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The impact of the global minimum tax on incentives for business location, investment, and profit shifting

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Abstract
In 2021, over 140 countries agreed to what is widely considered to be the most significant reform of international business taxes in a century: the introduction of a global minimum tax (GMT) at a rate of 15% on the profits of large MNEs. We study the reform's impact on three interrelated MNE decisions: the location of investment, the size of investment conditional on location, and the extent to which profit is shifted to a low-tax country. We extend existing models of the impact of taxation on investment incentives to allow for profit shifting and the GMT. We also develop and quantify a measure of the economic cost of tax-induced distortions to location. We apply our model to taxes in 34 OECD countries. Raising the GMT rate reduces profit shifting as the benefits of profit shifting are reduced. This raises the MNE's tax liability and its cost of capital, reducing its aggregate investment. The impact on location choice is more subtle, as the dispersion in effective tax rates across countries first rises, then falls, as the GMT rate rises. At a GMT rate of 15%, we estimate that there is a small rise in the dispersion, implying greater distortions to location decisions.

Keywords Business investment · Business location · Profit shifting · Global minimum tax

Introduction

In October 2021, over 140 countries in the OECD's Inclusive Framework agreed to a major reform of the international tax system: a global minimum tax (GMT) on the profits of multinational businesses (MNEs) with total revenues exceeding 750 million euros.[1] There is a general consensus that this reform constituted the most far-reaching change to the international tax system—a major aspect of the regulatory environment facing MNEs—since the structure was first created in the 1920s. At the time of writing (January 2026), 59 countries have introduced at least one element of the GMT.[2]

This paper analyzes the likely impact of the GMT on three key decisions of MNEs: the location of investment, the size of investment conditional on location, and the extent to which profit is shifted to low-taxed jurisdictions. The impacts of taxation on these interrelated decisions are

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[1] OECD (2021b). The agreement was also to introduce an element of taxation in market countries; however, that approach has not been implemented.

[2] See the PwC Tracker at https://www.pwc.com/gx/en/services/tax/pillar-two-readiness/country-tracker.html. The 2021 agreement did not actually require signatories to introduce these measures.

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complex. To analyze them, we first develop a model of profit-maximizing MNEs that incorporates each of these three choices. We then apply the model to assess the impact of the GMT on incentives for each of these three decisions for MNEs with activities in OECD countries. We draw on consensus estimates from an existing large empirical literature to infer the impact of the GMT on these choices, holding other factors constant.

The introduction of the GMT follows years of debate in academic and policy literatures about the problems of the existing international tax system and how those problems should be addressed. The political debate has mostly focused on the extent to which MNEs have been able to shift profits to low-taxed jurisdictions. However, this ignores the also considerable economic inefficiencies arising from distortions to the location and size of investment. Consistent with the wider debate, the international business literature has advocated two significant directions of reform. One would replace the existing "separate entity" approach with a formulary apportionment approach, defining profit on a global basis (European Council, 2011; McGaughey & Raimondos, 2019; Piciotto, 2016). A second would shift the basis of taxation towards market countries (Bond & Devereux, 2002; Devereux et al., 2021; Foss et al., 2019).

By contrast, the GMT takes a different route entirely, in effect creating a series of additional taxing rights. If an MNE has a foreign subsidiary which pays an effective tax rate in a source country (where the profit is declared) on its profit below a threshold—currently set at 15%—then the country of the parent can charge an additional "top-up" tax through a mechanism known as the *Income Inclusion Rule* (IIR) to raise the total tax to 15% of "excess profit". If the country of the parent chooses not to do so, then other countries in which the MNE operates can collectively charge an equivalent sum through a measure known as the *Under-Taxed Payments Rule* (UTPR). Finally, the source country can charge the top-up tax itself, through a measure known as the *Qualified Domestic Minimum Top-up Tax* (QDMTT). If the source country does so, the QDMTT would replace the IIR and UTPR, neither of which would then be collected.[3] A rapidly growing literature addresses various aspects of the GMT. Theoretical contributions include those of Johannesen (2022) and Janeba & Schjelderup (2023). Gomez-Cram and Olbert (2023) investigate market reactions to announcements of the GMT. Other recent papers that consider various aspects of the GMT include Devereux (2023), Hanlon & Nessa (2023), and Hebous and Mengitsu (2024).

The focus in this paper is on the impact of taxation on three MNE choices. We do so in the context of the Devereux–Griffith methodology for measuring forward-looking effective tax rates, which has become a standard tool for policymakers.[4] The first choice is where to locate a new investment. We model this as a discrete choice amongst locations, where the chosen location maximizes after-tax profit. The impact of taxation on this discrete choice is measured by an effective average tax rate (EATR). Second, conditional on location, the MNE chooses how much to invest. This is a standard choice and depends on the cost of capital, or equivalently, the effective marginal tax rate (EMTR). Third, conditional on the investment choices and profit being earned, the MNE chooses how much of its profit to shift to a low-taxed jurisdiction. This depends on the statutory tax rate.

There is considerable empirical evidence of the impact of taxation on each of these three choices, on which we draw. With respect to location choices and the scale of foreign direct investment, recent contributions include, for example, Dyreng et al. (2015); Hanlon and Lester (2015). Recent contributions have also investigated the elasticity of investment flows, including (Maffini et al., 2019; Zwick & Mahon, 2017); and Ohrn (2018, 2019). The estimated elasticities tend to be large, although also with considerable variation, from around 4 to 14. The third choice—of shifting profit—has also been the subject of significant investigation. A meta-analysis by Heckemeyer and Overesch (2017) found that reported profits decrease by about 8% if the international tax rate differential increases by 10 percentage points. Other recent contributions investigating the scale of profit shifting include (Bilicka, 2019; Chen et al., 2022; Liu et al., 2020). Niu et al. (2024) and Choi et al. (2025) investigate other factors influencing the extent of profit shifting, such as family ties and governance.

A smaller literature investigates real decisions in the presence of profit shifting, initially analyzed by Mintz and Smart (2004), with recent contributions including Bilicka et al., 2024; De Simone et al., 2022; Dyrda et al., 2024; Ferrari et al., 2024; Guvenen et al., 2022; and Dyrda et al., 2026. The key insight of this literature is that there is a trade-off for policymakers in combating profit shifting and supporting investment. Profit shifting reduces both effective average and effective marginal tax rates associated with locating in a specific country; as such, it makes that country both more attractive for discrete location choices and for greater investment conditional on the location.

[3] Further detail can be found in OECD (2021a).

[4] Devereux and Griffith (1998, 2003) The OECD includes such measures in its online Corporate Income Tax Rates Database (https://www.oecd.org/en/data/datasets/corporate-income-tax-rates-database.html), and the European Commission publishes regular reports on the state of EU taxes using the same methodology (see the references in https://taxation-customs.ec.europa.eu/taxation/economic-analysis/reports-studies).

Our model considers the location of a subsidiary of an MNE conditional on the locations of all the other entities within the MNE. It does not allow the MNE to make decisions on the joint location of two or more entities, possibly including the parent company. Recent papers have studied the role of taxation of dividends received by the parent in determining overall effective tax rates (Kohlhase & Pierk, 2019) and investment (Liu, 2020), as well as the location of the parent company itself (Reyes-Peña et al., 2023). We abstract from the taxation at the parent level. This is partly to keep the model relatively tractable. However, it also reflects a change in prevailing systems: no OECD country currently taxes a parent company on the receipt of dividends from a foreign subsidiary, the US being the last OECD country to abandon that system in 2017. The US did instead introduce a tax on the accrued profit of foreign activities, but only on profit subject to a relatively low effective tax rate abroad.

Our base model considers only the key parameters of the corporation tax system in each country. The extent of profit shifting then depends only on the difference in statutory tax rates between the host country and a tax haven to which profit is shifted. This neglects more specific aspects of taxes, studied elsewhere, such as the role of flow-through companies (Amberger & Kohlhase, 2023), and anti-avoidance measures (Hohmann et al., 2025; Song et al., 2025). To address this as a robustness check, in Appendix D we develop an index of anti-avoidance measures and allow profit shifting to depend on the strength of such measures.

This paper makes three key contributions. First, we investigate the interrelationships among the conceptual drivers of location choice, profit shifting, and investment decisions within the Devereux–Griffith framework. This approach keeps the analysis general enough to be of use in identifying the impact of tax on broad economic decisions, whilst also being specific enough to incorporate relatively detailed aspects of the tax system. One previous paper—Hanappi and Cabral (2022)—also develops the Devereux–Griffith approach to take into account profit shifting. Our approach differs in a number of ways.[5] One technical difference is that we define profit shifted as a proportion of the whole tax base, as opposed to net revenue before depreciation costs; we explore the impact of this difference in approach in Appendix C.

[5] Hanappi and Cabral (2022) use data on MNE ownership structures to identify all subsidiaries of an MNE in countries with lower statutory tax rates, and assume profit is shifted to all such subsidiaries, with the weighting based on the size of profit in the recipient entities. By contrast, we assume that profit is shifted to a haven country with a low tax rate (set to zero in the empirical analysis). Compared to our approach, this approach significantly reduces the gains from profit shifting.

Second, we embed the impact of the GMT in our framework to analyze the changes in the incentive to locate in, invest in, and shift profits from countries in which MNEs engage in real activity. We simulate the impact of the proposed global minimum tax across a range of possible minimum tax thresholds using the real tax system characteristics of OECD countries. We identify considerable heterogeneity in the effects of the GMT at different rates across OECD countries, exemplified by a comparison of Germany with Ireland.

