue. We also assume that the reform changes profit shifting incentives and both profit shifting out of Slovakia and in Slovakia is likely to be affected. Specifically, we assume that countries implementing the reform will become less attractive as a destination for profit shifting. In contrast, we assume no real response, for example, in investment or employees.

4   Data

We combine three datasets for multinationals active in Slovakia: (i) country-by-country reporting data, (ii) tax returns, and (iii) financial statements, which we complement with information from business and beneficial ownership registers. Some of these datasets have never been combined for similar research purposes. The combined dataset's strengths enable us to quantify and simulate a variety of behavioral responses of multinationals.

Our primary data are country-by-country reports filed by all large multinationals with activities in Slovakia. The country-by-country reports are a result of a new regulation that from 2016 on in Slovakia and many other countries requires all large multinationals with consolidated global group revenue of EUR 750 million or above to report their activities in all their countries of operation. The reports are prepared by a multinational at the level of the ultimate parent entity and filed to the tax authority of the multinational's headquarters, which then shares the report with tax authorities in other countries, where the multinational's subsidiaries are situated. From the financial perspective, the activities are aggregated at the level of the individual tax countries and not subsidiaries. However, multinationals disclose non-financial information about all of their subsidiaries in the form of addresses and tax

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identification numbers. Based on those, we can collect the information for Slovakia at the subsidiary level by enriching the dataset by tax returns and financial statements. We illustrate this in Figure 2, where we show the breakdown of multinational activities from the ultimate parent level to the subsidiary level.

Figure 2: Diagram of the financial data from the level of multinational parent to its subsidiaries in Slovakia
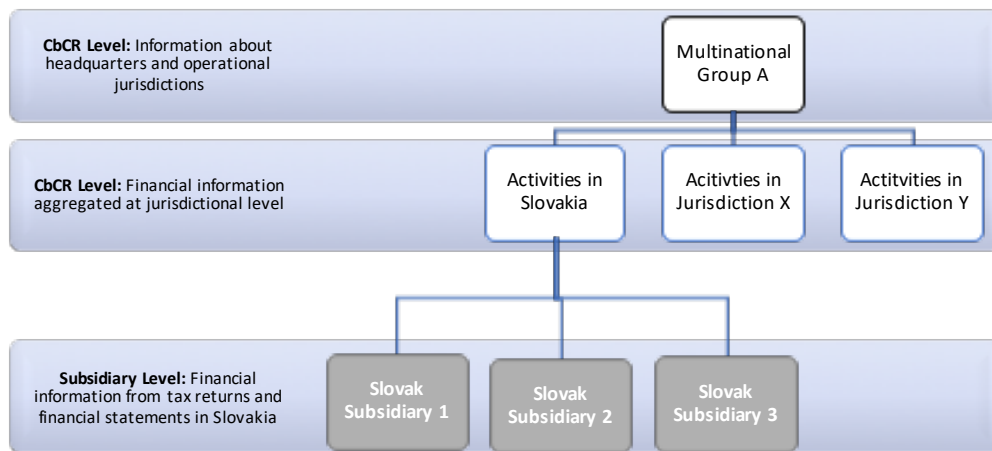
Note: Illustrative diagram of a hypothetical multinational group A, which has subsidiaries in countries X and Y. For those, we possess financial data aggregated only on the jurisdictional level. However, for activities in Slovakia, we can drill down further and by utilizing data from tax returns and financial statements, we can determine the financial activities at the subsidiary level.

Our analysis covers the year 2020 with 788 multinationals that had activities in Slovakia and which we have been able to pair on Slovak tax returns and financial statements. This gives us in total the sample of 1827 subsidiaries. The country-by-country reporting data at a micro level have been recently analyzed to study the activities of German multinationals Fuest, Hugger and Neumeier (2022) and Italian ones Bratta et al. (2021). Furthermore, a similar level of aggregation has been used by Dowd et al. (2017) to assess the profit-shifting by US multinationals. In addition, aggregated data at the level of tax jurisdiction has been used by Garcia-Bernardo and Janský (2024). The country-by-country reporting data has been also subjected to critique due to the double-counting of profits. Blouin and Robinson (2020) mention three possible channels of double counting in financial accounting data: (i) parent company may report equity income in its financial statements even if it was already reported by the subsidiary; (ii) inclusion of intra-company dividends in parent's income; (iii)

the income from partnership included both and parent and subsidiary level. As a large part of the double-counting applies to profit reported in headquarters countries and not their affiliates and since the OECD guidelines have been updated for the 2020 data to account for potential double-counting, we do not make any adjustments to our data.

The case of Slovakia as a medium-sized, export-oriented European Union member state is an interesting one to study. Slovak administrative tax returns data, which is one of the data sources we rely on, were recently used by Bukovina et al. (2020) to estimate the elasticity of corporate taxable income and by Istok et al. (2020) to show that the higher the aggressiveness of tax planning, the lower the salaries and social contributions paid by Slovak companies.

When examining descriptive statistics, we find that individual datasets may slightly differ in values for selected items, but overall, they are closely correlated as illustrated by Figure 3. This can be from conceptual reasons such as the difference between financial accounting (financial statements) and tax accounting (tax returns) for profits (94.4%) and taxes (86.2%). We then group the firm-level data on the multinational level and receive slightly lower coefficients. This can be also partly due to missing data of subsidiaries which we have not been able to identify from the CbC Reports (less than 5%). Even though the CbC Reports should be defined consistently with the principles of financial accounting and should follow International Financial Reporting Standards, we receive a slightly higher correlation with tax returns observations. For revenues related, and research and development, the correlation is very low for the most part. This stems from the fact that their definition is different across datasets (research and development) or just a portion of revenues is included (revenues related in financial statements). We explain these inconsistencies more in the description of Figure 3. The full descriptive statistics with close comparison of datasets are available in Table A.1.

Similarly to findings for more aggregate data for more multinationals by Hugger et al. (2023), we find a substantive amount of low-taxed profits, both for multinationals with a Slovak subsidiary and for Slovak subsidiaries of these multinationals. We capture this in Figure 4. In particular, the disproportion between profit or loss and other components is visible on a global scale. Close to 30% of profits is reported below 5% effective tax rate which is in disbalance with real activity in terms of assets, employees, and revenues. A corresponding insight is visible from the comparison of Global and Slovak activities. Whereas 52% of global profits is taxed bellow 15% rate, only 22% of profit in Slovakia is taxed bellow 15%. Furthermore, as the corporate income tax rate applicable to the majority of companies in Slovakia is 21%, we see larger shares for the companies between 15% - 25% effective tax rates in comparison to global distribution.

Figure 3: Correlation coefficients for individual data sources
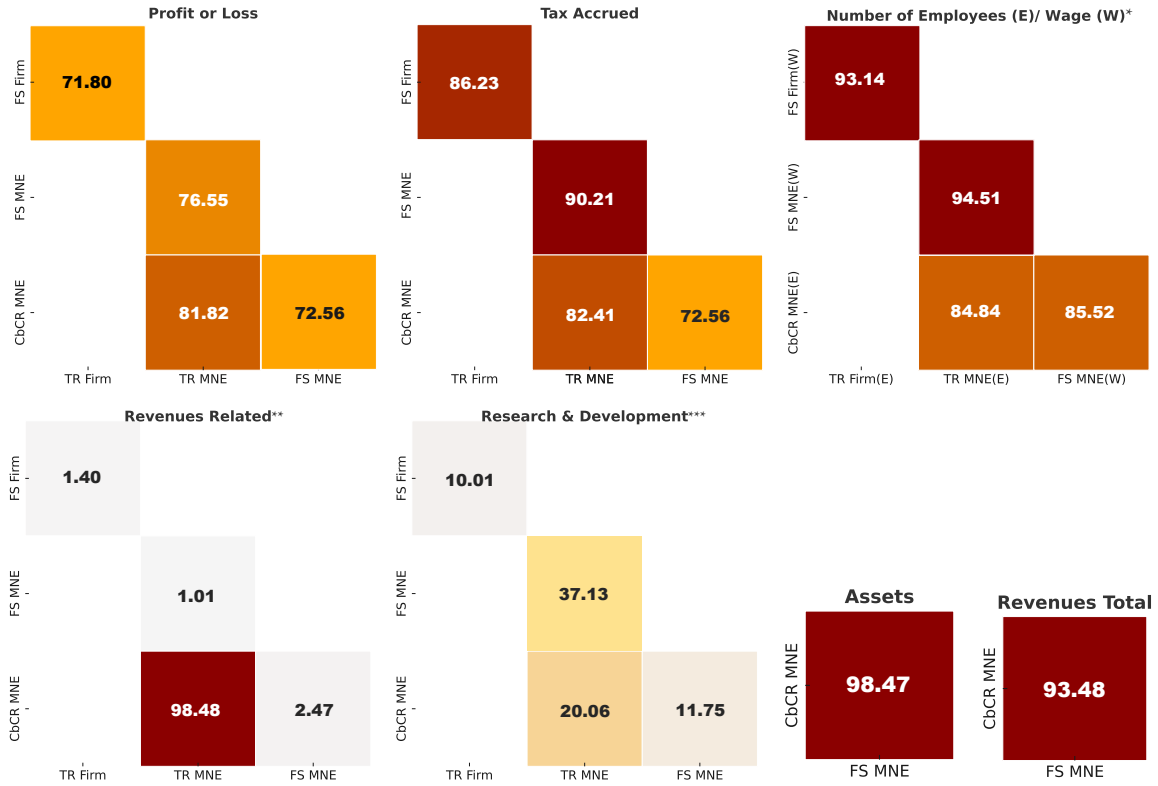
Note: In each box, we show the correlation coefficient for individual data sources. Those include Financial Statements (FS), Tax Returns (TR) and CbCR (Country-by-Country Reports). Furthermore, we include the firm level (denoted as FS/TR Firm) between tax returns and financial statements if possible. Next, we group the firm-level tax returns and financial statements on the multinational level to show the correlation with CbC Reports (denoted as FS/TR MNE). *Number of Employees (E)/ Wage (W): the appendix to tax returns offers data on employees, whereas in financial statements only wage is visible. **Revenues Related: the appendix to tax returns shows the distribution of expenses and revenues from intra-firm trade such as assets, licenses, services, and intra-firm loans. We offer the sum of all these revenues. Instead, for the financial statements, only revenues from intra-firm revenues are offered for two out of three financial statement statements. This can result in a small correlation as not all intra-firm revenues are visible. ***Research & Development: for tax returns, we include the deductions for R&D, which are eligible under the global minimum tax. We compare these with expenses on research from financial statements. From country-by-country reports, we source the business activity Research and development for a given multinational subsidiary denoted as 1 if the activity is included.

