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Minimum global tax: winners and losers in the race for mergers and acquisitions

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Abstract

In the context of the OECD's reform of international taxation, the paper quantifies the impact of the global minimum corporate tax rate on large multinational cross-border mergers and acquisitions. Within a gravity model specification, it examines how differences in capital taxation may drive bilateral cross-border mergers and acquisitions, taking into account both the direct and indirect distortionary effects of taxes. The empirical exercise exploits a large purpose-built dataset comprising 13,562 investor-firm M&As data points from 2001 to 2020, in (at the 516 4-digit level) industries times 109 "source" countries, matched with 559 (also at the 4-digit) industries times 161 "target" countries. In line with a simple theoretical model underpinning the mechanisms of transmission, the empirical results suggest that M&As flows are higher when the source and target countries have closer tax rates. Next, whenever the target country's corporate tax rate is lower than 15%, the gravity model estimates the impact of the 15% global minimum tax rate on cross-border investments by firms whose revenue exceeds the €750 millions threshold. The simulation shows that the overall effect of the global minimum corporate tax on M&As flows would be negative, but small in magnitude. Less developed economies would be comparatively the most affected area. As a percentage of expected flows, developing countries would experience the largest decrease. In absolute terms, the biggest decrease in outflow investments would be among OECD countries, while the biggest drop in inflow investments would be among high-income non-OECD countries.

Keywords Global tax rate · Bilateral Foreign Direct Investment · Profit shifting · Gravity model

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1 Introduction

Globalization has yielded numerous benefits worldwide, including increased mobility of goods, capital, and production factors (Clausing, 2013). One of globalization's important aspects is the significant rise of foreign direct investment (FDI), leading to the integration of capital markets. Macroeconomic drivers of international capital flows have been extensively explored in various literature streams. The trade literature commonly exploits gravity models, emphasising key "pull" factors like GDP growth, institutional quality, trade openness, and technological differences (Coeurdacier et al., 2009; Di Giovanni, 2005; Erel et al., 2012; Head & Ries, 2008). Another strand focuses on external "push" factors, such as financial market failures and information asymmetry (Daude & Fratzscher, 2008; Hyun & Kim, 2010), which create opportunities for private operators, albeit limited by taxation and domestic regulations.

In pursuing business opportunities (e.g. highest returns on money invested), agents naturally move from one market to another. This phenomenon can be regarded as a positive firm level externality, boosting competition and fostering innovative strategies at the societal costs of manipulating tax burdens, shifting profits to tax havens, leading to insufficient provision of public goods and services (Fuest et al., 2022). The tax avoidance phenomenon in international capital flows has been amplified in recent decades due to market integration, the proliferation of information and communication technologies (ICTs), and the rise of web-based businesses (such as social media and e-commerce), with loosely defined operational boundaries. Multinational enterprises (MNEs) have the size and means to move resources across borders and commonly engage in profit-shifting practices, yielding substantial gains. MNEs exploit favourable tax regimes in different countries to evade unfavourable national tax regulations, threatening the financial stability of host nations as their tax revenues erode. The OECD uses the term "Base Erosion and Profit Shifting" (BEPS) to describe this broad phenomenon (OECD, 2021).

This paper is motivated by the need to understand how the global minimum corporate tax rate (GMCTR), a key element of international taxation reform, may impact the behaviour of MNEs engaged in cross-border mergers and acquisitions (M&As). It provides both theory and empirical evidence to inform discussions and policy decisions concerning this tax reform. The theory investigates two channels through which the host country's corporate tax rate could impact the incentive to engage in M&A. The ensuing empirical model tests its theoretical predictions. The first"direct" channel entails the incentive to engage in cross-border investment activities when the host country's fiscal environment is favourable. The literature has also explored this channel via the gravity model, for example, in a recent contribution (Huizinga & Voget, 2009). The second"indirect" channel has been widely overlooked by the literature: there are important transaction costs in engaging in investment in countries with different fiscal regimes and tax rates. This transaction cost is highly hidden and cannot be recovered, see (Griffin, 2018). The paper fills this

gap and shows the complex theoretical relationship between these two costs and the empirical implications when they are analysed together.