Third, we develop and quantify a measure of the economic inefficiency arising from distortions to location decisions. The approach is to compare the difference in pre-tax rates of return between two countries when the post-tax rates of return are the same so that the MNE is indifferent as to which country to choose. The difference in pre-tax rates of return measures the social cost of choosing the country with the lower pre-tax rate of return.

We show two countervailing forces that the introduction of the GMT generates on this measure. In the absence of the GMT, more profit is shifted to tax havens from high-tax countries than from low-tax countries, implying that profit shifting has a greater effect on the EATR in high-tax countries, reducing the dispersion of the EATR across countries and hence the social cost of this inefficiency. The GMT limits such profit shifting, which could give rise to an increased dispersion, and hence a greater inefficiency. On the other hand, conditional on statutory rates being unchanged, the GMT also removes the lower part of the distribution of tax rates, since tax rates cannot go below the threshold minimum tax rate. This tends to reduce the dispersion of EATRs and the economic inefficiency.

Our empirical results confirm that both effects are present on the introduction of the GMT, and the net effect depends on the chosen rate. At the currently agreed 15% minimum rate, there is a small rise in the dispersion, implying slightly greater distortions to location decisions. However, any increase in the GMT rate above zero would increase the cost of capital and the EMTR, and hence depress investment. At a minimum rate of 15%, this increase would be likely to reduce investment by between 3.2% and 11.2%. The GMT would have a significant impact on profit shifting, although the direct welfare consequences of the resulting reduction in profit shifting are less clear. There would be a potential gain in reducing the socially wasteful expenditure on shifting. The indirect costs would need to balance the impact on the location and scale of investment, with the reduced requirement to levy taxes from some other source.

Summary of conceptual framework

We construct a simple model to investigate three related decisions of a multinational company (MNE):

1. In which country to locate a new investment;
2. How much to invest, conditional on having chosen the location; and
3. How far to reduce taxes paid by shifting profit to a low-rate tax "haven".

Our key aims are to explore the extent to which MNE location decisions are distorted by taxation, and the extent to which investment is also distorted, conditional on location. To do so, we extend the standard framework of Devereux and Griffith (1998, 2003) to allow for incentives for MNEs to engage in shifting profits to lower-taxed jurisdictions. We further extend the model to investigate how the GMT changes the tax incentives of MNEs. We use the results to infer the extent to which the GMT affects these tax distortions.

Our full conceptual framework is set out in detail in Appendix A; here we present only a brief summary of the approach. The Devereux–Griffith framework considers a simple static model in which the MNE sells its output in a market in a specific country, with investment and production possibly taking place in another country. Note that "production" in this sense could reflect a wide range of different activities in preparing a good or service for sale. We do not model the whole supply chain, but consider only the location of one element of the supply chain, conditional on the locations of the other elements.

The central approach of the model is to construct two measures of effective tax rates. The first is an effective average tax rate (EATR), which in essence measures the proportion of the NPV of a new investment that is paid in tax (taking into account liabilities in all jurisdictions). This should affect MNE's discrete location decisions. Suppose, taking all other economic considerations into account, that an MNE expects to generate a pre-tax NPV of x if locating in country X and y if locating in country Y. Then, in the absence of tax, the MNE should choose to locate in X if $x > y$. However, the relevant NPV for MNE location decisions is post-tax, that is, net of the EATR. If $x(1 - EATR_X) < y(1 - EATR_Y)$ then the MNE should instead choose to locate in Y. In this case, there is not only a cost to the MNE, but a welfare loss to society as a whole of $x - y$, representing value foregone due to the tax distortion. We use this simple insight to develop a new measure of the welfare cost arising from tax distortions to MNE location decisions. In the section "The impact of the GMT on location decisions" (and Appendix A), we set out this measure in more detail, and use it to analyze this welfare impact of the GMT.

In our analysis, we take into account the incentive for the MNE to shift part of its tax base to a zero-rated tax haven.[6] We use estimates from the empirical literature to gauge the proportion of the "true" tax base shifted from country i, denoted α_i. This depends on the difference in tax rates between the country of the investment and the haven, reflecting the gain from shifting an additional $1 to the haven. We develop two additional measures. We define $EATR_i$ as the standard measure of the EATR applying to an MNE with investment in country i; $EATR_i^*$ measures the EATR taking into account tax savings made by shifting some profit to the haven; and $EATR_i^{**}$ takes into account not only the reduction in tax liabilities but also the additional costs incurred by shifting profits.

Our second measure is an effective marginal tax rate (EMTR). We again follow the approach of the Devereux–Griffith framework, although the concept of the EMTR dates back to Hall and Jorgenson (1967). This is best understood with respect to the cost of capital of an investment. Conditional on a location, a standard approach implies that the MNE invests up to the point at which, in NPV terms, the marginal return is equal to the marginal cost. The cost of capital reflects the per-period financing and depreciation costs of the investment. The EMTR measures the proportionate increase in the cost of capital arising from taxation and has been used in countless empirical studies of investment. The higher the EMTR, the lower the investment. Our main measure of the impact of taxation on the incentive to invest is the mean EMTR across OECD countries. We aim to assess how that rises as a result of the GMT. As with the EATR, we take into account profit shifting and define three versions of the EMTR: $EMTR_i$, $EMTR_i^*$ and $EMTR_i^{**}$—corresponding to the three definitions of the EATR above.

The GMT introduces additional taxation in two steps. The first is to determine if an accounting-based "effective tax rate" in country i, ETR_i, measured in any period as the ratio of the tax liability to accounting profit, is below a threshold, which we denote z and which is currently set to 15%. If it is, the second step is to calculate the additional levy, which is set equal to the difference between z and ETR, multiplied by a measure of "excess profit". Excess profit is, in turn, defined as accounting profit less a form of relief known as the "substance-based income exclusion (SBIE)". The SBIE is a proportion of the value of tangible capital and payroll costs. For our purposes, we interpret the SBIE as being equal to normal return on the investment, and hence we interpret the measure of "excess profit" as being equal to economic rent.

[6] In Online Appendix C we also explore an alternative approach that allows the MNE to shift revenue, but not costs, to the haven.

We therefore need to model both the *ETR* and the additional levy, for each country separately. As we show in Appendix A, in the context of our model, $EATR_i$ is a reasonable measure of the ETR in the absence of profit shifting. In the presence of profit shifting, then the numerator of the ETR should include only taxes levied in country i (and not in the haven).[7] Since we assume that there is no real activity in the haven, there is no SBIE in the haven. However, we do take account of the SBIE in countries in which investment takes place; details are provided in Appendix A. We also provide robustness analysis of the impact of varying asset shares (Appendix E) and profitability (Appendix F).

Data and assumptions

In this section, we first describe our dataset, present our assumptions regarding the fixed parameters of the model, and discuss additional features of the model that are useful for simulation. We then provide descriptive statistics on the parameters developed for evaluating the EATRs and costs of capital.

The simulation model extends our framework set out in Section "Summary of conceptual framework" in several ways. First, we consider a combination of investment in three types of asset and three sources of finance. The three assets are plant and machinery, buildings, and intangible assets. These are generally treated differently in taxation, with different tax depreciation rates permitted. We take into account the cross-country statutory variation in tax depreciation rates. We assume different economic depreciation rates that we list in Table 1. We calculate the net present value of tax depreciation allowances, A_i, for an investment in each type of asset, and take a weighted average based on the shares of each asset with weights that we report in Table 1. In effect, we assume that each unit of investment has a share in each asset given by these weights.

Second, we consider investment financed by borrowing as well as by equity; borrowing has the advantage that interest costs are generally tax-deductible.[8] We assume a proportion of debt finance as shown in Table 1. The adjustment for debt finance set out in Devereux and Griffith (2003) is multiplied by this weight for debt.

Third, in our base case, we assume the same pre-tax rate of return across countries, in order to make straightforward comparisons of the EATRs. However, we vary that assumption in generating our measure of the economic inefficiency arising from tax distortions to location, and also present alternative measures based on empirical data on profit rates in the Appendix. Fourth, the simulation model allows for general inflation, which is assumed to affect nominal required rates of return, including the interest rate. Fifth, we focus entirely on MNEs that are within the scope of the GMT; that is, they are assumed to have global revenues in excess of €750 million. We do not address the potential for MNEs to bunch just below this threshold in order to escape the impact of the GMT.

These modeling choices clearly reflect a simplification of real-world business decisions. They are made in order to focus on the incentives created by taxation and in particular by the GMT. For example, much of the literature on the impact of taxation on investment has focused on differences in effective tax rates between different types of investment, highlighting distortions in the type of investment undertaken. In most of our analysis, we abstract from these differences to focus on aggregate investment. However, we explore differences across sectors with different asset mixes in the Appendix. Also, in our modeling, we do not allow for economic conditions to vary across countries, even though

Table 1 Base-case parameter assumptions

Description	Value (%; except for β)
Pre-tax rate of return (p)	20
Inflation rate (π)	2.5
Real interest rate (r)	5
Profit shifting parameter (β; not %)	0.8
Economic depreciation of machinery	17.5
Economic depreciation of building	3.1
Economic depreciation of intangible asset	15.35
Share of investment financed by equity	65
Share of investment financed by debt	35
Share of building in total investment	41.1
Share of machinery in total investment	44.0
Share of intangible assets in total investment	14.9

This table presents our base-case parameter assumptions, for which we present the results in the sections "The impact of the GMT on location decisions" and "The level of investment". The second column lists all the parameter assumptions in percent (%), with the exception of the profit-shifting parameter β. The assumed parameter value for β based on Heckemeyer and Overesch (2017) is displayed in levels. We explore heterogeneity in β in the Appendix. We also explore heterogeneity in p in the section "The impact of the GMT on location decisions" and the Appendix. The remaining parameters used in our calculations for our base-case scenario are largely taken from Spengel et al. (2020). We deviate from Spengel in not including inventories as a separate asset on the grounds that they do not represent new investment in a jurisdiction; including inventories does not change the qualitative conclusions

[7] We also explore possible alternative measures of the denominator of the ETR.