We continue with the illustration of differences in profitability and effective tax rates between the activities of multinationals in Slovakia and globally by plotting the profit-to-employee ratio in Figure 5. The profit-to-employee ratio for individual countries exhibits a similar pattern to Garcia-Bernardo and Janský (2024) and Tørsløv et al. (2023b). In other words, with decreasing effective tax rates the profit-to-employee ratio significantly increases. However, this is not the case for the firms in Slovakia, where the firms are distributed more

Figure 4: Distribution of multinationals' activities according to their effective tax rates
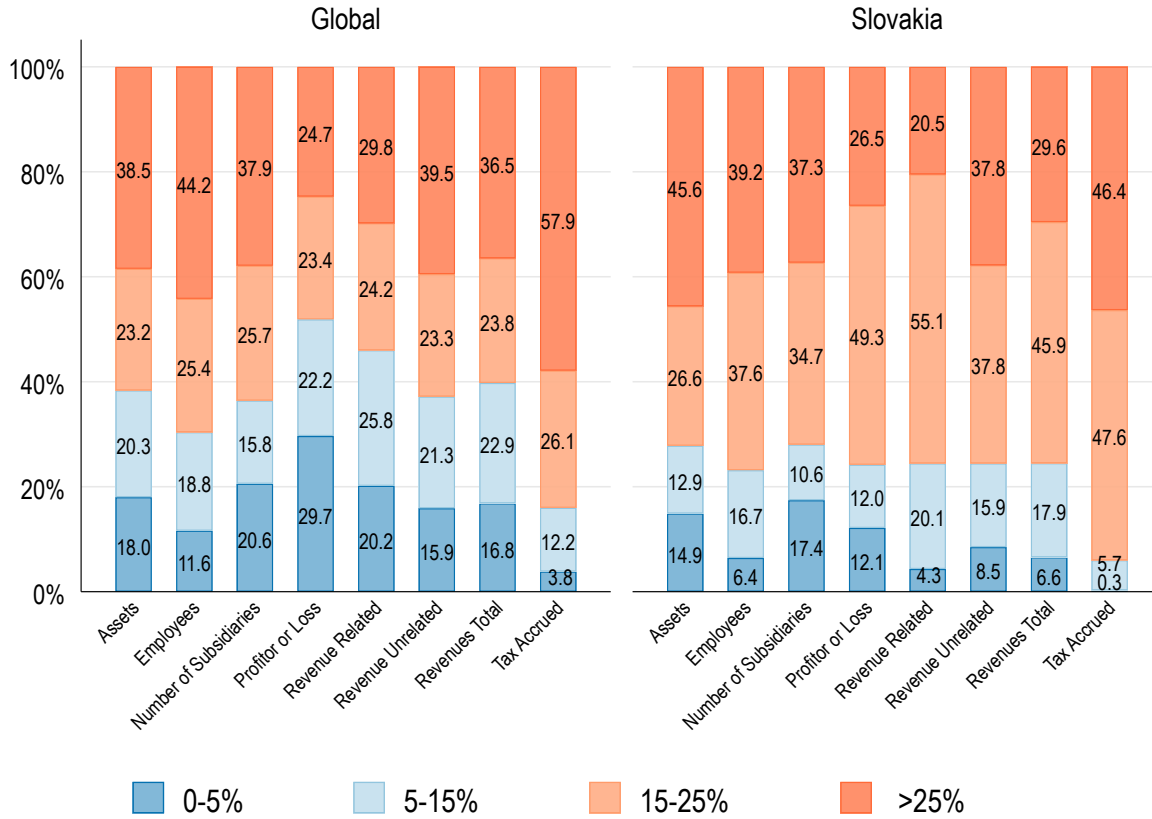
Note: The figure depicts the distribution of items found in the country-by-country reports based on the effective tax rates (labelled as ETR) that a multinational is paying at the jurisdictional level. In category *Global*, we include all country-multinational pairs, with *Slovakia* being a subset. We constrain the effective tax rates from the below, such that multinationals with negative profits or taxes are excluded.

equally around the 21% corporate tax rate. To observe the patterns in global taxation more closely and to illustrate the differences in taxation between tax havens and other countries, we show the firm-level distribution of effective tax rates in Figure A.10.

5   Results

We estimate that Slovak corporate tax revenues will increase by around 4% or EUR 117 million due to the global minimum tax. This is the sum of the seven components discussed above. We arrive at each of these by aggregating from the bottom up: for each affected multinational we estimate how their profits and taxes are likely to be affected in each country

Figure 5: Profitability and effective tax rates

(a) Global
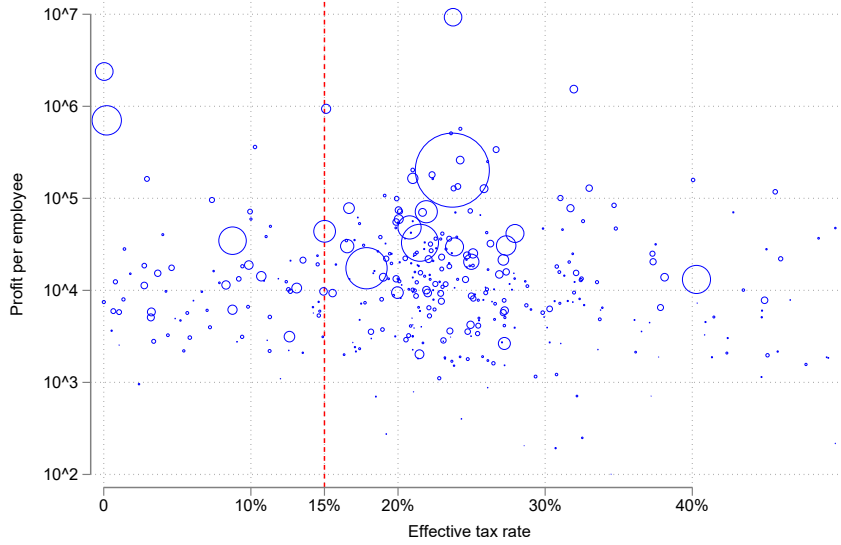
(b) Slovakia

Note: The figure shows profit per employee as a function of the effective tax rates. For the subfigure *Global*, we weigh both effective tax rates and profit per employee by profits booked. In addition, we label countries, which are denoted as tax havens by Tørsløv et al. (2023b), and the economies with the largest profits booked. For the subfigure *Slovakia*, we use the firm-level data grouped for each multinational group. For both subfigures, we constrain the effective tax rates to be between 0% - 50%.

by each global minimum top-up tax. In our estimates we follow the global minimum tax rules as carefully as possible, including the required adjustments of the tax base discussed in Section A.3 in the Appendix. We describe results of the tax base adjustments for a domestic top-up tax by Slovakia in Table 3 in the Appendix.[3]

We estimate that roughly half of the 4% increase in Slovakia's corporate tax revenue is due to top-up taxes by Slovakia, while the other half is due to a decrease in profit shifting out of Slovakia. The decrease in profit shifting is due to other countries applying their top-up taxes. Since multinationals will shift less profits out of Slovakia, they will report more profit in Slovakia and pay corporate income tax on it. Specifically, we estimate that Slovakia will collect EUR 53 million (45% of the total net tax revenue effect of the reform) on top-up taxes. In addition, Slovakia will collect EUR 64 million (55%) of tax revenue on profits that will newly be reported in Slovakia rather than being shifted to another country. This effect could potentially be offset by a decrease in profit shifting into Slovakia by multinationals that currently pay low effective tax rates in Slovakia. However, we estimate that the tax loss for Slovakia from reduced profit shifting into Slovakia will be negligible and will mainly affect the amount of top-up taxes and not the corporate income tax.

We decompose the overall estimate into its seven components. Figure 6 shows the five components that we are able to estimate and we discuss all seven of them one by one below. Domestic top-up tax and income tax domestic are the two most important components, accounting together for a majority of the overall estimate. This suggests that domestic top-up tax as applied by both Slovakia and other countries is the most consequential top-up tax, at least from the point of view of Slovak tax revenue. We estimate also substantial revenue increases from third country top-up tax and income tax headquarter components, while only a negligible income tax decrease. Below we discuss the individual components one by one.

Our estimate of the first component, the domestic top-up tax, is EUR 44 million. This is

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[3]In addition to applying global minimum tax adjustments to the tax base, which can lower the tax rate below 15% as demonstrated by Equation (22)), we also make several different adjustments to correct for negative values of tax accrued that are reported in the country-by-country reporting data. In dealing with these negative reported values, we leverage our access to matched corporate tax returns to investigate their cause and replace them by values reported in tax returns where appropriate. Our preferred estimate of the tax revenue impact of the global minimum tax in Slovakia is EUR 47.3 million, as shown in panel (c) in Table 3. This estimate assumes substance-based carve-outs of 5% for tangible assets and 5% for payroll, which are scheduled to apply after a 10-year transition period; until then, carve-outs of 8% for tangible assets and 10% for payroll apply (see panel (d)). Applying 8% and 10% decreases the estimated top-up tax revenue by 7%, to EUR 44 million. The impact of substance-based carve-outs on the estimated top-up tax is relatively large. In panel (b) of Table 3, we show that without carve-outs, the top-up tax would raise EUR 64.6 million. This is due to a relatively large number of multinationals which pay effective tax rates below 15% but have substantial economic activity in Slovakia, and so substance-based carve-outs will decrease their top-up taxes.

Figure 6: Tax revenue composition based on profit shifting behavior
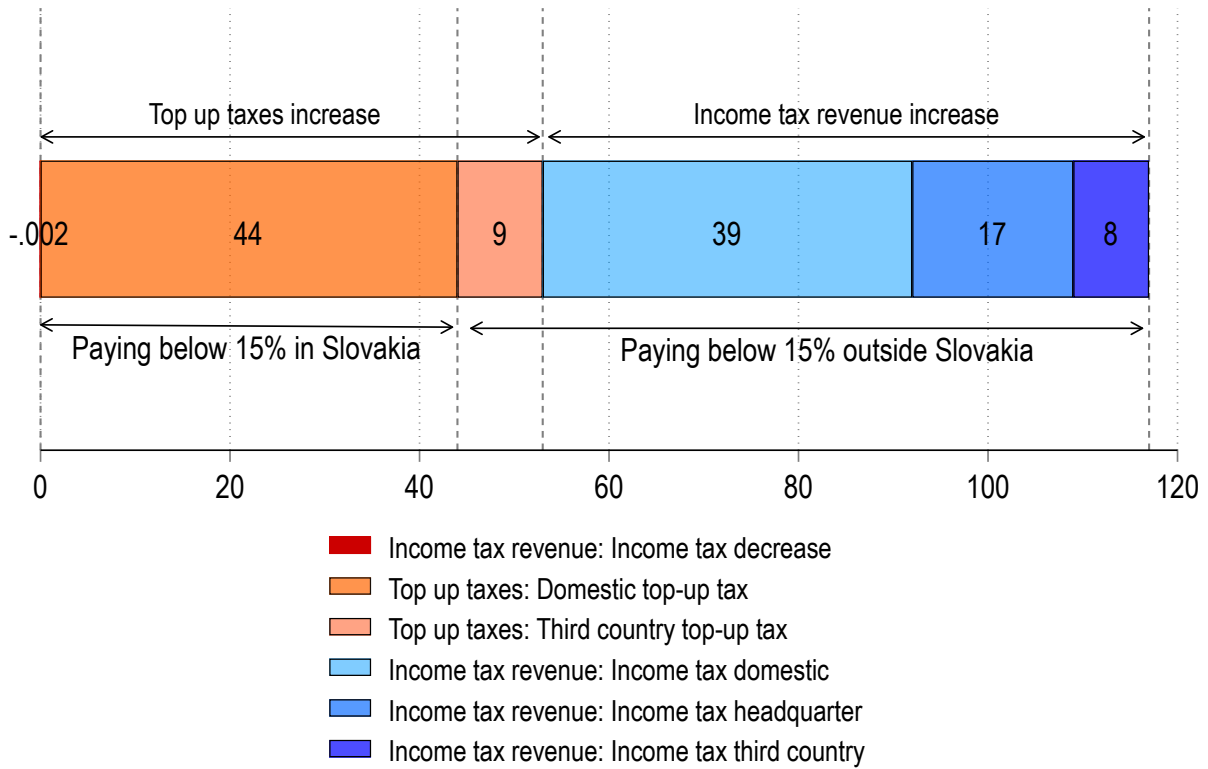
significantly larger than an existing estimate provided by Baraké et al. (2022), who used the 2017 aggregated country-by-country reporting data published by the OECD to estimate no tax revenue from top-up taxes for Slovakia. Their and our estimates vary in the data and year used as well as the breadth of the effects analysed. For the sake of comparison, we replicate their method using the 2020 aggregated data in Figure 13 in the Appendix. This exercise yields an estimate of EUR 16 million, i.e. just over a third of our estimate. While all the estimates carry a degree of uncertainty, a comparison of the assumptions needed to arrive at each set of estimates suggests the superior characteristics and detail of administrative micro-level data and country-specific approaches which we use here. The data available to us in Slovakia enable a more detailed analysis and more accurate estimates than the relatively aggregate, cross-country analyses that have thus far provided these estimates for Slovakia and other countries.