This paper aims contributing to the emerging literature on the GMCTR, which explores the implications of its institutional design and implementation (Devereux et al., 2020; Englisch & Becker, 2021). It represents the first study to focus on the impact of GMCTR on cross- border M&As, looking at both the direct and indirect channels. It exploits a gravity model to evaluate the expected shifts in cross-border M&As flows resulting from the GMCTR, collecting a comprehensive industry-wide bilateral gross capital via the Zephyr database. The latter offers in-depth reports on cross-border M&As transactions, including integrated business information. M&As represent just one *facet* of FDI, with greenfield investments being another significant form. Nevertheless, M&As typically represent the most prevalent type of cross-border investment activity, often referred to as "brownfield FDI" (Herger et al., 2008). According to UNCTAD estimates, from 2000 to 2023, M&As accounted, on average, for approximately 43% of the total value of global FDI outflows and 46% of flows from developed economies. The dataset encompasses 13,562 investor firms operating across 516 industries (classified under NACE Rev. 2 at the 4-digit level) in 109 countries. These firms target 559 sectors in 161 different countries, covering the period from 2001 to 2020. To assess how the GMCTR may affect M&As, we need to measure taxation. Various measures have been used in the literature (see Wier and Zucman (2022)). We adopt the effective tax rates on capital, constructed by Bachas et al. (2022), and compute the delta in effective tax rates as the difference between the tax rates in the host ("j") and the investor home ("i") country, respectively. This measure provides data on a comprehensive number of countries complying with the global perspective of the policy. Indeed, other datasets, while offering reliable measures, have limited geographical and time coverage.[1] To evaluate the impact of the GMCTR scheme, we use the estimated coefficients in the gravity model to estimate the change in M&As by MNEs with annual revenues exceeding €750 million. In other words, we simulate the scenario where the GMCTR is set at 15% if a target country has a lower tax rate. Our analysis highlights that the overall effect of the GMCTR on M&As flows would be negative, albeit small in magnitude. We also find that differences in tax rates between countries exert an overall negative influence on the intensity of M&As activity.

The structure of this paper is as follows: Sect. 2 summarises the literature on FDI determinants and provides a theoretical backdrop for our empirical approach; Sect. 3 addresses the theoretical mechanisms behind our empirical framework; Sect. 4 introduces our empirical strategy and econometric model; Sect. 4 outlines the sources of our purpose-built data and presents relevant descriptive statistics; Sect. 5 discusses the results of the empirical analysis; and, finally, Sect. 6 provides concluding remarks.

[1] Further explanation on this point is proposed in section 3.

2 Literature review on corporate tax rates and FDI

The theoretical foundations of international corporate tax competition have been underpinned by the seminal paper of Wilson (1986), and ensuing analyses in Wilson (1999) and Wilson and Wildasin (2004). Recent evidence suggests that countries are competing against each other to attract FDI by lowering their corporate tax rates. Egger and Raff (2015) discover strategic behaviour across OECD countries and some emerging economies, which tend to lower their statutory tax rates and raise depreciation allowances when rival governments cut corporate taxes. Furthermore, membership in regional free trade areas seems to make tax competition even tougher. Azémar et al. (2020) find that corporate tax competition is stronger when geographically proximate countries share high economic performances, particularly within more developed and internationally integrated areas of the world. A meta-analysis by Heckemeyer et al. (2021) on 33 primary studies confirms the existence of corporate tax competition, although the intensity of the phenomenon varies by country size and partisan politics.

Scholars have studied the topic from a theoretical point of view too. Lowering capital taxation is not necessarily an optimal strategy for governments. For example, according to Hong and Smart (2010)'s model, in the presence of opportunities for international tax planning and when the corporate tax rate is not too high, governments might even wish to increase statutory and effective tax rates, as domestic welfare would increase whilst FDI outflows would not occur. Addressing the evidence of complementarity between domestic and foreign investment, Becker and Riedel (2012), Becker and Riedel (2013) show that a large share of multinational companies can mitigate tax competition and allow countries to levy higher corporate taxes. Indeed, further factors can shape international capital mobility, keeping capital tax rates relatively high. Tian (2018) theoretical model compares the effectiveness of reducing taxes and subsidising investments to increase inbound FDI. She finds that tax reductions should be preferred to subsidies only for investment projects with high growth rates, volatility and low discount rates, such as investments in high-tech industries. Reducing taxes would enable sharing FDI-related risks between investors and the government. As long as good public infrastructure is financed, a highly educated labour force is resourced, and access to new technology is supported, a higher tax rate might be linked to greater FDI inflows (Besley & Persson, 2014; Garrett, 1998; Genschel & Schwarz, 2011). There is also ample literature on the role of corporate tax rates as determinants of the direction and intensity of FDI flows, including cross-border M&As. Meta-analysis-based reviews of the empirical literature (Mooij and Ederveen, 2008; Feld & Heckemeyer, 2011; Heckemeyer & Overesch, 2017) elicit that corporate tax rates do harm in attracting FDI. However, the results of specific studies vary across econometric strategies, control variables, and corporate tax measures.