[8] Note that we do not allow for taxes on dividends paid by the parent company or ultimate shareholders. In this case, the $EATR_i$ is the same for investment financed by new equity and retained earnings.

Table 2 Main components of corporation tax, OECD countries, 2019

Country	Statutory rate, τ_i (%)	Capital allowances, A_i	Country	Statutory rate, τ_i (%)	Capital allowances, A_i
Australia	30	0.65	Lithuania	15	0.88
Austria	25	0.60	Luxembourg	26.01	0.73
Belgium	29.58	0.75	Mexico	30	0.66
Canada	26.1	0.36	Netherlands	25	0.67
Chile	27	0.52	New Zealand	28	0.55
Colombia	33	0.75	Norway	22	0.60
Denmark	22	0.68	Poland	19	0.59
Finland	20	0.68	Portugal	24.39	0.72
France	32.02	0.73	Slovakia	21	0.74
Germany	30.94	0.57	Slovenia	19	0.65
Greece	28	0.63	South Korea	27.5	0.74
Hungary	11	0.62	Spain	25	0.56
Iceland	20	0.66	Sweden	21	0.70
Ireland	12.5	0.63	Switzerland	25.3	0.74
Israel	23	0.57	Turkey	22	0.59
Italy	26.58	0.59	United Kingdom	19	0.68
Japan	30.69	0.57	United States	28.74	0.73

This table shows the statutory corporation tax rates and the net present value of capital allowances in the OECD countries for which the data (and assumptions for calculating the depreciation allowances) are available in the CBT Tax Database. Statutory tax rates are in percentages. We present here the weighted average NPV of depreciation allowances based on the asset use shares that we present in Table 1 for the broad asset categories: (i) buildings, (ii) machinery, and (iii) intangibles. All values are from real-world data without taking any minimum tax surcharge into account. We exclude Estonia and the Czech Republic from the analysis due to significant differences in the tax treatment of corporate profits.

such variation, of course, affects business decisions. However, allowing for such differences to affect our measures of tax incentives would mean that any inferences we made about the GMT, for example, would depend not only on taxation but also on those differences in economic conditions. To identify the incentives created by taxation, it is therefore necessary to hold other factors constant across countries.

Data

We use tax system characteristics of OECD countries to demonstrate the features of our model. We base our simulation on data from 2019, before any special measures were introduced in response to the economic consequences of the COVID-19 global pandemic. Our data source is the Centre for Business Taxation (CBT) Tax Database that contains corporation tax rates and detailed information on the tax bases for different types of assets in OECD countries.[9]

The two key tax components for our analysis are:

1. The statutory tax rate on profit, τ_i, allowing for taxes levied by both national and sub-national governments, and for any offsets between the two, including any surcharges.
2. The schedule of tax depreciation permitted for each asset; we summarize each schedule as the net present value of allowances, A_i, using the company's discount rate. We apply asset weights that we present in Table 1 for different asset types.

We also account for any special features of the tax system in each country, such as notional interest deductions and accelerated depreciation allowances. We include these only to the extent that they apply generally to a wide range of investments; we do not include, for example, measures available only to small businesses.

We present the data for the statutory tax rate τ_i and the NPV of depreciation allowances A_i for each OECD country in Table 2. The average tax rate is 24.3%. However, this average is a product of substantial variation, from 11% in Hungary to 32% in France. The standard deviation in tax rates across the countries in the absence of the global minimum tax is 5.4%. The average NPV of allowances is 0.65, with a standard deviation of 0.092.

[9] These data are freely available online at www.oxfordtax.sbs.ox.ac.uk.

Table 3 Different effective average tax rate measures across countries

Country	$EATR_i$ (%)	$EATR_i^*$ (%)	$EATR_i^{**}$ (%)
Australia	25.5	19.4	22.5
Austria	21.6	17.3	19.4
Belgium	23.6	18.0	20.8
Canada	29.9	23.7	26.8
Chile	25.8	20.2	23.0
Colombia	25.3	18.6	21.9
Denmark	18.1	14.9	16.5
Finland	16.6	13.9	15.2
France	25.2	18.7	22.0
Germany	28.4	21.4	24.9
Greece	24.6	19.1	21.9
Hungary	9.2	8.4	8.8
Iceland	16.4	13.8	15.1
Ireland	11.0	9.9	10.4
Israel	21.0	17.1	19.1
Italy	23.1	18.2	20.6
Japan	27.3	20.6	23.9
Lithuania	10.5	9.3	9.9
Luxembourg	20.0	15.9	18.0
Mexico	26.0	19.8	22.9
Netherlands	19.7	15.8	17.7
New Zealand	25.5	19.8	22.6
Norway	19.2	15.8	17.5
Poland	16.8	14.2	15.5
Portugal	19.3	15.5	17.4
Slovakia	16.4	13.6	15.0
Slovenia	15.7	13.3	14.5
South Korea	21.3	16.6	19.0
Spain	22.4	17.9	20.1
Sweden	16.8	14.0	15.4
Switzerland	19.7	15.7	17.7
Turkey	18.9	15.5	17.2
United Kingdom	16.0	13.6	14.8
United States	21.9	16.9	19.4
Mean	20.5	16.4	18.5
SD	5.1	3.4	4.2

Effective average tax rate measures determine the location of investment for multinational companies. In this table, using data from 2019, $EATR_i$ is the standard effective average tax rate, assuming away profit shifting. $EATR_i^*$ allows for a proportion of profit to be shifted out to a tax haven. $EATR_i^{**}$ additionally takes the cost of shifting profit into account.

Effective average tax rates

In Table 3, we present three measures of the EATR, based on tax system characteristics for each country in 2019, and reflecting the discussion in the section "Summary of conceptual framework". The first column is the standard measure of the EATR, $EATR_i$, which does not make any adjustment for profit shifting. The second column shows the EATR in the presence of the optimal profit shifting out of that country, $EATR_i^*$, according to the model that we develop in the section "Summary of conceptual framework". We assume that the profit is shifted to a country with a zero tax rate in the absence of a minimum tax. And the third column adds the implied cost of profit shifting, $EATR_i^{**}$, and so reflects not only the tax liability to the government, but additional costs of shifting profit.

The standard EATR without profit shifting is generally below the statutory rate; the mean is 20.5% as opposed to 24.3% for the statutory rate. This difference reflects the relative generosity of the tax base, through both tax depreciation allowances and deductions for the cost of finance. This difference between the statutory rate and the EATR varies across countries.[10] For example, the difference is 6.8 percentage points in the case of the USA, which allows immediate expensing for plant and machinery, as well as giving a deduction for interest payments. Note that the EATR has a smaller standard deviation (5.1%) than the statutory rate (5.4%); this reflects the fact that there is a tendency for countries with higher rates to have more generous allowances, so that part of the variation in rates is reduced when the tax base is taken into account.

Not surprisingly, the EATR is lower when account is taken of profit shifting. On average, the EATR is reduced by 4.1 percentage points after allowing for profit shifting. The gain in terms of a lower EATR is also—not surprisingly—higher for companies located in countries with higher tax rates. Recall that we are assuming here that the country to which profit is shifted has a zero tax rate. In this case, the proportion shifted is proportional to the statutory rate in the host country. There is therefore a much higher gain to shifting profit out of France rather than out of Hungary, for example.

There is a significant reduction in the standard deviation of the EATR once allowance is made for profit shifting, to 3.4. As noted above, this is important in identifying the likely distortion to location decisions as a result of differences in the EATR across countries. MNEs in countries with higher statutory rates shift a higher proportion of their profit to the tax haven. The result is a reduction in the dispersion of EATRs, and hence a gain in economic efficiency. In terms of tax design, this of course represents a trade-off of efficiency against revenue: if all profits were costlessly shifted to the tax haven, then there would be no revenue and no inefficiency.

[10] Hugger et al. (2023) also highlight that the gap between the statutory rate and the effective rate varies across countries. In addition, they find considerable variation in ETR across firms within the same jurisdiction.

Adding the costs of profit shifting halves the reduction in the EATR due to profit shifting; this is a result of the shape of the shifting cost function. The pattern in the last two columns is therefore very similar, but the gains from shifting are smaller: the mean rises back up to 18.5%, and the standard deviation rises to 4.2%. In principle, it is the last column that should be relevant for an MNE deciding in which country to undertake real investment, since that takes into account all tax-related costs of investing in that country. The issue for a MNE is therefore whether any real economic gain from investing in one country—for example, from lower labor costs—may be offset by higher taxes. Taking shifting costs into account makes it less likely that differences in taxation would overturn differences in other real costs, and hence less likely—other things being equal—that taxes would distort location decisions.

Effective marginal tax rates

In Table 4, we present three measures of the effective marginal tax rate (EMTR), defined above, and equivalent to those for the EATR in Table 3. The first column presents the EMTR, $EMTR_i$, in the absence of profit shifting. The second column shows the EMTR in the presence of the optimal profit shifting out of that country, $EMTR_i^*$, and the third column adds the implied cost of profit shifting, $EMTR_i^{**}$.