Our access to firm-level country-by-country reporting and tax returns data in Slovakia

enables us to study the heterogeneity of the expected top-up tax payers.[4] We find that companies liable for the top-up tax are highly concentrated. As shown in Figure 9 in the Appendix, EUR 35 million will be paid by just 3 multinationals, and an additional EUR 9.1 million will be raised from an additional 10 multinationals. The 13 largest top-up tax payers will be responsible for 95% of the total revenue generated. In Figure 11 in the Appendix we classify the top-up tax payers based on the country in which their ultimate parent is incorporated, and in Figure 12 in the Appendix we show the industry sector and business activities, in which their Slovak affiliates operate. We find that the largest share of the top-up tax will be paid by companies headquartered in Germany, the United Kingdom, and South Korea. The activities of these companies in Slovakia are scattered across various industry sectors, including manufacturing, financial and insurance services, real estate, and retail. We compare the sectors with business activities as reported in country-by-country reports. We find a large discrepancy between the reporting. Despite the fact that categories "Insurance" or "Regulated Financial Services" are present in country-by-country reports, they are not reported among the top-up taxpayers. On the other hand, we find a large prevalence of the category "Other" for reporting of business activities.

We cannot provide estimates of the second component for Slovakia because the headquarter top-up tax—top-up tax Slovakia headquarter—is likely to apply to only few multinationals that are headquartered in Slovakia, which has two implications: first, we would not be able to estimate it due to confidentiality reasons, and the revenue sourced from it is likely negligible. Therefore, we do not estimate it and, for simplicity, we assume it to be zero.

We estimate that the third component, third-country top-up taxes, will result in new tax revenue of EUR 9 million for Slovakia (Figure 6).

We estimate that in 2020, multinationals shifted EUR 760 million in profits out of Slovakia, and that only EUR 386million (51%) will be shifted after the global minimum tax reform. This is likely to represent a lower bound estimate of the longer-term impact, as we have included only the 2024 adopters of the reform (the EU member states, Australia,

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[4]The detailed data also enable us to estimate the domestic top-up tax to be EUR 44 million rather than EUR 47 million after taking into account changes in profit shifting. We assume that multinationals will adjust their behaviour in response to the reform. Without the behavioural response, the static estimate of domestic top-up tax would be EUR 47 million. We illustrate this in Figure 8, where we split the companies shifting profits out of Slovakia and into Slovakia. The majority of companies shift profits out of Slovakia and the top-up tax after the reform would remain the same at EUR 24 million. However, the remaining EUR 23 million in top-up taxes are attributed to companies shifting their profits into Slovakia and thus, this amount would be subject to a change post-reform. By the application of a change in tax differentials before and after the application of the 15% minimum tax rate, we estimate that EUR 3 million would no longer be collected on top-up taxes, reducing the share of companies shifting profits into Slovakia to EUR 20 million and, altogether EUR 44 million that we use an estimate of the domestic top-up tax.

Canada, Japan, Norway, South Korea, and the United Kingdom). We decompose the 49% reduction in profit shifting out of Slovakia into three components which we have conceptually describe in Section 3.

Firstly, there will be less profit shifting out of Slovakia to countries that apply their domestic top-up taxes, as this takes away the incentive of reduction of tax burden. The second effect, which pertains exclusively to countries not subjected to the first rule, then extends to any affiliates with undertaxed profits headquartered in the adopting country. We label the tax revenue arising from this scenario as Income tax headquarter. The third effect pertains to countries which have imposed top-up taxes on third countries. The largest share is attributed to the Income tax domestic which is only by EUR 5 million smaller than the effect of top-up tax introduction on affiliates operating in Slovakia. The other two effects are comparatively lower in scale. We attribute this to the fact that the majority of multinational corporations operating in Slovakia have affiliates located in EU member states, which have adopted the reform. To ensure the robustness of our analysis, we present an alternative decomposition in Table 2 based on different methods for the calculation of profit shifting.[5]

We also show changes in global distribution of profit shifting out of Slovakia to the most important countries (with more than EUR 10 million shifted before the reform) in Figure 7 (and related results in Table 5).For example, only EUR 17 million is shifted to non-participating countries, which are not targeted by the reform in any aspect. The projection that the larger share of profit shifting will stop after the reform is largely given by responses of countries applying domestic top-up taxes. The other two components of the profit shifting out of Slovakia reveal an opposite trend of a larger share of profit shifting not being affected by the reform. Overall, we estimate that the global minimum tax will reduce profit shifting out of Slovakia by 49%. The finding is driven by the result that profit shifting will mostly continue to few European Union member states in spite of them implementing the reform. We find both before and after the reform that a majority of profits is shifted out of Slovakia into few European Union member states.

We estimate that profit shifting into Slovakia will be reduced by only 31% despite its application of top-up taxes and thus reduced incentives to shift profits into Slovakia. As we

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[5]In addition to the semi-elasticity quadratic method in our baseline estimates, in Table 2 we compare the estimates with the semi-elasticity logarithmic method and the misalignment method, which does not take into account any tax motivation of profit shifting. By using this method, we find that a large amount of profits shifted out of Slovakia is shifted into countries with relatively high effective tax rates, such as Germany, Austria, France, and the US. Some of this shifted profit is taxed at very low effective tax rates (which is in line with recent findings of Hugger et al. (2023)) but a large part is taxed at relatively high tax rates. This suggests that many multinationals shift profits out of Slovakia for other motivations than achieving a lower overall effective tax rate.

show in table 5, this is in contrast to a reduction of 56% in profit shifting out of Slovakia. We find that the corresponding reduction in tax revenue will be negligible and amount only EUR 0.002 million. We present the robustness of the results in Table 2, where we show that the corporate income revenue can be reduced up to EUR 13.9 million, however, this would compensated for by a higher amount of taxes in other components.

Figure 7: Changes in profit shifting
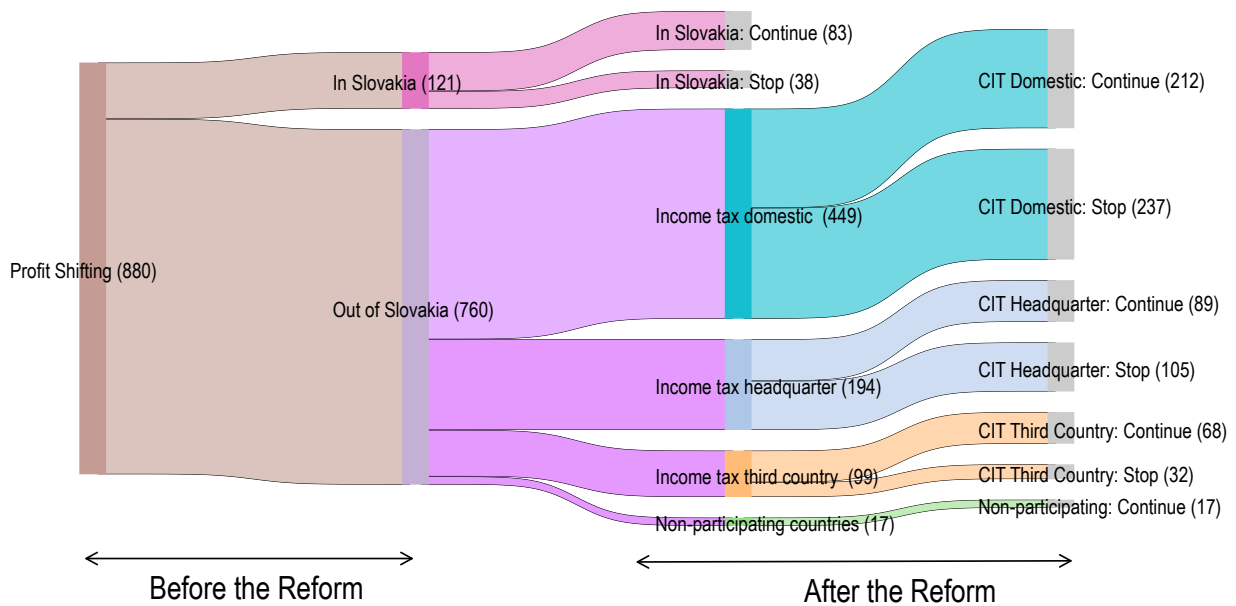
Note: The figure shows profit shifting before and after the reform. We decompose the change in profit shifting based on individual levels. In the last layer, income tax is abbreviated to CIT.

6 Conclusion

Profit shifting of multinationals has been motivating governments worldwide to agree on a series of piecemeal corporate tax reforms over the 2010s, culminating in the 2021 deal of more than 130 countries that includes the global minimum tax of 15% being implemented from 2024 on. The reform is likely to reduce profit shifting, but how much, for what countries and which

multinationals? We answer these questions using rich administrative data of multinationals worldwide available to us thanks to our collaboration with the financial administration of Slovakia. We find that the global minimum tax should increase its corporate tax revenues by 4%, but our main contribution in this paper is in decomposing this number further and quantifying the role of profit shifting. Most of the revenue increase is due to its minimum top-up taxes, but almost half of it is due to corporate income tax on profits that will no longer be shifted out of it. Still, profit shifting will decrease by less than half and most of it will continue to few European countries—most prominently Luxembourg—that implemented the reform. So while a reduction of profit shifting is likely to make a significant contribution to the increase in tax revenue, our estimates for Slovakia suggest that profit shifting is going to be far from eliminated by the reform.

Although it is clearly too soon for a final verdict on the effects of the global minimum tax that is only being implemented as we are writing this in early 2024—if only due to the fact that it will take some years before medium- and long-term effects take place and data are available to evaluate them as well as due to limitations present in any simulation exercise including this one—we do hope that our conceptual decomposition shows the potential, if not necessarily the most likely, impact of the reform on tax revenue and profit shifting. Despite the obvious limitations of timing and methodology, we attempt to at least partially overcome some of them and do the empirics as thoroughly as we can: outlining our methodology including assumptions clearly and applying them to the data of 34 thousand multinational-country observations from tax returns, financial statements and country-by-country reports of all multinationals active in Slovakia.

Our conceptual framework of how the global minimum top-up taxes interact with profit shifting and tax revenue, we hope, should be long-lived and can, of course, be re-estimated with data focused on other countries and when data are available for the 2024 or other post-reform years. There are bound to be differences across countries and over time in how much additional revenue they raise in top-up taxes versus corporate income tax or how much reduction in profit shifting they will see. For example, we expect both countries and governments to learn from what they experience in 2024 and other early years and to change their tax policies or behaviour. The longer the kick-off year of 2024 will be in the past, the more fruitfully researchers will be able to learn about the reforms' effects and from them, for example, about the impact of increased taxation on investment by multinationals.

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Appendices

A   Additional methodological details

A.1   Tax revenue changes estimation

We first describe components related to post-reform profit shifting out of Slovakia.