There is significant variation across countries in $EMTR_i$ —from – 3.4 in Lithuania to 56.0 in Canada. The most important source of this variation is the generosity of tax deductions for expenditures, summarized in A_i, and shown in Table 2. For each country, there is also a deduction for the cost of interest payments, reflecting the parameter values for the use of debt shown in Table 1. As is well known, the EMTR would be zero in the case of $A_i = 1$ and no deduction for interest. In the case of Lithuania, $A_i = 0.88$, but this, combined with the deduction for interest payments, is more generous, leading to a slightly negative EMTR. At the other extreme, Canada has $A_i = 0.36$, generating a high EMTR.

Given the central importance of A_i for the cost of capital and EMTR, variations in the effective statutory rate due to profit shifting have a relatively small impact compared to the cross-country variation. The impact is higher in absolute terms where $EMTR_i$ is high in the absence of profit shifting.

The impact of the GMT on location decisions

We now turn to using our model to demonstrate the consequences of introducing the GMT. In this section, we focus on the location choice, which we take to be affected by the EATR, in the possible presence of profit shifting. We begin by illustrating the effects for a single country, and then consider the distribution of effects across all OECD countries.

Table 4 Different effective marginal tax rate measures across countries

Country	$EMTR_i$ (%)	$EMTR_i^*$ (%)	$EMTR_i^{**}$ (%)
Australia	17.3	11.9	14.5
Austria	15.3	11.4	13.3
Belgium	7.8	5.4	6.6
Canada	56.0	41.3	48.4
Chile	30.3	22.0	26.0
Colombia	3.2	2.1	2.6
Denmark	8.2	6.4	7.3
Finland	7.8	6.3	7.0
France	6.8	4.5	5.6
Germany	30.3	20.5	25.2
Greece	20.0	14.3	17.1
Hungary	4.1	3.7	3.9
Iceland	7.2	5.8	6.5
Ireland	7.3	6.4	6.9
Israel	19.6	15.1	17.3
Italy	17.2	12.6	14.8
Japan	24.5	16.7	20.4
Lithuania	−3.4	−2.9	−3.2
Luxembourg	2.9	2.1	2.5
Mexico	20.1	13.9	16.8
Netherlands	5.1	3.9	4.5
New Zealand	24.9	17.8	21.2
Norway	14.0	11.0	12.5
Poland	12.4	10.1	11.2
Portugal	5.4	4.1	4.8
Slovakia	3.1	2.5	2.8
Slovenia	7.3	6.0	6.6
South Korea	3.9	2.8	3.3
Spain	19.3	14.5	16.8
Sweden	5.2	4.2	4.7
Switzerland	4.0	3.0	3.5
Turkey	12.1	9.5	10.8
United Kingdom	8.6	7.1	7.8
United States	2.1	1.5	1.8
Mean	12.6	9.3	10.9
SD	11.4	8.2	9.7

Effective marginal tax rate measures determine the size of investment in a location, conditional on that location being chosen. In this table, using data from 2019, $EMTR_i$ is the standard effective marginal tax rate, assuming away profit shifting. $EMTR_i^*$ allows for a proportion of profit to be shifted to a tax haven. $EMTR_i^{**}$ additionally takes the cost of shifting profit into account

An example: Germany

We show the results for the GMT implemented in the country-by-country design agreed by the OECD/G20 Inclusive Framework. We use Germany to demonstrate the main model features, since it has a relatively high statutory rate,

and so the benefits of shifting profit to a haven from Germany are relatively large.

In Fig. 1, we plot five measures against a range of threshold rates for the GMT. These are the three measures of the EATR defined above, $EATR_i$, $EATR_i^*$ and $EATR_i^{**}$, the proportion of taxable profit shifted, α_i, and the accounting effective tax rate in the presence of profit shifting, used as the first step on the GMT calculation and denoted ETR_i^*. Consider first the far left of the figure, where the threshold is zero, and so the minimum tax does not apply. The overall German statutory rate is just under 31%, and the EATR in the absence of profit shifting is 28.4%. In the absence of the GMT, the MNE shifts a substantial proportion of the tax base to a zero-rated haven. That proportion shifted is equal to 80% of the statutory rate: that is 24.8%—just under a quarter of the tax base—is shifted. This results in the values of the EATR accounting for profit shifting as shown in the figure and as given in columns 2 and 3 of Table 3.

As the GMT threshold rate (denoted z) rises, the gain from profit shifting is reduced to 80% of the difference between the German statutory rate and the threshold rate (which is effectively the new rate in the haven). Hence, the proportion of the tax base shifted falls linearly as the threshold rises. As a consequence, the measures of the EATR that allow for profit shifting also rise. As profit shifting declines, then ETR_i^* also rises. As the GMT threshold continues to rise, at some point (just above 27.5% in the German case) shifting 80% of the difference between the German statutory rate and the minimum tax threshold would incur the top-up tax in Germany (because $ETR_i^* < z$). To avoid the top-up tax, α_i must be set at a lower rate, to achieve $ETR_i^* = z$. This generates the kink in the α_i schedule, which begins to fall more sharply as the threshold continues to rise.

Beyond this, as z rises further, it reaches $EATR_i$ (28.4% in the German case). From this point on, as the threshold continues to rise, there is no profit shifting, $\alpha_i = 0$, and so all three measures of the EATR are the same, and they are also equal to ETR_i^*. As z rises further, additional top-up tax is levied on the profit in Germany, which also raises all the effective tax rate measures further. Since the top-up tax is levied only on excess profit, they remain slightly below z.

It is useful to relate these effects on the EATR to the estimated effects in the empirical literature of the elasticity of foreign direct investment (FDI) to the EATR. The meta-study of Feld and Heckemeyer (2011) provides a consensus estimate from the empirical literature of a semi-elasticity of 2.5; that is, a one percentage point rise in the EATR depresses inward FDI by 2.5%. Applying this semi-elasticity to the profit shifting adjusted EATR, the GMT at a rate of 15% would raise $EATR_i^*$ by around 3.5 percentage points; if the GMT were introduced only in Germany, this would be consistent with a reduction in inward FDI into Germany of nearly 9%. Of course, however, it is intended that the GMT will also be introduced in other countries. Then we need to

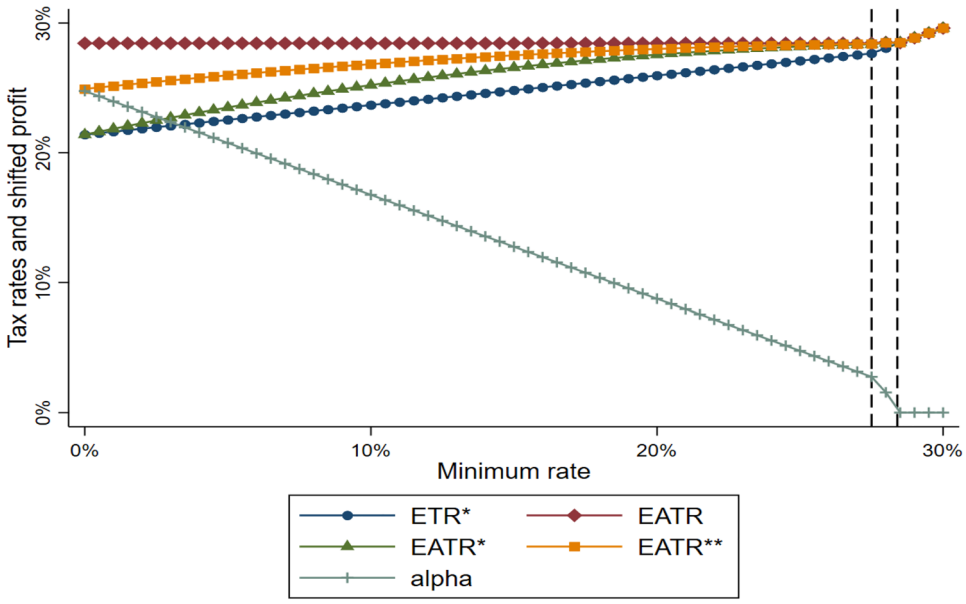

Fig. 1 Effect of the threshold rate on the incentive to locate in Germany. *Note* In this figure, we show key model variables as a function of a changing GMT threshold rate. α is the proportion of profit shifted out of Germany to the tax haven. *ETR* depends only on taxes paid in Germany, taking profit shifting into account; this constitutes the basis for calculating whether the MNE needs to pay top-up tax in Germany under the global minimum tax. The effective average tax rate measures are *EATR*, *EATR** and *EATR***; all depend on taxes paid in all countries on profits arising in Germany. *EATR** takes into account profit shifting, but not the cost of such shifting. *EATR*** takes into account both the amount of profit shifted to the haven and the cost of profit shifting

consider the relative change in the EATR between countries that are candidates for a multinational's inward investment.

Comparing Germany and Ireland

In Fig. 1, as z rises, the share of profits shifted from Germany to tax havens decreases steadily and the different effective tax rate measures rise. This overall pattern applies to each country, although at different levels of profit shifting and EATRs. Ultimately, we are concerned with the difference in EATRs between countries to assess their attractiveness for new investment projects. To illustrate that, Fig. 2 presents the two measures of the EATRs that allow for profit shifting—$EATR_i^*$ and $EATR_i^{**}$—for both Germany and Ireland, again as z rises.

Ireland is a relatively low tax jurisdiction with a statutory rate of 12.5%, nearly 20 percentage points lower than that in Germany. Consider the status quo without any GMT; this is represented by the 0% threshold in the far left of Fig. 2. The difference between the two countries reduces to 17.4 percentage points when we compare the EATRs in the absence of profit shifting, $EATR_i$. It is reduced further to only 11.5 percentage points in the presence of profit shifting ($EATR_i^*$), although this rises back to 14.5 percentage points if the costs of profit shifting are also included ($EATR_i^{**}$)).