For the income tax domestic component, we assume that multinationals have a lower incentive to shift profits out of Slovakia post-reform. We estimate the locations of profit shifting within each multinational depending on the locations of profit and economic activity as well as the differences in effective tax rates between the locations. This corresponds to component 4 - Income tax do - from Equation 5.

$$\Delta\pi_{out\&domestic_k,j} \times \tau_{income,j} \tag{7}$$

We assume that this share will consist of adopters of the global minimum tax for the year 2024.[6]

The first part of Equation (7) represents the share of country j - in this case Slovakia - of undertaxed profits reported in another country k ($\Delta\pi_{out\&third\ country_k,Sk}$). This will depend on the profits shifted from Slovakia ($\pi_{out,SK,before}$) to countries k. We calculate this as the share of profits shifted from Slovakia with respect to profits shifted from all countries j ($\frac{\pi_{out,SK,before}}{\sum_j \pi_{out,j,before}}$). We apply this ratio to the profits shifted in country k by a given multinational $\pi_{in,k,before}$. In other words, the part of profits shifted out of Slovakia to country k can be expressed as:

$$\Delta\pi_{out\&third\ country_k,j} = \pi_{in,k,before} \times \frac{\pi_{out,Sk,before}}{\sum_j \pi_{out,j,before}} \tag{8}$$

The second part of Equation (7), $\tau_{income,j}$, represents the corporate tax rate applied by country j to the no longer shifted profits. We assume that the corporate tax rate will be proportional to changes in the differences in effective tax rates as there will be an increase in minimum taxation. This measures the reduced incentive of the multinational to shift profits. For example, if the tax differential between Slovakia (j) and the Netherlands (k) due to the Netherlands's implementation of 15% tax went down from 10 to 5 percentage points, this halving of tax differential will translate into the halving of profits shifted out of Slovakia ($\frac{\Delta\tau_{effective,after,k,Sk}}{\Delta\tau_{effective,before,k,Sk}}$). We multiply the tax differential by the multinational's effective

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[6]The EU countries, Australia, Canada, Japan, Norway, South Korea, and the United Kingdom

tax rate in Slovakia. We assume that the effective tax rate will not be higher than the current corporate tax rate in Slovakia of 21%. Similarly, for-profit multinationals paying below 15% effective tax rate in Slovakia and shifting profits there, will be paying an effective tax rate of at least 15% after the reform. This gives us for Slovakia the following expression:

$$\tau_{income,Sk} = \frac{\Delta\tau_{effective,after,k,Sk}}{\Delta\tau_{effective,before,k,Sk}} \times \tau_{effective\&constrained,before,k,Sk} \tag{9}$$

$$\text{where } \tau_{effective\&constrained,before,k,Sk} \in [0.15, 0.21].$$

We follow a similar approach for the income tax headquarter component expressed as:

$$\Delta\pi_{out\&headquarter_k,j} \times \tau_{income,j} \tag{10}$$

The only change will be the group of country-subsidiaries k to which this approach will apply. In this context, the headquarter countries will apply the top-up taxes on their multinationals in countries k, where the reported profits are currently undertaxed. This applies only if the top-up-tax was not collected before by a domestic top-up tax. This will in hand reduce the incentive to shift profits from Slovakia, which will receive more on corporate tax revenue.

We now turn to the third country top-up tax component. If none of the top-up taxes defined apply will not apply for subsidiary in jurisdiction k, Slovakia is still eligible for sourcing top-up tax on undertaxed profits, provided jurisdiction k is among the participating countries in the global minimum tax. We maintain that profit shifting out of Slovakia will not be reduced to these countries, because only share of profits will be reclaimed back. Thus, Slovakia will be more likely to touch these profits by top-up taxes ($\tau_{topup,i,SK}$) giving us the tax revenue applicable to Slovakia sourced from multinational i having undertaxed profits in countries k, $T_{i,SK,k,after}$:

$$T_{i,SK,k,after} = \pi_{reported\&undertaxed\&share_i,SK,k,after} \times \tau_{topup,i,SK}. \tag{11}$$

$\tau_{topup,i,SK}$ can then be rewritten as the difference between the 15% rate and the current tax rate that multinational i is paying in jurisdiction k:

$$T_{i,j,after} = \pi_{reported\&undertaxed\&share_i,SK,k,after} \times (15\% - \tau_{i,topup,k}) \tag{12}$$

Additionally, $\pi_{reported\&undertaxed\&share_i,SK,k,after})$ depicts the share of Slovakia from all the undertaxed profits multinational i reports in country k. This is calculated as the ratio of real economic activity in Slovakia with respect to total real economic activity in all countries j where multinational i is active.

$$\pi_{reported\&undertaxed\&share_i,Sk,k,after} =$$
$$\pi_{reported\&undertaxed_i,k,after} \times (0,5 \times \frac{Employees_{i,Sk}}{\sum_j Employees_{i,j}} + 0,5 \times \frac{Assets_{i,Sk}}{\sum_j Assets_{i,j}}), \tag{13}$$

We next describe components related to post-reform profit shifting into Slovakia.

We propose there will be the same behavioral responses of multinationals when it comes to profit-shifting into Slovakia as those we have outlined for the profit-shifting out of Slovakia. In terms of Equation 5, we expect the effect to be twofold. First, there will be a reduction of $\pi_{reported\&undertaxed\&non-headquartered_j,j,after} \times \tau_{topup,j}$ as there will be less undertax profits reported in Slovakia. Secondly, the effect will imply the reduction of corporate income by $\Delta\pi_{in,j} \times \tau_{income,j}$ as companies will no longer be taxing shifted profits in Slovakia.

Thus, rewriting this equation for multinational i, with profits shifted into Slovakia, we receive:

$$\pi_{reported\&undertaxed\&non-headquartered_i,SK,after} =$$
$$\pi_{real\&undertaxed\&non-headquartered_i,Sk,after} + \pi_{in\&undertaxed\&non-headquartered_i,SK,after} \tag{14}$$

Next, we rewrite Equation 8 to calculate the profit shifted to Slovakia out of jurisdiction j as the share of profits shifted to Slovakia with respect to all profits shifted to countries k (Slovakia being a subset of k) for a given multinational i.

$$\pi_{in\&undertaxed\&non-headquartered_i,SK,j,before} = \pi_{out,j,before} \times \frac{\pi_{in,SK,before}}{\sum_k \pi_{in,k,before}} \tag{15}$$

To move from profit shifting *before* to *after*, we use the tax differentials as in equation 9 to account for the lower incentive to shift profits into a given jurisdiction.

$$\pi_{in\&undertaxed\&non-headquartered_i,SK,j,after} = \pi_{out,j,before} \times \frac{\pi_{in,SK,before}}{\sum_k \pi_{in,k,before}} \times \frac{\Delta\tau_{effective,after,k,SK}}{\Delta\tau_{effective,before,k,SK}} \tag{16}$$

Last, we apply the top-up on newly calculated undertaxed profits in Slovakia.

$$T_{i,SK,after} = \pi_{i,reported\&undertaxed\&non-headquartered_SK,SK,after} \times (15\% - \tau_{i,topup,SK}) \qquad (17)$$

.

For some multinationals, it can occur that the change of undertaxed profits shifted into Slovakia before and after the reform ($\Delta\pi_{in,SK} \times \tau_{income,SK}$) is on such a large scale that it will lower the amount of corporate tax revenue $\Delta\pi_{in,SK} \times \tau_{income,SK}$ currently sourced by Slovakia. This can be expressed as

$$
\begin{aligned}
T_{i,SK,after} = \pi_{i,reported\&undertaxed\&non-headquartered_SK,SK,before} \times \tau_{i,SK}) - \\
\pi_{i,reported\&undertaxed\&non-headquartered_Sk,SK,after} \times (15\% - \tau_{i,topup,SK}) \\
\text{given that } \pi_{i,reported\&undertaxed\&non-headquartered_SK,SK,before} \times \tau_{i,SK}) > \\
\pi_{i,reported\&undertaxed\&non-headquartered_SK,SK,after} \times (15\% - \tau_{i,topup,SK}).
\end{aligned}
\qquad (18)
$$

A.2   Profit shifting estimation

We estimate the scale of profit shifting before and after the reform using the quadratic specification of the tax semi-elasticity method, which was pioneered by Hines and Rice (1994), highlighted by Dowd et al. (2017) and recently applied by Garcia-Bernardo, Janský and Zucman (2022):

$$\log(\pi_{i_j}) = \beta_0 + \beta_1 \log(K_{i_j}) + \beta_2 \log(L_{i_j}) + \beta_3(1 - \tau_j) + \beta_4(1 - \tau_j)^2 + \beta_\chi \chi + \epsilon, \qquad (19)$$

where π_{i_j} represents profits reported by a multinational i in a country j, including both real profit and profit shifted, and K_{i_j} and L_{i_j} are the capital and labour components of the Cobb-Douglas production function, usually operationalised with total tangible assets and wages. τ_j is the tax rate faced by the subsidiary which we proxy by effective tax rates, and χ are controls.

As a robustness check, in addition to the quadratic specification in our headline estimates, we also use a logarithmic specification, in which we follow Garcia-Bernardo and Janský (2024), who propose to modify equation 19 to model the extreme non-linearity as follows:

$$\log(\pi_i) = \beta_0 + \beta_1 \log(K_i) + \beta_2 \log(L_i) + \beta_3(\tau_i) + \beta_4 \log(t + \tau_i) + \beta_\chi \chi + \epsilon. \qquad (20)$$

where t is an offset parameter (which Garcia-Bernardo and Janský (2024) discuss in detail, and we set to 0.001).

As another robustness check, we proxy profit shifting using the so-called profit misalignment method. This method has been shown by Garcia-Bernardo and Janský (2024) to arrive at similar estimates of the scale of profit shifting as the tax semi-elasticity method (Beer et al.; 2020). The profit misalignment method calculates the extent of profit misalignment as the difference between the share of profits in a given country and the share of economic activity proxied by employees and assets, E_i.

$$f_i = \frac{\pi_{i_j}}{\Pi_i - E_{i_j}}, \tag{21}$$

where p_i are profits booked in the country and P corresponds to total profits by US multinationals, $\sum_j (p_j)$. The share of economic activity, E_i, is proxied using unrelated party sales, tangible assets, employment and wages (as in Garcia-Bernardo and Janský; 2024). If the share of economic activity is lower than the share of profits, we assume that profits are shifted into the country.

A.3 Tax base calculation

We define profits as profit or loss before taxation as it can be found in country-by-country reports or tax returns. However, for the purposes of global minimum effective tax rate the $TaxBase_{SK,i}$ can be lowered by deductibles. We split these on tax deductions, which are listed in tax returns files and companies regularly use them to lower their tax burden and substance-based carve-outs, which have been added as deductible to the global minimum tax to reduce top-up taxes for companies with large economic presence. Additionally, for the calculation of $TaxBase_{SK,i}$ exempt entities which include non-profit organisations, pension funds, investment funds, or real estate investment vehicles are not considered eligible. We illustrate this by equation 22 for multinational i where the deduction are aggregated for all its subsidiaries:

$$TaxBase_{SK,i} = Profit_{SK,i} - \text{Tax Deductions}_{SK,i} -$$
$$\text{Carve-outs}_{SK,i} - \text{Exempt Entities}_{SK,i}. \tag{22}$$

In Slovakia, as well as in the OECD Guidelines the tax deductions apply to research and development expenses, patent box, and carry-loss forward. Specifically, the tax deductibles

apply in the following amount:

$$\text{Tax Deductions}_{SK,i} = 1 \times \text{Research \& Development Expenses}_{SK,i} +$$
$$0.5 \times \text{Patent Box Deductibles}_{SK,i} + \qquad (23)$$
$$1 \times \text{Carry-loss Forward}_{SK,i}$$

Equation 24 then specifies the substance-based carve-outs that amount to a percentage of the carrying value of tangible assets and payroll expenses that the multinational company records in the subsidiary country in the following way:

$$\text{Carve-outs}_{SK,i} = 0.05 \times \text{Assets}_{SK,i} + 0.05 \times \text{Payroll}_{SK,i}, \qquad (24)$$

where $Assets_{SK,i}$ stands for long-term tangible assets and may differ in value from the item "Assets", which is included in CbC reports, by exclusion of inventories as discussed by Baraké et al. (2022). Hence, we take this value from financial statements. The same data source holds for $Payroll_{SK,i}$ as CbC reports only offer value for the number of employees. We include the 5% carrying value as a preferable percentage. Nevertheless, it is important to note that this percentage will be applicable after a transition period of 10 years, for which 8% of tangible assets and 10% of payroll will apply. This provision reduces significantly the top-up tax liability in countries with substantial activity while the close to 15% top-up tax applies in countries with no genuine economic activity. This tax liability will be globally determined for each multinational company.