As z rises, the proportion of the tax base shifted from both countries falls by the same percentage point (for example, both proportions fall by 8 percentage points if z is raised by 10 percentage points). However, that raises $EATR^*_{Germany}$ more steeply than in $EATR^*_{Ireland}$, since there is a larger rise in the tax liability in Germany for each percentage point fall in α. As a result, the difference in $EATR_i^*$ and $EATR_i^{**}$ between the two countries initially increases.

However, as illustrated in Fig. 1, when z reaches the EATR in the absence of shifting, $EATR_i$, then there is no further profit shifting and all three measures of the EATR (and the ETR) are equal, and a little below z. That occurs in Ireland when z reaches 11%. Beyond that, the Irish EATRs rise in line with z. At this point, that is a much steeper rise than occurs in Germany, which has yet to reach that point, and so, between values of z between 11% and 28.4%, the EATRs of the two countries converge. At $z = 15\%$, the gap in $EATR_i^*$ and $EATR_i^{**}$ between Germany and Ireland is narrower than without the GMT, which should benefit FDI inflows to Germany relative to FDI inflows into Ireland.

At a threshold of 28.4%, there is no profit shifting in either Germany or Ireland, and above that level, the top-up tax is levied in both countries. Since the top-up tax applies only to excess profit, there remain differences in the EATR in the two countries. As noted in Appendix A, the EATR in this case is a weighted average of the EATR in the absence of profit shifting and the top-up tax ($EATR_i$) and z. The former is higher in Germany than Ireland, and so the EATR is higher in Germany. As z increases, there is a parallel increase in the EATR in the two countries.

Figure 2 therefore illustrates our model's main predictions. As the GMT is introduced at a relatively low threshold rate and then raised, the dispersion of profit shifting-adjusted EATRs initially increases. When relatively low-tax countries reach the point where profit is no longer shifted from them, then their $EATR_i^*$ and $EATR_i^{**}$ both rise with the threshold, which has an offsetting effect of reducing their dispersion across countries.

The overall impact of the GMT on the dispersion of effective average tax rates is therefore ambiguous; it depends on the distribution of statutory rates, τ_i, and $EATR_i$; and also on

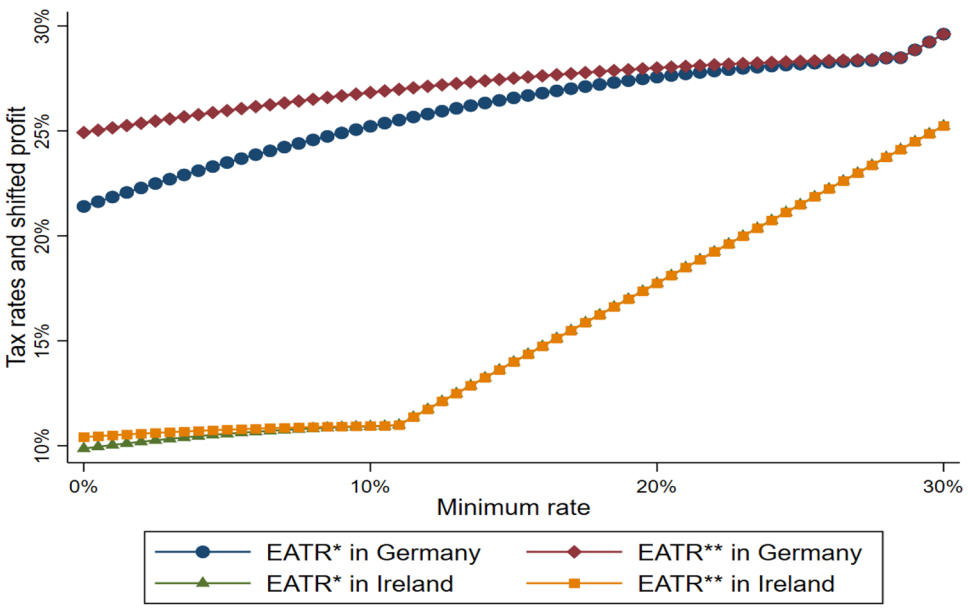

Fig. 2 Comparison between Ireland and Germany. *Note*. In this figure, we show key effective average tax rate variables as a function of a changing global minimum tax threshold rate for Germany and Ireland. *EATR** takes into account profit shifting, but not the cost of such shifting. *EATR*** takes into account both the amount of profit shifted to the haven and the cost of profit shifting

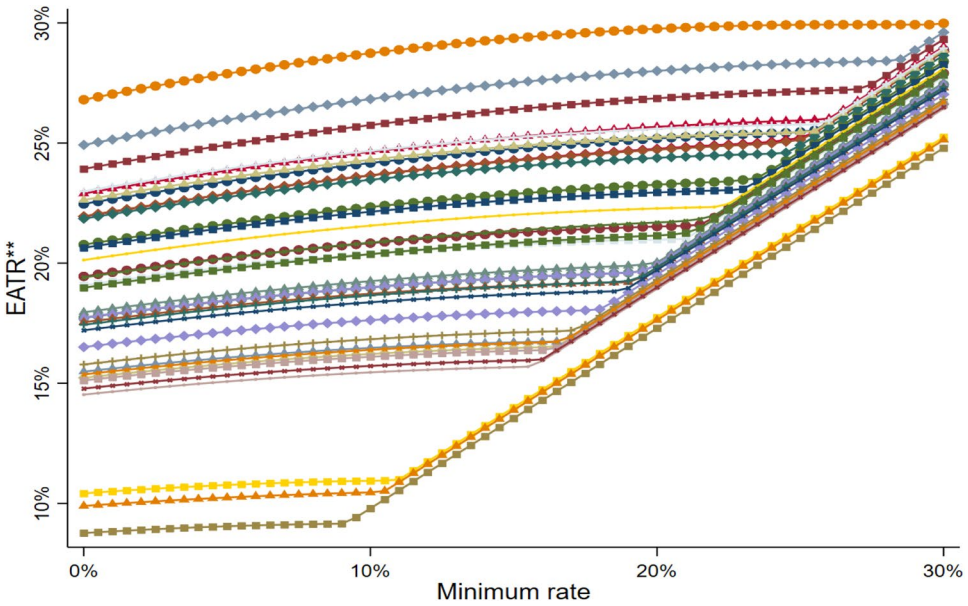

Fig. 3 Effect of the threshold on the incentive to locate in OECD countries. *Note* Each line represents $EATR_i^{**}$ for one OECD country. $EATR^{**}$ is the effective average tax rate measure that takes into account both the amount of profit shifted to the haven and the cost of profit shifting

the threshold rate at which the minimum tax is introduced. We now turn to examine the distribution across all OECD countries.

EATRs across OECD countries

We apply our model to data from all OECD countries to assess the consequences of the GMT being introduced in all such countries.[11] In Fig. 3, each line traces $EATR_i^{**}$ for one OECD country. There is a small non-linear increase in the $EATR_i^{**}$ of each country i as the minimum tax is introduced and the rate z raised from low levels. There is an effect even with a minimal value of z since we assume the tax haven statutory rate is zero. Then $EATR_i^{**}$ increases more rapidly when the threshold reaches and exceeds the "non-shifting" EATR for each country, $EATR_i$. At that point, there is no longer shifting from that country, and all measures of the EATR and the ETR in that country are equal. They are above z, since the top-up tax applies only to excess profit. However, there remains some dispersion in the EATR even at high minimum tax thresholds.

As we show in Fig. 4, the average rate of profit shifting across the OECD at first declines rapidly as the threshold increases. It then begins to decline more slowly as profit shifting reaches zero in more and more countries. By contrast, the average $EATR^{**}$ rises relatively slowly at first because profit shifting continues at low levels of the GMT threshold. As profit shifting ends in more and more countries, the average $EATR^{**}$ begins to rise more rapidly.

[11] Appendix B shows the effect by country of a GMT introduced at a rate of 15% on the $EATR_i^{**}$ and $EMTR_i^{**}$.

Measuring the costs of inefficient location decisions

Our main focus here is on the impact of taxation on investment location decisions and the social costs of distortions arising due to taxation. In the section "Summary of conceptual framework", we summarize a measure of the efficiency loss arising from possible distortions; details are in Appendix A. To analyze this measure, we first illustrate the issue with the example of investment in Germany and Ireland.

Figure 5 shows the difference in the values of an incremental investment in Germany and Ireland; we hold the pre-tax rate of return in Ireland (p_i) constant at 20%, and allow the pre-tax rate of return in Germany (p_j) to vary between 10% and 30% (note that i is Ireland and j is Germany). Denote the post-tax value of the incremental investment in, say, country i as $V_i' = p_i(1 - EATR_i^{**})$. The red line shows the difference between Ireland and Germany, specifically $(V_i' - V_j')$. For most values of p_j, $V_i' - V_j'$ is of the same sign as $p_i - p_j$, indicating that tax does not distort the location choice. However, at values of p_j between 20% and approximately 24%, this is not true: the lower tax rate in Ireland implies that $V_i' > V_j'$ despite $p_j > p_i$. That implies that, in this region, the MNE would choose to locate in Ireland rather than Germany, due to the higher $EATR_j^{**}$ in Germany. The efficiency cost of this choice is the difference in the pre-tax rates of return, $p_j - p_i$, shown by the blue line.

The maximum efficiency cost arises when the difference in the pre-tax rates of return is at the largest point consistent with the tax distorting the location choice; a difference of about 4 percentage points in the case of Ireland and Germany. In Fig. 6, we show how this difference varies with the GMT levied at rates from zero to 30%. The figure shows

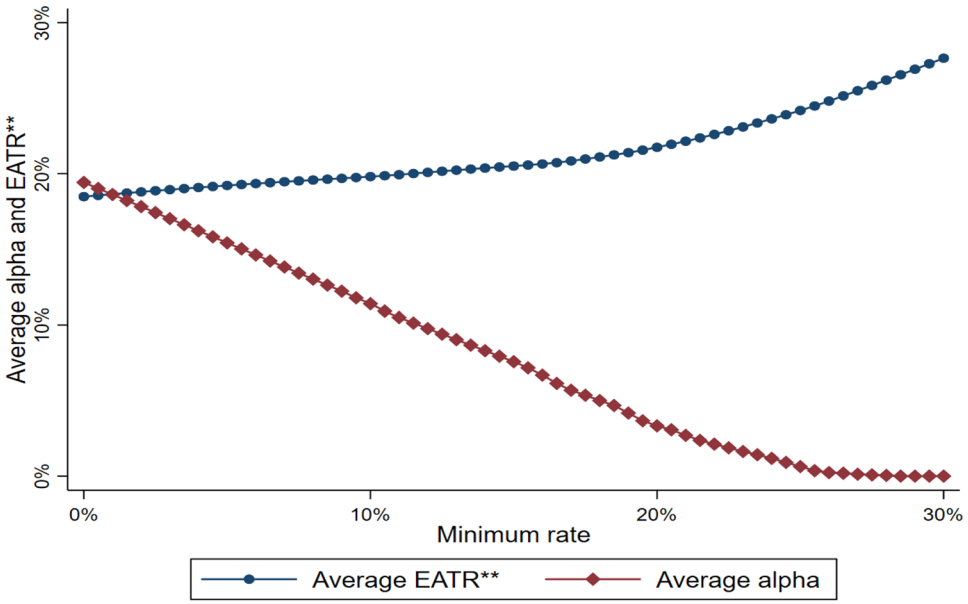

Fig. 4 Mean $EATR^{**}$ and profit shifting

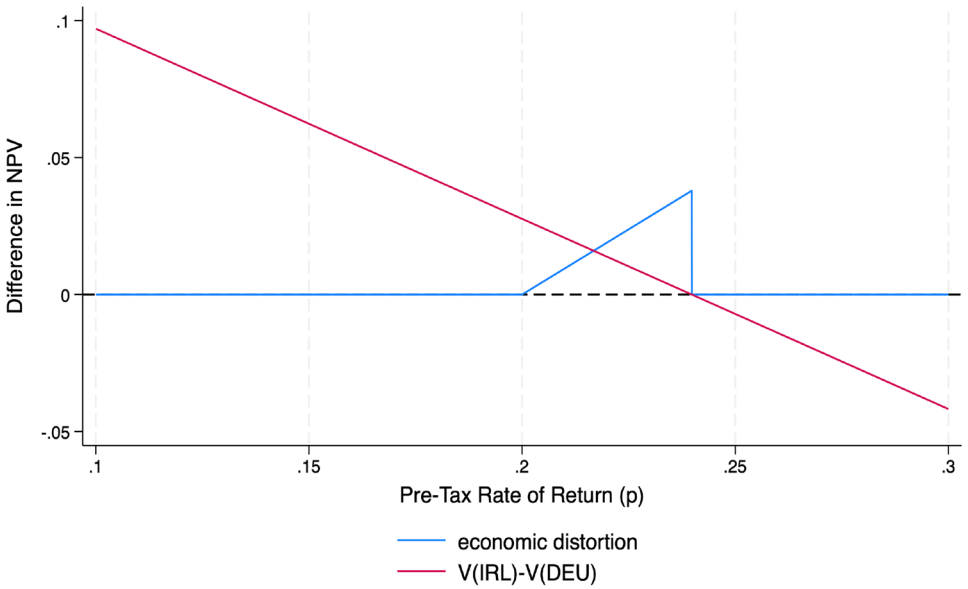

Fig. 5 Difference in NPV in Germany and Ireland for different rates of return. *Note* In this figure, we fix p_i for Ireland at 20%, and allow p_j for Germany to vary between 10% and 30%. We calculate the difference in pre-tax present value of an incremental investment ($V_i' - V_j'$) between the two countries (*red line*). In this case, distortion arises for values of p_j between 20% and approximately 24%, where $p_j > p_i$, but $V_i' > V_j'$. In this region, the MNE would choose to locate in Ireland despite the lower pre-tax rate of return there. We measure the efficiency cost (*blue line*) as $p_j - p_i$

the maximum value of $p_i - p_j$ consistent with a distortion to location. The far left-hand side of the figure reflects the case of no GMT, as in Fig. 5. As the GMT rate rises, the efficiency cost initially rises, and then begins to fall.

In line with our analysis so far, raising z from a very low rate tends to exacerbate differences in EATRs across countries, which is reflected in a higher efficiency cost in Fig. 6. That is because, although profit shifting is reduced in all countries, there is a greater effect on $EATR_i^{**}$ in high-tax countries. However, there comes a point at which the second effect becomes dominant—that is when profit shifting from lower-taxed countries is eliminated. At this point, $EATR_i^{**}$ in different countries become closer to each other. The measure of efficiency cost then begins to fall. Over this range, further increases in the threshold rate reduce distortions to location choice. As seen above, however, even at very high rates of the GMT, there remains some dispersion in EATRs, and hence an efficiency cost; this is because the minimum applies only to excess profit, not to all profit.

In Fig. 7, we show the average position for all bilateral comparisons of the OECD countries analyzed here. That is, for each pair (34*33 = 1122) of countries, we calculate the efficiency cost in the way described here, for the same range of GMT rates. The figure presents the mean efficiency cost

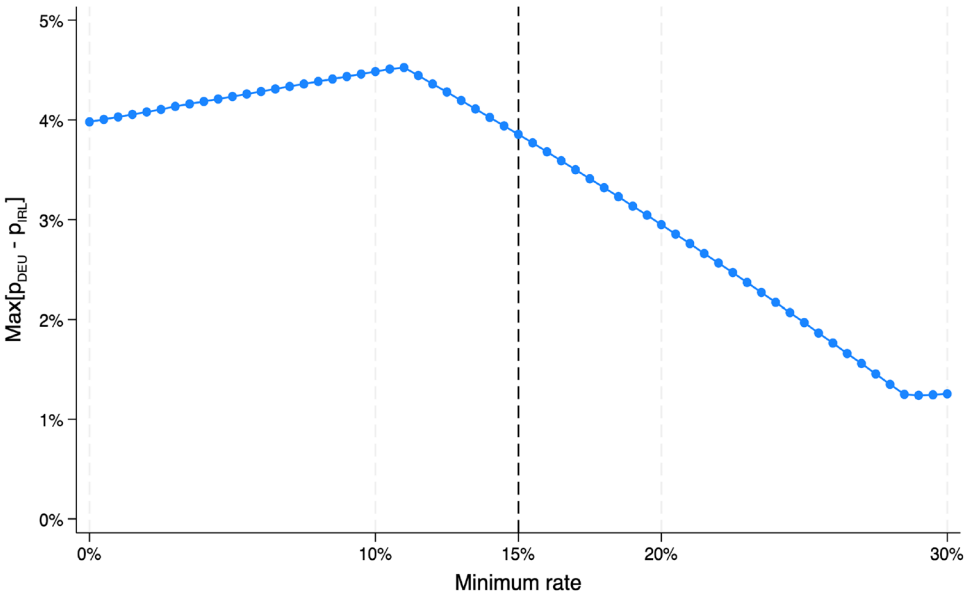

Fig. 6 Efficiency cost of distortion between Germany and Ireland under the GMT. *Note* In this figure, we show the maximum absolute difference between the pre-tax rates of return in Ireland and Germany for which the MNE's location choice is distorted. In the absence of the GMT—shown in Fig. 5 and the left-hand part of this figure—this corresponds to a difference of approximately 4 percentage points. This figure shows how this maximum difference varies with the GMT introduced at rates between zero and 30%

across these bilateral comparisons. The pattern shown in Fig. 6 is also apparent in Fig. 7; that is, the mean efficiency cost first rises and then declines as the GMT rate increases. However, a striking feature of Fig. 7 is that there is a relatively small change in the mean efficiency cost, up to the current GMT rate of 15%. At that rate, the overall measure of distortion rises from 1.15% to 1.26%. This indicates that the GMT at 15% will have a relatively small impact on location distortions, and also on the efficiency costs arising from differences in taxation across countries.

The level of investment

We have so far demonstrated that a GMT implemented with a sufficiently high minimum tax threshold rate may be beneficial in reducing the distortions to location decisions by reducing the dispersion of effective tax rates across OECD economies. Should the Inclusive Framework then set a very high threshold?