B Additional tables and figures

Figure 8: Composition of tax revenue post-reform, less profit shifted into Slovakia

- ■ Income tax decrease - less profit shifting from other countries into Slovakia
- ■ Top-up tax on undertaxed profits - companies shifting profits out of Slovakia
- ■ Top-up tax on undertaxed profits - companies shifting profits to Slovakia
- ⌐_⌐ Top-up tax forgone with respect to baseline (retrospective) scenario, companies shifting less profits to Slovakia
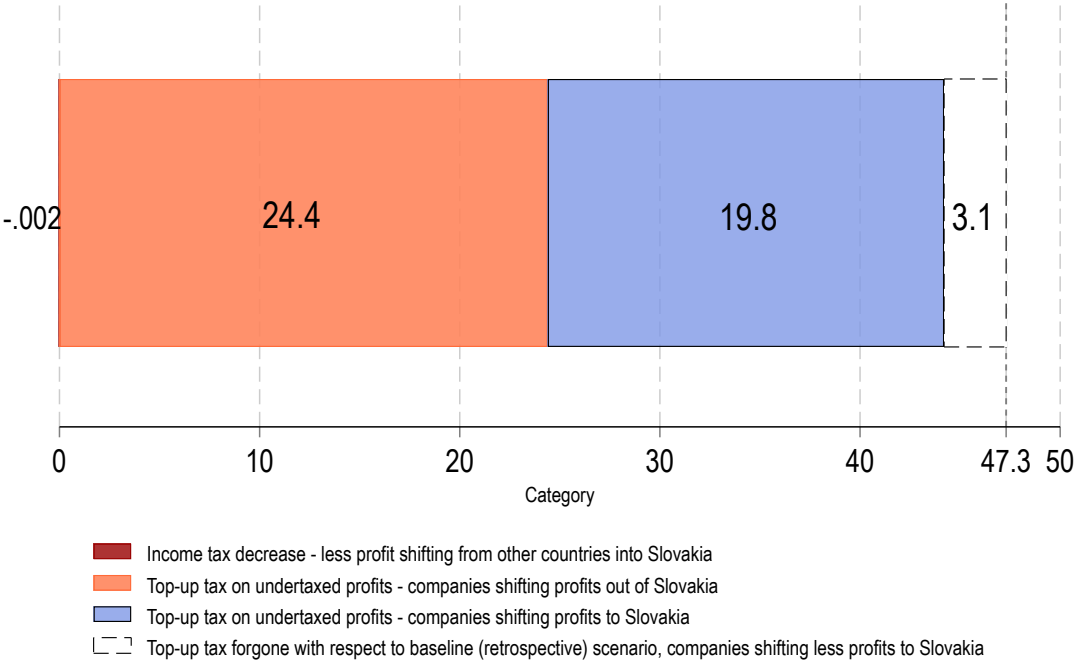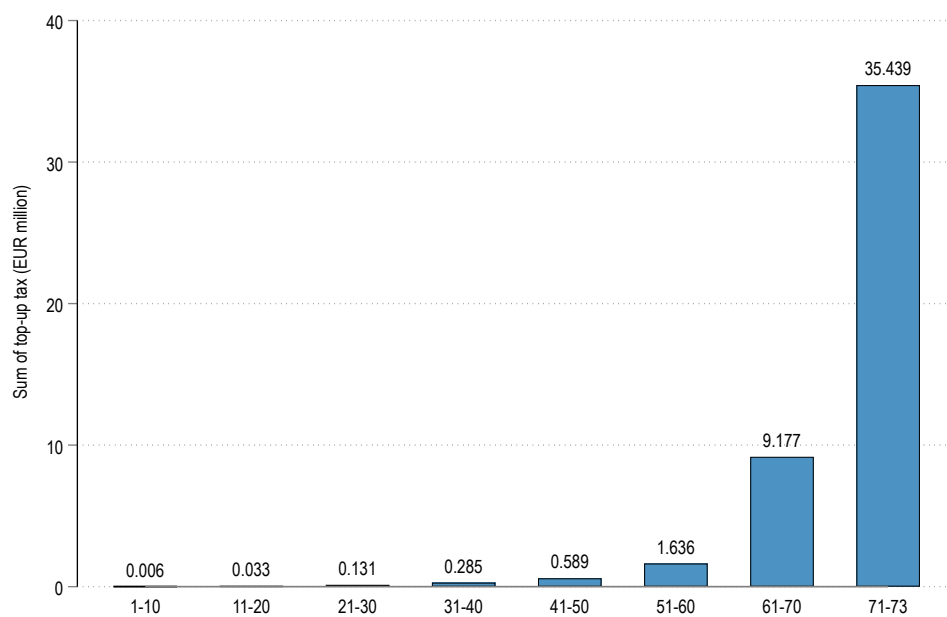
Figure 9: Distribution of top-up taxpayers in Slovakia

Note: This figure shows the distribution of top-up taxpayers in Slovakia based on the amount they would pay from the lowest to the highest. The bins are comprised of 10 companies for the first 70 multinationals. The last bin includes only 3 multinationals to show that only a few firms would be responsible for the largest share.

Table 1: Descriptive statistics

Country-by-country reporting: all multinational-jurisdiction pairs

Variables	N	mean	min	max	sum	p50	p95	p99
Revenues Total	34,494	4.854e+08	-4.348e+10	3.044e+11	1.674e+13	2.128e+07	1.412e+09	8.076e+09
Revenues Related	34,494	1.734e+08	-4.375e+10	1.498e+11	5.980e+12	923,714	3.701e+08	2.906e+09
Profit or Loss (Before Tax)	34,494	1.747e+07	-8.304e+10	8.476e+10	6.027e+11	455,889	7.942e+07	5.155e+08
Tax Accrued	34,494	6.577e+06	-9.378e+08	3.794e+10	2.269e+11	78,405	1.552e+07	9.559e+07
Tax Paid	34,494	6.748e+06	-1.769e+09	4.302e+10	2.328e+11	70,531	1.494e+07	9.603e+07
Employees	34,494	1,446	0	740,250	4.989e+07	74	3,952	17,970
Assets	34,494	3.966e+08	-2.723e+09	7.088e+12	1.368e+13	2.498e+06	4.168e+08	2.729e+09

Country-by-country reporting: multinational-Slovakia pairs

Variables	N	mean	min	max	sum	p50	p95	p99
Revenues Total	787	9.994e+07	-5,918	1.092e+10	7.865e+10	9.261e+06	3.420e+08	1.823e+09
Revenues Related	787	3.962e+07	-9.778e+06	9.967e+09	3.118e+10	449,000	1.184e+08	5.320e+08
Profit or Loss (Before Tax)	787	4.975e+06	-1.040e+08	9.943e+08	3.915e+09	209,450	1.338e+07	1.141e+08
Tax Accrued	787	371,657	-3.041e+08	5.785e+07	2.925e+08	31,623	2.644e+06	1.941e+07
Tax Paid	787	293,034	-3.543e+08	5.958e+07	2.306e+08	26,507	2.512e+06	2.245e+07
Employees	787	357.6	0	13,542	281,427	40	1,748	5,389
Assets	787	5.961e+07	-19,085	9.758e+09	4.691e+10	1.056e+06	1.259e+08	1.060e+09

Tax returns: all companies in Slovakia

Variables	N	mean	min	max	sum	p50	p95	p99
Profit or Loss (Before Tax)	281,797	39,396	-1.142e+08	5.844e+08	1.110e+10	218.3	89,993	569,000
Tax Base	281,797	39,918	-8.974e+07	5.661e+08	1.125e+10	261.8	85,736	519,803
Carry Loss Forward	281,797	1,520	0	8.794e+06	4.283e+08	0	2,120	18,207
Deduction for R&D	281,797	703.2	0	1.244e+07	1.982e+08	0	0	0
Tax Payable	281,797	9,616	0	1.189e+08	2.710e+09	0.110	16,594	102,333
Employees	188,018	15.02	0	21,729	2.823e+06	3	44	172

Tax returns: Only companies found in country-by-country reports

Variables	N	mean	min	max	sum	p50	p95	p99
Profit or Loss (Before Tax)	1,827	2.188e+06	-1.140e+08	5.844e+08	3.998e+09	32,583	5.413e+06	4.326e+07
Tax Base	1,827	2.109e+06	-2.682e+07	5.661e+08	3.854e+09	46,843	5.661e+06	3.190e+07
Carry Loss Forward	1,827	44,938	0	8.794e+06	8.210e+07	0	78,767	1.041e+06
Deduction for R&D	1,827	34,125	0	1.244e+07	6.235e+07	0	0	373,935
Tax Payable	1,827	456,050	0	1.189e+08	8.332e+08	6,649	1.113e+06	6.454e+06
Employees	1,472	189.5	0	15,594	278,875	20	834	2,623

Financial statements*: all companies in Slovakia

Variables	N	mean	min	max	sum	p50	p95	p99
Profit or Loss (Before Tax)	237,322	38,158	-1.081e+08	5.337e+08	9.056e+09	918	101,525	626,861
Tax Accrued	139,079	16,600	-2.494e+07	1.261e+08	2.309e+09	1,061	39,274	205,666
Total Revenues	214,713	1.003e+06	-1.272e+06	9.785e+09	2.154e+11	49,345	1.885e+06	1.187e+07
Revenues Related	180,728	2,771	0	2.684e+08	5.008e+08	0	0	0
Payroll	140,835	129,697	-134,746	3.414e+08	1.827e+10	12,149	302,989	1.861e+06
Assets	60,904	2.572e+06	-1.157e+06	9.738e+09	1.567e+11	98,835	5.886e+06	2.837e+07

Financial statements*: only companies present in country-by-country reports

Variables	N	mean	min	max	sum	p50	p95	p99
Profit or Loss (Before Tax)	1,735	11.097e+06	-1.081e+08	2.818e+08	1.903e+09	29,653	4.580e+06	1.667e+07
Tax Accrued	1,448	359,707	-2.494e+07	7.116e+07	5.209e+08	22,842	1.247e+06	4.653e+06
Total Revenues	1,584	4.190e+07	-531,189	9.785e+09	6.636e+10	1.793e+07	1.349e+08	5.157e+08
Revenues Related	171	1.581e+06	0	2.684e+08	2.704e+08	0	200	981,000
Payroll	1,463	3.054e+06	-5,642	3.414e+08	4.468e+09	377,241	1.168e+07	4.217e+07
Assets	1,388	2.486e+07	0	9.450e+09	3.451e+10	329,957	6.728e+07	2.554e+08

Note: Table shows descriptive statistics for selected items across our main three datasets. We splits the statistics into all observations and only the activities of multinationals in Slovakia. We allow for negative values of both tax and profit indicators   * For financial statements, we do not fill the missing values with zeros. Also some companies are not required to file financial statements, which results in their lower number in comparison to tax returns.