The reduction in the dispersion in EATRs happens only when the minimum tax rate is set at a higher level. As implied in our conceptual framework (the section "Summary of conceptual framework"), a disadvantage of such a strategy is that a higher rate will also tend to increase

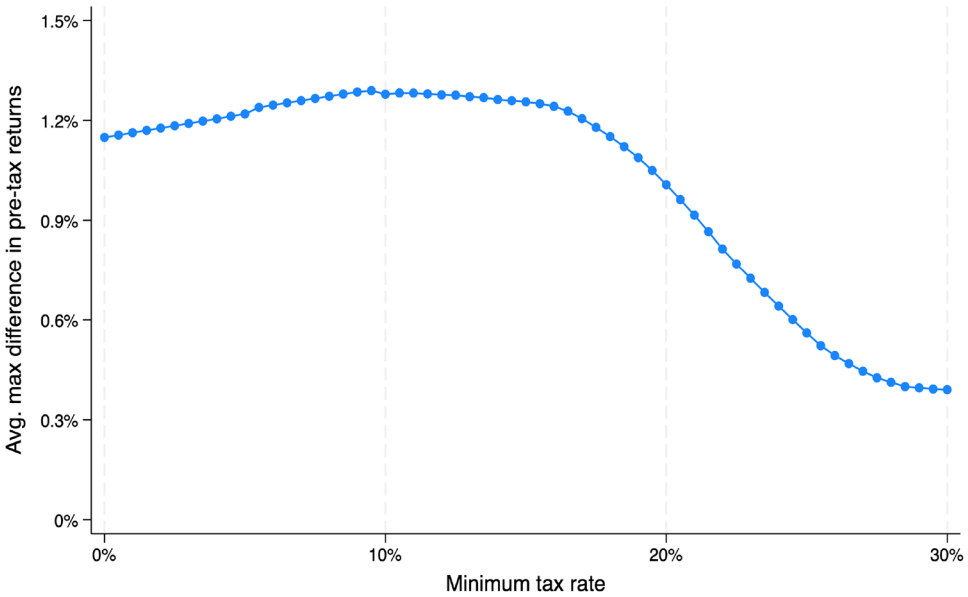

Fig. 7 Mean efficiency costs with the GMT for bilateral comparisons in OECD countries. *Note* In this figure we show the mean efficiency cost (as demonstrated in Fig. 6) for each pair of bilateral comparisons across OECD countries in our analysis, for rates of GMT between zero and 30%

the EMTR and the cost of capital. The extent to which this occurs depends on the balance of the statutory rate and the generosity of allowances. At the margin, a higher EMTR will depress investment. To examine this in more detail, we repeat some of the analysis in the previous section, focusing on the EMTR rather than the EATR. We use the same depreciation rates and weights for different capital goods as set out in the section "Data and assumptions".

An example: Germany

As in the previous section, we begin with the single country example of Germany. In Fig. 8, we plot the three measures of the EMTR against a range of values of z. For completeness, we also include the effect of the minimum tax on α_i, which is the same as in Fig. 1.

The effect of a rise in the minimum tax threshold on $EMTR_i^*$ and $EMTR_i^{**}$ is broadly similar to that on the EATRs in Fig. 1. Both rise as profit shifting falls, approaching $EMTR_i$ as z also rises towards ETR_i^*. There is a small jump in all three measures of the EMTR, and a steeper fall in α_i, in the regime in which $z = ETR_i^*$. For Germany, at higher levels of the minimum, there would be a substantial rise in $EMTR_i^{**}$.

Overall effects on investment incentives

In the case of the EMTR, we are primarily interested in the rise in the EMTR with z. The issue is not the dispersion of EMTRs across countries, but rather the overall impact on $EMTR^*$ and $EMTR^{**}$. We address this in Fig. 9, which shows the mean values of these variables for the OECD countries analyzed in this paper.

Table 4 showed that, on average and in the absence of the minimum tax, the EMTR is lower by more than 25% as a result of profit shifting (reducing the mean from 12.6% to 9.3%), although the effect of this is moderated by incorporating the costs of profit shifting. Figure 9 shows how this effect begins to evaporate as z rises. At the rate of 15%, most of the reduction in the mean $EMTR_i^*$ has been lost, with the mean just below 12%. The $EMTR_i^{**}$ rises to 11.9% with the GMT, compared to 10.9% under the status quo.

This figure hides considerable variation in the impact of the GMT on the EMTR across countries. The impact on the EMTR tends to be greater in cases where capital allowances are less generous. This is illustrated in Online Appendix B, which shows the impact on $EMTR_i^*$ in each OECD country for the introduction of the GMT at a rate of 15%. There is a clear negative correlation between the value of capital allowances and the percentage point change in the $EMTR_i^*$. In countries with high capital allowances, and hence a low $EMTR_i^*$, such as the USA, profit shifting therefore has only a marginal impact on the EMTR. Consequently, the impact of the GMT on US investment is also small. Germany is at the other extreme.

Implications for investment

We now use estimates of the elasticity of investment with respect to taxation from the empirical literature to infer the likely impact of these changes on the cost of capital and the EMTR. In doing so, care has to be taken in determining the measures of taxation used in the literature, and comparing that with the measures presented here.

Several recent papers have examined the impact of a change in the generosity of allowances on investment, and

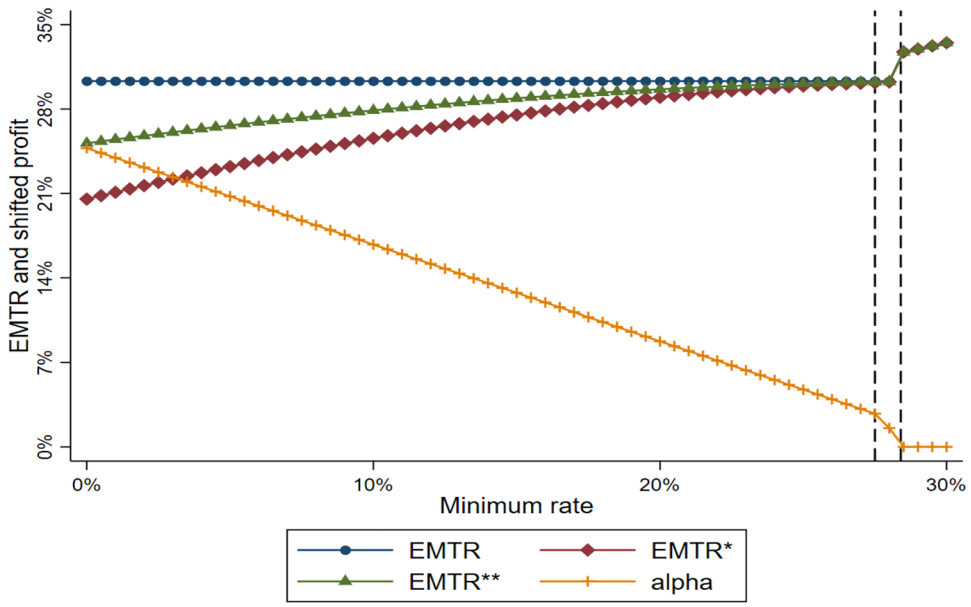

Fig. 8 Effect of the minimum tax threshold on the EMTR in Germany. *Note* In this figure, we show key EMTR variables as a function of the global minimum tax threshold rate. α is the proportion of profit shifted out of Germany to the tax haven. The effective marginal tax rate measures are *EMTR*, $EMTR^*$ and $EMTR^{**}$; all depend on taxes paid in all countries on profits arising in Germany. $EMTR^*$ takes into account profit shifting, but not the cost of such shifting. $EMTR^{**}$ takes into account both the amount of profit shifted to the haven and the cost of profit shifting

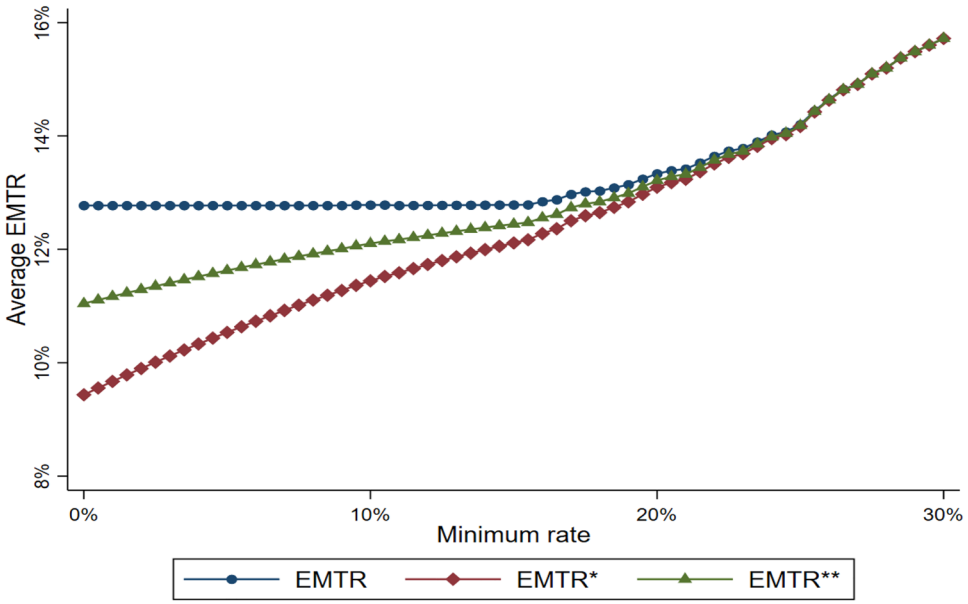

Fig. 9 Mean $EMTR_i^*$ and $EMTR_i^{**}$ in OECD countries

presented estimates of the elasticity of the level of investment to the net-of-tax cost of a unit investment. The literature does not generally take profit shifting into account, and so this is best measured as $1 - \tau_i A_i$, where A_i is the NPV of allowances per unit of investment. Assuming a standard model in which a firm invests up to the point at which the marginal return is equal to the cost of capital, this can be translated into an elasticity with respect to the cost of capital. In our setting, we are interested in the impact of the GMT, the direct effect of which is largely to change the "effective" statutory rate, τ_i^*, taking into account profit shifting.[12] We denote the cost of capital as the required financial return on an investment, u_i^*. However, the net-of-tax cost of a unit investment is proportional to the user cost, which we denote $y_i^* = u_i^* + \delta$, and so the elasticity with respect to the net-of-tax cost is equal to the elasticity with respect to the user cost. We therefore estimate the percentage change in the user cost, y_i^*, and use that to estimate the impact on investment.

Recent published estimates of this elasticity are as follows: 6 to 14 (House & Shapiro, 2008); 8.3 to 9.9 (Maffini et al., 2019); 7.2 (Zwick & Mahon, 2017); 3.98 (Ohrn, 2018); and 9.5 (Ohrn, 2019). These are all large elasticities, and should be distinguished from an older literature that estimated the elasticity of the capital stock to the cost of capital (see, for example, Hassett & Hubbard (2002)). The change in long-run capital stock can be expected to be considerably lower than the initial percentage change in investment, as the latter partly reflects a partial move to a new desired capital stock.

At $z = 15\%$, the mean percentage change in the user cost of capital, y_i^*, across OECD countries is rather small, at 0.80%. Given the range of elasticities in the literature, this would reduce investment by between 3.2% and 11.2%. Using a mid-range estimate (of 8.75%), the likely mean reduction in investment in OECD countries would be around 7%. This hides considerable variation across countries. For example, we estimate a rise in y_i^* for Germany of 2.02%, but for the USA of only 0.14%. At this mid-range elasticity, that translates into a fall in investment in Germany of 17.7%, and in the USA of 1.2%. A caveat of these estimates is that they do not take into account any worldwide general equilibrium effects of the introduction of the GMT in all countries. However, these would in any case be moderated by the GMT applying only to large MNEs.

Other simulations

We now briefly compare our results for the GMT to other potential reform options. In each case we present our two summary outcome measures: the mean efficiency cost arising from distortions to location decisions (as presented in Fig. 7) and the mean $EMTR_i^{**}$ (as presented in Fig. 9). We do not take into account any of the possible responses to these potential reforms by individual governments.

In Table 5, the first row presents these two summary statistics for the status quo, without any reform, and the second row presents the case of the GMT at a minimum rate of 15%. As noted above, the GMT generates a small increase in the efficiency cost of location distortions, and a rise in the

[12] We do not include the costs of profit shifting, as these are also not included in the estimated elasticities described below.

Table 5 Simulations of alternative reforms

Scenario	Mean efficiency cost (%)	Mean $EMTR_i^{**}$ (%)
Status quo	1.15	10.47
GMT at 15%	1.26	11.88
GMT at 25%	0.56	13.33
15% minimum statutory rate	1.11	10.49
25% minimum statutory rate	0.71	10.90
Mean statutory rate in all countries	0.47	9.26
Source-based cash flow tax	0.93	0
50% reduction in statutory rates in all countries	0.56	4.82

Note. This table shows the mean efficiency cost, defined earlier and weighted by the sum of the GDPs of each bilateral pair of countries, and the mean $EMTR_i^{**}$, weighted by GDP. The minimum statutory rates, and the reduction in statutory rates, apply only to OECD countries and not to the tax haven. The harmonized statutory rate is at the current mean of 24.3%. The source-based cash flow is an R-base, permitting immediate expensing for all assets, but no relief for the cost of finance.

mean $EMTR_i^{**}$ of around 1.5 percentage points. Increasing the GMT minimum threshold to 25% would considerably reduce the efficiency cost of location distortions, but would lead to a much greater impact on overall investment, as also implied by Figs. 7 and 9.

A natural comparison to the GMT would be an agreement amongst host (OECD) countries (but not the tax haven) to set a lower limit on the statutory rate. We first consider the case where there is an OECD minimum agreed statutory rate of 15%. This has a much smaller impact than the GMT; only two OECD countries would be affected by such a minimum (Hungary and Ireland). As a result, there is no change in the other countries. Setting the minimum statutory rate to 25% would affect 15 OECD countries. Compared to the GMT at 25%, this would lead to a smaller reduction in the distortion to location decisions, as it remains the case that other countries would be unaffected, so that more of the dispersion across countries would remain. By contrast, the impact on the $EMTR_i^{**}$ would be much smaller.

We also consider two potential reforms that move away from the notion of a minimum tax. First, we consider a reform that harmonizes OECD statutory tax rates across all OECD countries at the current mean of 24.3%. Not surprisingly, this improves the efficiency of location decisions; however, considerable variation remains due to differences in the tax base across countries. This measure also slightly reduces the mean $EMTR_i^{**}$ below the status quo. Second, a more radical change to the tax system would be to switch (in all OECD countries) to a cash flow tax, advocated by many economists, notably by the Meade Committee (1978). The idea of such a tax is that, by taxing all positive and negative cash flows at the same rate, the tax is equivalent to a tax on economic rent. It is therefore neutral with respect to decisions as to the level of investment, as confirmed by its $EMTR_i^{**}$ of zero. However, it might still affect discrete location choices if the tax rates applied by countries differ. This is reflected in the still significantly high efficiency cost of location decisions.

Finally, we consider a potential scenario driven not by a reform, but by the lack of reform. In the absence of reform, it is likely that competitive pressures between governments would continue to drive down statutory tax rates. We therefore consider the case in which all OECD statutory rates are reduced by 50% (to a mean of just over 12%). This would have significant benefits both for the efficiency of location decisions and total investment; but of course, the unmeasured downside of such a reform is the potential reduction in revenue.

Conclusions

The global regime for taxing international profit is currently undergoing its most profound reform in a century. One key element of that reform is the introduction of a global minimum tax on profit. In this paper, we investigate whether the reform will lead to a more or less productive allocation of investment across countries by MNEs, and also the effects on investment and profit shifting.

We develop a model of the impact of taxation on MNE location choice and the level of investment, which allows for profit shifting. We apply this model to all OECD countries based on their tax systems in the pre-pandemic period. The model identifies the effective average tax rate and the effective marginal tax rate—respectively, the relevant measures for location decisions and the level of investment—in the absence and presence of profit shifting and the costs of shifting profit to tax havens. The simulation model is then used to identify the likely impact of the introduction of a GMT at different possible rates.

There are two offsetting factors for the distortion to the location decision. First, profit shifting tends to reduce the disparities in effective tax rates between countries because more profit is shifted out of countries with higher effective tax rates. This reduces the distortions to MNE location decisions arising from differences in taxation amongst countries. To the extent that the GMT reduces profit shifting, it is likely to increase the dispersion in effective tax rates and hence lead to greater distortions to location decisions. Second, however, raising what are currently low effective tax rates to a minimum threshold raises the effective tax rate on investment in countries currently below that threshold. This in turn reduces the overall dispersion of effective tax rates, thereby reducing distortions to location decisions.

The two offsetting factors are reflected in the results. For low rates of the GMT, its introduction raises effective tax rates more in high tax countries than in low tax countries. This increases the dispersion of effective average tax rates. However, at higher levels of the threshold, some countries simply set their effective rate equal to the threshold. When this affects enough countries, the overall dispersion in effective average tax rates begins to fall. The overall impact on MNE location decisions therefore depends on the level at which the GMT rate is set. At the current rate of 15%, these two offsetting factors lead to a small increase in the dispersion, slightly increasing the overall distortion to location decisions.

Raising the threshold has the disadvantage of raising the cost of capital, and hence reducing the level of investment conditional on location. At the 15% rate, we estimate that the reform would reduce investment by around 7%, although with considerable heterogeneity across countries. Countries with a less generous system of capital allowances (such as Germany) experience a much more significant reduction in investment, whilst those with more generous systems (such as the USA), would experience a much smaller reduction in investment.

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Data availability Our main dataset on the corporation tax rates and tax base features of various countries is the CBT Tax Database, which is freely available online at https://oxfordtax.sbs.ox.ac.uk/cbt-tax-database. /pp /pp This is an updated version of the previously available dataset that provided coverage up to 2017. Users who might have worked with the 2017 vintage of the data might notice some differences in the figures reported for the EATR and EMTR in the current dataset. This is because of two methodological changes: (a) Inventories are no longer included as a business asset; (b) The EMTR is computed by scaling the difference between the cost of capital and the tax-free rate (the real interest rate in our context) by the tax-free rate. We additionally make use of the following datasets in supplementary analyses available in the Online Appendix: (a) Research School of International Taxation (RSIT) International Tax Institutions (ITI) Database, University of Tubingen: We use the RSIT ITI Dataset for constructing our index of transfer-pricing strictness. The ITI consists of several constituent datasets, each focusing on a specific topic, viz., personal income taxes, transfer-pricing regulations, consumption taxes, etc. The data can be accessed on request by emailing the RSIT Team at mailto:rsit[at]wiwi.uni-tuebingen.de. Additional information on access and documentation of the different datasets is available at https://www.rsit-uni-tuebingen.de/data/. (b) EU-KLEMS and INTANPROD: We use the Capital Module of the EU-KLEMS dataset to investigate the robustness of our effective tax rate measures to heterogeneity in country and country-industry level asset shares. We use the "All Countriesfrom 1995" version of the dataset in STATA format. The data has been compiled by the LUISS Lab of European Economics and is publicly available at https://euklems-intanprod-llee.luiss.it/download/. (c) AMECO: The AMECO dataset is publicly available at the European Commission's website: https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/ameco-database_en-database. We used the vintage available in July 2025 and downloaded data for the year 2019 and for all countries on domestic income at current prices (UVND), employee compensation (UWCD), total domestic employment (NETD), net capital stock (OKND), and the price deflator (PIGT).

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