Table 2: Tax revenue effects of global minimum tax according to the types of taxes and profit shifting estimates

	Semi-elasticity quadratic		Semi-elasticity logarithmic		Misalignment	
	million EUR	% corporate tax	million EUR	% corporate tax	million EUR	% corporate tax
Total	**117**	**4.3%**	**135**	**5.0%**	**144**	**5.3%**
		% Total		*% Total*		*% Total*
Top up taxes	**53**	**45.1%**	**51**	**37.5%**	**43**	**29.8%**
Domestic top-up tax	44	38%	42	31%	34	24%
Headquarter top-up tax	-	-	-	-	-	-
Third country top-up tax	9	7%	9	6%	9	6%
Income tax revenue	**64**	**55%**	**85**	**63%**	**101**	**70%**
Income tax domestic	39	34%	48	36%	59	41%
Income tax headquarter	17	14%	25	19%	41	29%
Income tax third country	8	7%	11	8%	14	10%
Income tax decrease	-0.002	-0.01%	-0.04	-0.03%	-14	-10%

Source: Authors. Notes: The Slovak corporate tax revenue in 2020 was EUR 2710 million. The Slovak corporate tax paid by multinationals in country-by-country reports was EUR 833 million. The headquarter top-up tax—top-up tax Slovakia headquarter—is likely to apply to only few multinationals that are headquartered in Slovakia, which has two implications: first, we would not be able to estimate it due to confidentiality reasons, and the revenue sourced from it is likely negligible; therefore, we do not estimate it and, for simplicity, we assume it to be zero.

Table 3: Baseline results without profit shifting: Top-up tax on undertaxed profits in Slovakia of multinationals not headquartered in Slovakia

Correction to negative values of tax accrued	Number of multinationals	Global minimum top-up tax (EUR million)
(a) No correction to tax base		
Keeping negative	202	621.8
(b) Corrected tax base for tax deductions & exempt entities		
Keeping negative	201	613.5
Replaced by 0	201	225.3
Replaced by tax return value	**163**	**64.6**
Drop negative values	139	21.6
(c) Corrected tax base & carve-outs (5% & 5%)		
Keeping negative	99	511.2
Replaced by 0	99	132.0
Replaced by tax return value	**73**	**47.3**
Drop negative values	60	12.8
(d) Corrected tax base & carve-outs (8% & 10%)		
Keeping negative	77	460.7
Replaced by 0	77	82.8
Replaced by tax return value	**55**	**44.0**
Drop negative values	45	4.2

Note: In the table, we show the baseline results for top-up tax on undertaxed profits operating in Slovakia, but not headquartered there. It assumes no behavioral changes by these multinationals and thus illustrates the effect as if the reform was applied retrospectively. We split the results with different corrections to the tax base and also the correction to negative values. Keeping the negative values leads to a clear overestimation of the reform effect. We assume that replacing the negative values with data from tax returns is the most consistent and display this in bold.

Table 4: Semielasticity model results

Dependent variable: Log of Profit	(1) Linear	(2) Quadratic	(3) Logarithmic
Log of Assets	0.357***	0.357***	0.357***
	(72.11)	(72.37)	(72.28)
Log of Labor	0.419***	0.420***	0.420***
	(55.85)	(56.18)	(56.25)
Effective tax rate	-0.885***	-7.867***	4.246***
	(-4.50)	(-13.16)	(9.75)
Effective tax rate (quadratic)		19.410***	
		(12.37)	
Effective tax rate (logarithmic)			-0.727***
			(-13.19)
Log of GDP per capita	0.288***	0.301***	0.316***
	(25.73)	(26.85)	(27.82)
Log of Population	0.0757***	0.102***	0.101***
	(7.36)	(12.96)	(12.93)
Constant	3.342***	3.297***	0.430
	(18.22)	(18.04)	(1.50)
N	19,747	19,747	19,747
R2	0.647	0.650	0.650

Note: t value in parentheses. * p<0.05, ** p<0.01, *** p<0.001
For the calculation of tax semi elasticities we use only observations with positive profits. We replace the negative values of tax accrued by 0 and do not allow for higher effective tax rates than 50%. The control variables in terms of GDP per capita and population are taken from World Development Indicators published by the Word Bank.

Table 5: Changes in profit shifting due to the introduction of global minimum tax

	Quadratic semi-elasticity			Logarithmic semi-elasticity			Misalignment		
	Before	After	% Reduction	Before	After	% Reduction	Before	After	% Reduction
	million EUR	million EUR		million EUR	million EUR		million EUR	million EUR	
Out of Slovakia	**760**	**386**	**49%**	**887**	**433**	**51%**	**1850**	**1138**	**38%**
Income tax domestic	449	212	53%	482	218	55%	962	562	42%
Income tax headquarter	275	89	53%	275	141	49%	605	367	39%
Income tax third country	99	68	60%	113	56	50%	258	182	29%
Non-participating	18	18	0%	15	15	0%	25	25	0%
Into Slovakia	**121**	**83**	**31%**	**105**	**65**	**39%**	**692**	**511**	**26%**

Figure 10: Distribution of firm-level effective tax rates in individual countries

Source: Country-by-country reports
Note: The effective tax rates are censored by 0 from the below and by 50% from the top. For confidentiality reasons, only countries with at least 50 observations are included.

Figure 11: Location of headquarters for top-up taxpayer in Slovakia

Country	Sum of top-up tax (EUR million)
Austria	31.91
United Kingdom	4.29
Korea (the Republic of)	3.64
United States of America	1.56
Ireland	1.43
Italy	1.21
Germany	0.91
Finland	0.41
Japan	0.38
Canada	0.28
Switzerland	0.26
Saudi Arabia	0.22
Luxembourg	0.20
France	0.17
Other	0.43
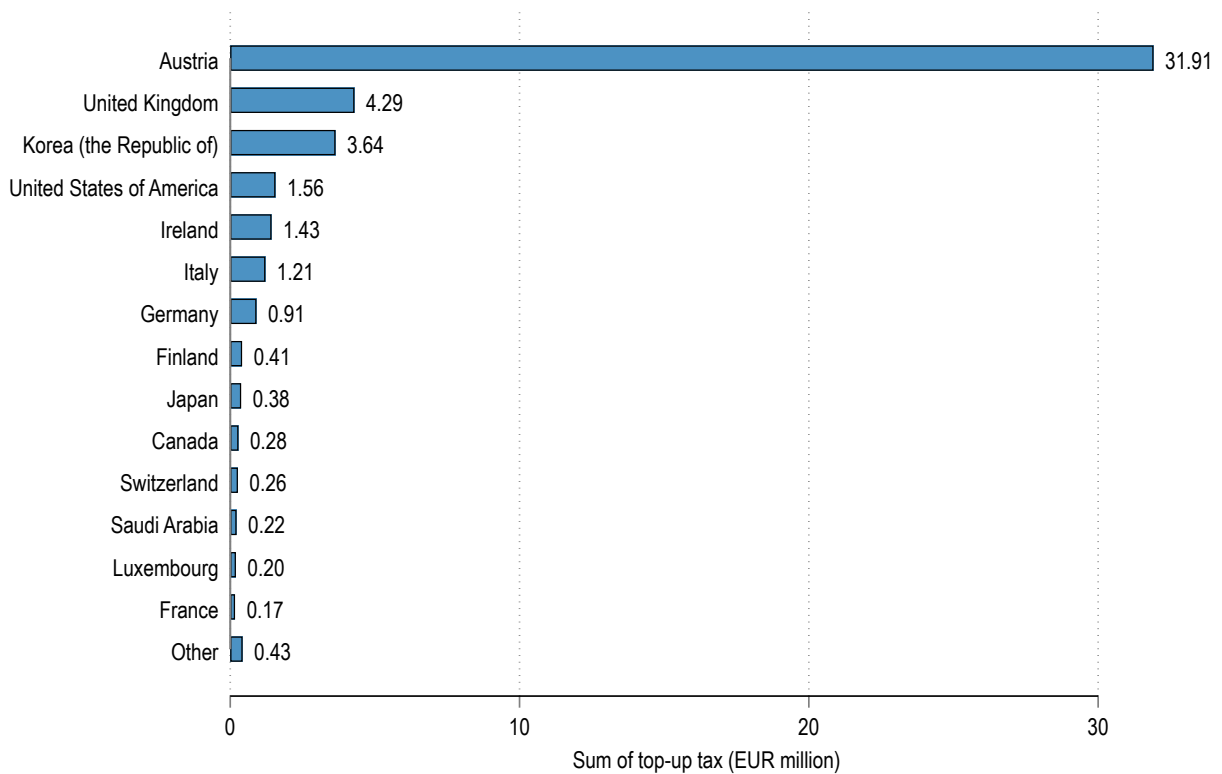
Source: Country-by-country reports.
Note: The breakdown of headquarters jurisdiction, whose affiliates would be eligible for top-up taxes in Slovakia (non-headquartered in Slovakia). Countries whose sum is smaller than EUR 0.1 million are grouped into the category Other.

Figure 12: Sector and business activities of top-up taxpayers in Slovakia
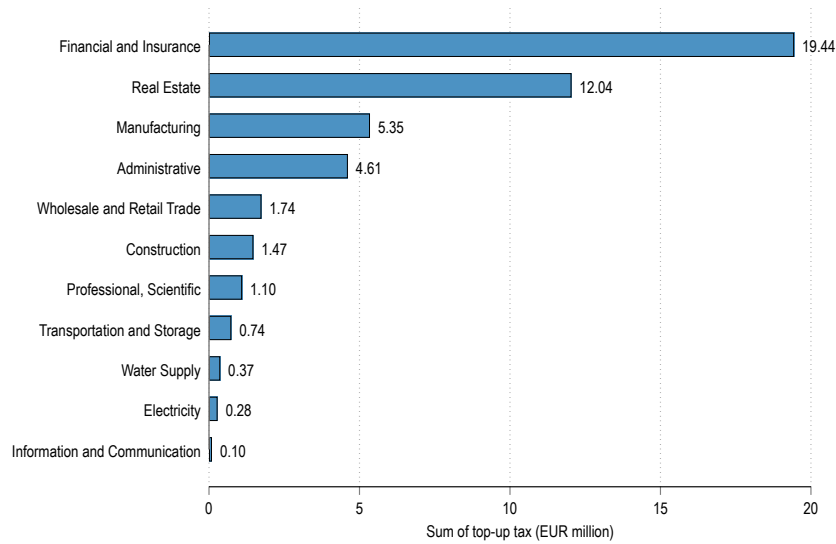
(a) Sector of operation, tax returns
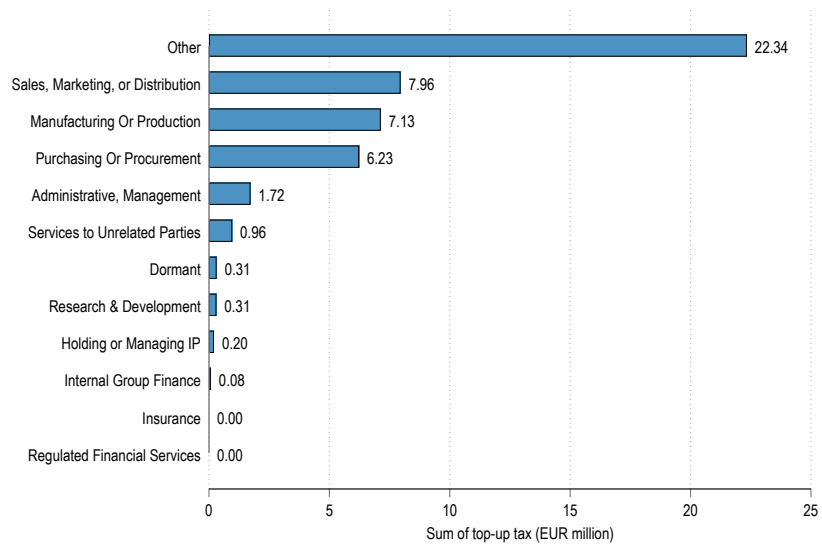
(b) Business activity, country-by-country reports

Source: (a) - sector of operation is taken from tax returns and corresponds to NACE Codes; (b) - business activity is taken from CbC reports.
Note: The figures depict the heterogeneity of firms in terms of their main economic activity. This information is available for both of the sources only at the firm level. For the CbC reports, a firm can indicate multiple business activities. Thus we distribute the aggregated information for multinationals at Slovak level by the amount of profits a given firm indicates in tax returns. For subfigure (a), we do not indicate sectors, where the generated top-up tax would be 0. For subfigure (b), we include 0 for categories *Insurance* and *Regulated Financial Services* to indicate the discrepancy between the two.

Figure 13: Distribution of Slovak increased tax revenue based on global minimum top-up taxes, distributed by multinational parent countries
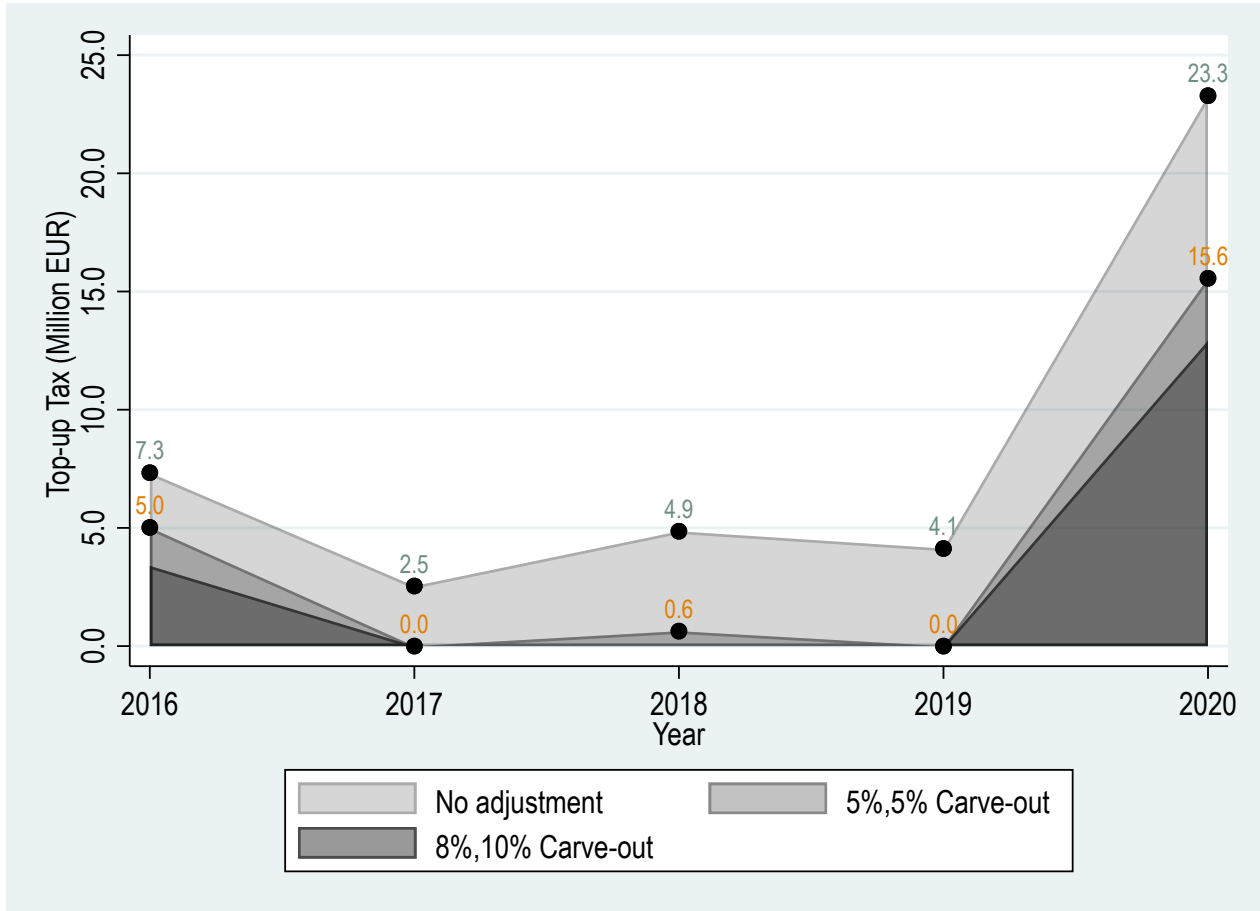
Note: In this figure, we simulate the effect of the global minimum tax using OECD aggregated country-by-country reporting similarly to the approach described in Baraké et al. (2022). The data do not allow the use of tax deductibles to the tax base. As only information on the number of employees is available in CbC reports, we multiply it by the median wage in Slovakia for individual years. Also, the value for assets can be different from the one used for carve-outs due to the inclusion of inventories.

Figure 14: The Change in Profit shifting to individual countries
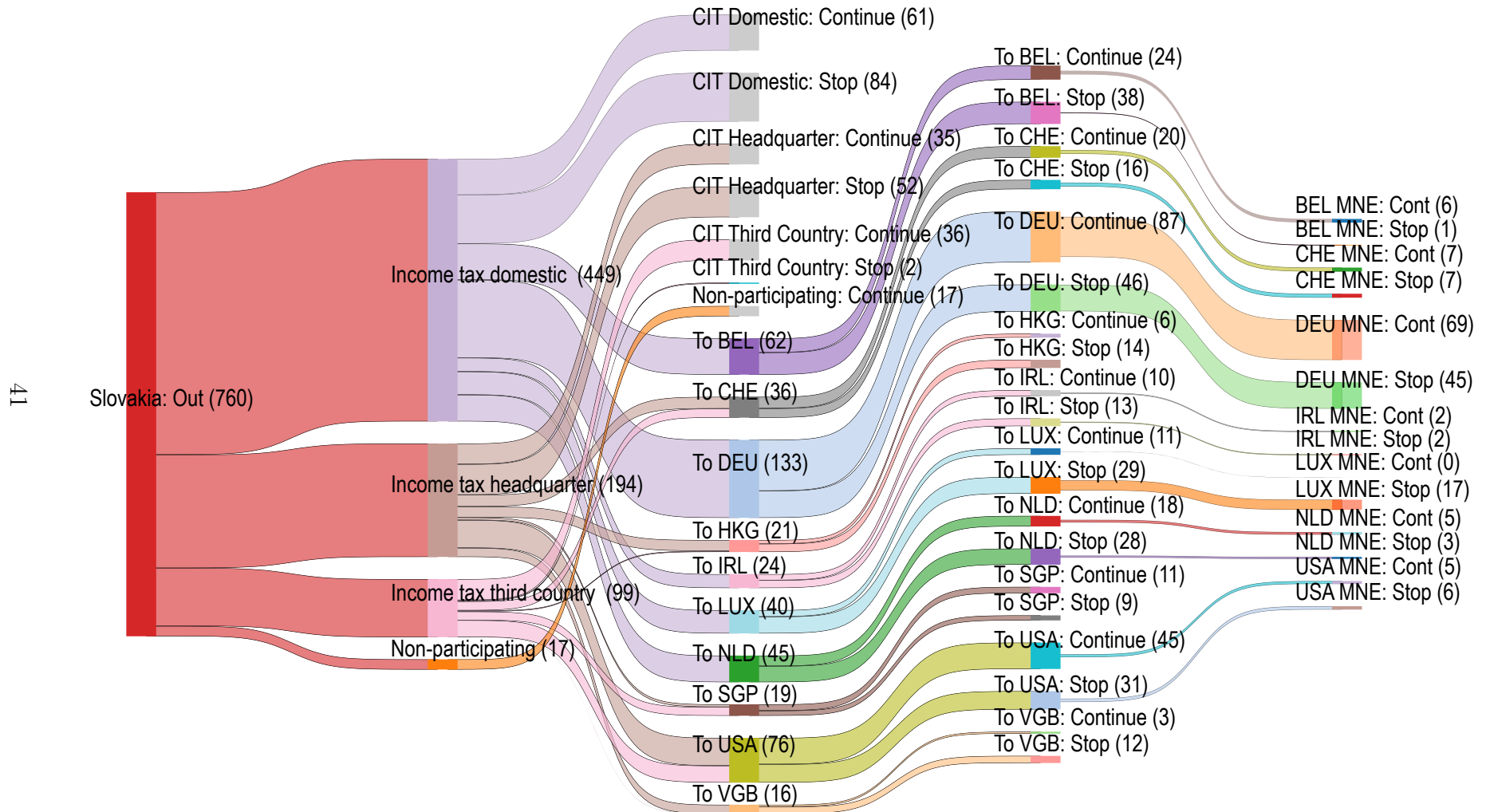
Table 6: Tax revenue effects of global minimum tax according to the types of taxes and profit shifting estimates

	Tax base adjusted for substance based carve-outs					
	Semi-elasticity quadratic		Semi-elasticity logarithmic		Misalignment	
	million EUR	% corporate tax	million EUR	% corporate tax	million EUR	% corporate tax
Total	**117**	**4.3%**	**135**	**5.0%**	**144**	**5.3%**
		% Total		*% Total*		*% Total*
Top up taxes	**53**	**45.1%**	**51**	**37.5%**	**43**	**29.8%**
Domestic top-up tax	44	38%	42	31%	34	24%
Headquarter top-up tax	-	-	-	-	-	-
Third country top-up tax	9	7%	9	6%	9	6%
Income tax revenue	**64**	**55%**	**85**	**63%**	**101**	**70%**
Income tax domestic	39	34%	48	36%	59	41%
Income tax headquarter	17	14%	25	19%	41	29%
Income tax third country	8	7%	11	8%	14	10%
Income tax decrease	-0.002	-0.01%	-0.04	-0.03%	-14	-10%

	Tax base adjusted for carve-outs only for Domestic top-up tax					
	Semi-elasticity quadratic		Semi-elasticity logarithmic		Misalignment	
	million EUR	% corporate tax	million EUR	% corporate tax	million EUR	% corporate tax
Total	**131**	**4.8%**	**152**	**5.6%**	**162**	**6.0%**
		% Total		*% Total*		*% Total*
Top up taxes	**55**	**42%**	**52**	**34%**	**44**	**27%**
Domestic top-up tax	44	34%	42	28%	34	21%
Headquarter top-up tax	-	-	-	-	-	-
Third country top-up tax	10	8%	10	7%	10	6%
Income tax revenue	**76**	**58%**	**99**	**66%**	**118**	**73%**
Income tax domestic	48	37%	57	37%	73	45%
Income tax headquarter	20	15%	32	21%	43	26%
Income tax third country	9	7%	11	7%	16	10%
Income tax decrease	-0.002	-0.01%	-0.04	-0.03%	-14	-9%

Source: Authors. Notes: The Slovak corporate tax paid by multinationals in country-by-country reports was EUR 833 million. The headquarter top-up tax—top-up tax Slovakia headquarter—is likely to apply to only few multinationals that are headquartered in Slovakia, which has two implications: first, we would not be able to estimate it due to confidentiality reasons, and the revenue sourced from it is likely negligible; therefore, we do not estimate it and, for simplicity, we assume it to be zero.

Table 7: Changes in profit shifting due to the introduction of global minimum tax

	Quadratic semi-elasticity			Logarithmic semi-elasticity			Misalignment		
	Before	After	% Reduction	Before	After	% Reduction	Before	After	% Reduction
	million EUR	million EUR		million EUR	million EUR		million EUR	million EUR	
Into Slovakia	**121**	**83**	**31%**	**105**	**65**	**39%**	**692**	**511**	**26%**
Tax base adjusted for substance based carve-outs									
Out of Slovakia	**760**	**386**	**49%**	**887**	**433**	**51%**	**1850**	**1138**	**38%**
Income tax domestic	449	212	53%	482	218	55%	962	562	42%
Income tax headquarter	194	89	54%	275	141	49%	605	367	39%
Income tax third country	99	68	60%	113	56	50%	258	182	29%
Non-participating	17	17	0%	18	18	0%	25	25	0%
Tax base not adjusted for substance based carve-outs									
Out of Slovakia	**760**	**354**	**53%**	**887**	**354**	**60%**	**1850**	**1069**	**44%**
Income tax domestic	449	192	57%	482	176	63%	962	508	47%
Income tax headquarter	194	90	53%	275	108	61%	605	359	41%
Income tax third country	99	55	45%	113	54	52%	258	176	32%
Non-participating	17	17	0%	18	18	0%	25	25	0%

Country level results (above 10 million EUR in profit shifting)

					Headquartered in that country		
Out of Slovakia	**Country**	**Before**	**After**	**% Reduction**	**Before**	**After**	**% Reduction**
Income tax domestic	Austria	19.4	6.2	68%	7.7	0.4	95%
Income tax domestic	Belgium	62.0	24.1	61%	7.3	6.3	14%
Income tax domestic	Czechia	15.3	9.4	39%			
Income tax domestic	Germany	133.3	87.1	35%	113.8	68.5	40%
Income tax domestic	France	17.1	11.5	33%	6.4	4.6	28%
Income tax domestic	UK	13.1	7.4	43%			
Income tax domestic	Ireland	23.6	10.4	56%	3.8	2.0	47%
Income tax domestic	Luxembourg	39.7	11.1	72%	17.4	0.1	99%
Income tax domestic	Netherlands	45.4	17.9	61%	7.9	4.5	43%
Income tax headquarter	Switzerland	20.1	11.4	43%			
Income tax headquarter	China	17.6	12.5	29%			
Income tax headquarter	Hong Kong	18.6	5.7	69%			
Income tax headquarter	Cayman Is.	13.2	5.2	61%			
Income tax headquarter	Singapore	4.6	1.7	63%			
Income tax headquarter	USA	47.6	31.5	34%			
Income tax headquarter	BVI	15.4	3.4	78%			
Income tax third country	Switzerland	15.5	8.3	47%	13.5	6.8	50%
Income tax third country	China	8.8	8.5	3%			
Income tax third country	Hong Kong	1.9	0.8	58%			
Income tax third country	Cayman Is.	0.12	0.05	55%			
Income tax third country	Singapore	14.9	9.1	39%			
Income tax third country	USA	28.8	13.5	53%	10.9	5.0	54%
Income tax third country	BVI	0.13	0.04	72%			

Note: We do not list jurisdictions with above EUR 10 million profits shifted, but without substantional multinational presence.

Table 8: Aggregate numbers for major jurisdictions.

Country	Pairs	ETR	WETR	Profits ml. EUR	Tax Acr. ml. EUR	EE thsd.	Revenues bln. EUR	Assets bln. EUR
Argentina	287	20,9%	7,5%	11902,5	890,7	222,9	45,1	17,1
Australia	481	20,7%	10,0%	24396,8	2437,7	445,6	172,0	95,0
Austria	581	16,7%	7,3%	25020,0	1837,4	785,0	246,1	124,9
Bahrain	83	1,7%	1,6%	214,4	3,4	6,3	2,5	0,4
Bangladesh	76	21,9%	27,0%	187,6	50,7	16,9	1,8	0,7
Belarus	81	16,2%	11,6%	188,4	21,8	237,5	1,2	0,3
Belgium	576	19,9%	13,1%	31791,8	4178,6	1154,8	301,0	164,0
Bermuda	105	2,3%	0,9%	17722,8	162,9	113,3	194,1	36,9
Bosnia and Herzegovina	106	8,0%	5,8%	125,1	7,2	14,3	2,2	0,9
Brazil	491	20,3%	12,7%	22608,3	2874,5	819,8	182,4	90,6
Bulgaria	328	9,0%	9,7%	1384,3	134,4	161,1	17,5	6,5
Cambodia	66	15,5%	15,0%	287,2	43,2	14,5	2,1	0,9
Canada	517	18,2%	11,3%	22865,3	2588,2	907,0	305,9	155,5
Cayman Islands	92	1,6%	5,2%	20594,5	1072,5	41,8	25,0	40,5
Chile	301	17,2%	18,5%	1120,2	206,9	103,2	18,8	8,1
China	620	18,6%	21,8%	87220,9	19019,9	3869,6	1186,4	541,3
Colombia	263	23,7%	25,5%	2228,8	568,8	105,8	20,6	16,7
Costa Rica	111	16,8%	14,1%	409,1	57,5	43,6	3,9	1,4
Croatia	312	14,4%	11,5%	1000,6	114,9	136,3	15,7	7,5
Cyprus	120	10,3%	2,7%	1477,7	40,3	332,3	5,1	2,6
Czechia	659	17,0%	16,7%	10647,6	1776,5	1201,5	197,4	74,1
Denmark	456	14,9%	10,0%	16905,2	1683,7	182,2	137,0	72,0
Dominican Republic	79	20,2%	22,3%	441,7	98,7	20,7	2,3	1,1
Ecuador	123	20,7%	27,5%	523,1	143,7	24,9	4,9	2,0
Egypt	202	16,0%	15,4%	2890,5	445,6	116,0	18,4	14,2
El Salvador	59	22,7%	31,0%	231,4	71,8	27,7	1,9	0,9
Estonia	196	5,2%	7,8%	244,4	19,1	170,7	5,4	1,8

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Country	Pairs	ETR	WETR	Profits ml. EUR	Tax Acr. ml. EUR	EE thsd.	Revenues bln. EUR	Assets bln. EUR
Finland	392	16,3%	17,8%	4728,8	840,1	274,9	83,6	27,5
France	620	19,9%	13,4%	86038,0	11495,5	1864,5	807,0	493,4
Germany	701	19,5%	14,9%	95452,5	14181,6	3776,2	1731,1	613,5
Ghana	82	16,5%	11,6%	313,1	36,3	5,2	2,4	2,4
Greece	303	17,9%	23,7%	1554,1	368,5	99,7	25,3	20,0
Guatemala	80	22,6%	19,0%	393,7	74,7	23,1	2,8	1,6
Hong Kong	465	10,3%	8,0%	14151,7	1128,2	495,4	175,9	42,4
Hungary	548	12,3%	10,7%	5735,8	613,8	641,3	90,2	28,7
India	510	21,9%	25,0%	13184,3	3300,0	2088,7	156,9	51,1
Indonesia	301	21,0%	20,5%	3589,0	735,9	308,2	53,0	26,4
Ireland	441	11,1%	12,4%	59522,8	7382,9	802,0	449,4	137,3
Israel	184	17,6%	15,0%	1431,9	214,3	49,9	21,0	11,4
Italy	650	20,0%	18,0%	31205,7	5624,9	1641,1	474,4	300,7
Japan	402	24,7%	18,3%	74456,9	13659,7	1965,6	1157,8	350,4
Kazakhstan	161	16,6%	20,3%	693,3	140,8	288,8	7,0	21,6
Kenya	142	16,4%	30,4%	142,5	43,3	17,2	2,5	0,8
Korea	392	18,1%	20,2%	28712,7	5805,6	420,7	383,0	290,0
Latvia	213	6,4%	9,3%	552,4	51,3	232,0	8,5	3,8
Lithuania	237	13,2%	13,5%	1007,8	135,6	352,5	13,5	5,7
Luxembourg	381	9,4%	6,5%	29139,7	1881,3	158,7	145,5	14254,4
Malaysia	395	18,3%	7,6%	14022,9	1066,5	354,4	67,2	36,5
Malta	79	15,5%	6,0%	2119,2	128,0	10,8	6,3	2,1
Mauritius	109	8,0%	2,2%	401,1	8,8	174,3	0,5	0,4
Mexico	432	22,8%	12,8%	20489,9	2627,0	1208,9	183,1	66,6
Morocco	237	20,9%	31,2%	638,8	199,5	397,4	15,0	6,1
Myanmar	96	11,5%	9,6%	73,9	7,1	7,8	1,0	1,0
Netherlands	679	15,5%	11,3%	44033,6	4963,0	1753,9	607,8	144,3
New Zealand	303	21,4%	24,8%	822,1	203,8	41,0	15,6	6,0
Nigeria	131	19,7%	24,5%	556,8	136,2	22,7	9,0	16,4

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Country	Pairs	ETR	WETR	Profits ml. EUR	Tax Acr. ml. EUR	EE thsd.	Revenues bln. EUR	Assets bln. EUR
Norway	373	15,7%	14,2%	3462,9	492,2	97,3	48,4	26,3
Oman	82	10,5%	9,6%	424,8	40,6	8,3	2,6	1,6
Pakistan	87	18,4%	23,8%	784,2	186,4	22,3	5,0	3,6
Panama	168	12,2%	6,8%	1264,1	85,9	35,5	55,2	17,5
Peru	205	22,2%	24,6%	1131,2	278,0	60,3	11,1	5,8
Philip-pines	274	20,6%	19,5%	4532,0	885,4	374,2	49,7	23,6
Poland	663	18,3%	12,6%	23537,2	2964,5	944,9	231,0	96,4
Portugal	395	21,0%	24,2%	1836,8	444,6	443,2	36,9	12,2
Puerto Rico	89	12,8%	2,3%	3332,9	77,5	29,0	30,5	13,8
Qatar	116	7,0%	22,9%	1817,5	416,6	13,7	6,7	11,0
North Macedonia	71	9,9%	10,5%	76,7	8,0	15,5	1,1	0,4
Romania	572	14,8%	13,6%	4915,7	669,1	1064,9	76,4	33,0
Russia	505	18,5%	19,6%	8211,8	1611,2	1163,6	111,7	26,8
Saudi Arabia	187	15,6%	44,0%	86561,6	38101,3	160,1	256,5	244,4
Serbia	288	12,9%	11,3%	1118,4	126,6	131,4	13,3	7,0
Singapore	505	11,4%	5,2%	25552,6	1320,0	352,8	387,3	53,0
Slovakia	727	17,6%	17,3%	3521,2	609,1	255,5	71,4	27,2
Slovenia	273	15,8%	13,2%	1006,6	132,5	99,6	12,7	5,9
South Africa	368	18,2%	18,2%	1736,5	315,8	258,1	45,4	16,5
Spain	616	16,6%	14,6%	13264,8	1934,8	1063,7	304,9	136,3
Sri Lanka	82	16,6%	17,5%	151,4	26,6	52,3	1,7	1,0
Sweden	526	15,1%	12,4%	11485,0	1425,3	406,7	166,3	63,4
Switzerland	596	13,2%	9,9%	72757,0	7186,8	1387,0	687,4	222,1
Taiwan	341	18,7%	13,9%	11737,0	1633,8	250,9	181,5	28,2
Thailand	393	14,8%	14,2%	7674,4	1092,4	1197,9	103,9	30,9
Tunisia	129	14,6%	16,6%	201,5	33,4	78,2	2,7	1,4

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Country	Pairs	ETR	WETR	Profits ml. EUR	Tax Acr. ml. EUR	EE thsd.	Revenues bln. EUR	Assets bln. EUR
Turkey	470	16,5%	17,7%	4744,4	839,2	353,3	71,0	16,0
Ukraine	316	14,8%	14,8%	1409,4	208,0	126,3	18,5	6,2
UAE	436	1,8%	3,2%	5970,2	192,0	324,9	77,3	12,3
UK	688	13,8%	13,4%	52846,1	7051,1	2014,4	862,4	399,5
Uruguay	134	12,6%	7,5%	369,4	27,7	9,2	3,5	4,0
USA	691	15,0%	12,3%	239833,5	29455,0	4299,5	2881,6	1106,4
Venezuela	102	9,9%	5,9%	183,5	10,9	7,4	1,4	0,4
Viet Nam	302	15,5%	10,6%	7297,2	775,0	391,2	98,7	23,3

Source: Authors. Notes: For confidentiality reasons, only countries with at least 50 observations are included. ETR: mean effective tax rate for affiliates in the jurisdictions; WETR: mean effective tax rate for affiliates in the jurisdictions weighted by profits; Tax Acr.: tax accrued; EE: Employess.