We first look at a strand of empirical works focusing on firm-level location choice models. The seminal work by Devereux and Griffith (1998) explores the location choice of US MNEs investing in Europe, finding that the effective

average tax rate of the destination country drives the choice between different European countries by affecting the level of net profits after taxes. Instead, the work by Buettner and Ruf (2007) investigates the location choice of German MNEs when investing abroad. While the marginal effective tax rate and effective average tax rate turn out to have weak predictive power, the statutory tax rate has a significant (negative) effect on the choice of where to invest abroad. In addition, the labour cost difference between the origin and destination countries of investments has the same predictive power as the tax rate difference. A similar research question is explored by Fuest et al. (2022).

Barrios et al. (2012) focus on EU MNEs' strategy for their foreign subsidiary locations. They find that the probability of investing in a given country is negatively correlated with both host country taxation and additional taxation in the home country. Among highly profitable foreign subsidiaries, location choice is less correlated than average to corporate taxation, since high profitability might be related to favourable location-specific rents that would not be available in alternative locations, notwithstanding higher taxes. By contrast, subsidiaries with low fixed assets are more sensitive to both host and home country taxation. Egger et al. (2014) similarly analyse the sensitivity to tax rates of German MNEs, but also take into account whether the investor firm can be categorised as a tax evader. They find that the location choice of tax-evader investors (about 11% of the sample) is not affected by the host country's corporate taxation, unlike non-tax-evaders. Merz et al. (2017) study the location of German MNEs' foreign affiliates in the financial sector. The probability of selecting a given foreign destination turns out to be negatively correlated with the host country's corporate tax rate. Merz et al. (2017) also estimate the impact of a change in taxation in one country on the probability that a different country will be chosen as the destination, finding complementarities, meaning that a tax rate reduction in one country is helpful to other countries (such as in the case of the US, Canada, and Australia). Secondly, we move to another strand of empirical literature that employs macro-level gravity models. Bellak and Leibrecht (2009) investigate factors driving FDI flows from EU countries and the US to central and eastern European host countries, finding that the bilateral effective average tax rate has a negative effect. Egger et al. (2009)'s work focuses on outward stocks of bilateral FDI among OECD countries, showing a positive impact of both home and destination country tax rates and a negative effect of the bilateral effective tax rate. Van 't Riet and Lejour (2018) map the international tax system across 108 countries, taking into account not only corporate tax rates but also withholding taxes on dividends and double tax treaties. Using network analysis, they compute cross-border investment patterns, minimising MNEs' tax payments when profits are repatriated. They identify countries (such as the US, Luxembourg and the Netherlands) that are most likely to be used as conduits to reduce the tax burden. Therefore, they include "centrality indexes" in a gravity model and find that they are significant drivers of bilateral FDI stocks.

Thirdly, we look at the literature on the role of corporate taxes in international capital mobility, specifically concerning cross-border M&As. Di Giovanni (2005) employs a country- level gravity model to test the drivers of a large set of worldwide cross-border M&As operations between 1990 and 1999. Their empirical analysis

shows that the level of financial development of the investor country is an important factor driving investments abroad. In addition, the host country's corporate tax rate reduces flows of cross-border M&As. Coeurdacier et al. (2009) explore the role of corporate tax rates on a panel of cross-border M&As transactions across the largest industrialised markets. Through a country-industry level gravity model, they reveal that the differential between host and home country tax rates is negatively correlated with the volume of cross-border M&As. However, this effect is significant only in manufacturing sectors and is stronger in horizontal acquisitions. Huizinga and Voget (2009) investigate the drivers of cross-border M&As across EU countries, the US and Japan. Using a country-level gravity model, they show that the number of foreign acquisitions is negatively affected by both the target country's tax rate and by double taxation imposed by investors' home countries on foreign-sourced income. Similar results are reported in Herger et al. (2016), a study that also tests the difference of the taxation impact in vertical and horizontal cross-border M&As, finding that vertical deals turn out to be generally more sensitive to taxation. Arulampalam et al. (2019) test a location choice model on worldwide cross-border M&As data, combined with investor-level information, over the 2008–2016 period. They estimate a random parameter logit model and obtain three main results: (i) a high corporate tax rate reduces the probability of a country hosting cross-border M&As; (ii) the latter result is weakened if the investor's origin country taxes worldwide profits through a credit on host country taxation; (iii) heterogeneity across investors' characteristics is relevant. Companies owning foreign subsidiaries in the base year are less sensitive to international taxation since they can more easily undertake international tax planning and profit shifting.

More recent literature has highlighted further factors of cross-border capital flows, which are related to cross-border tax evasion, tax avoidance and transfer pricing activities and illegal, borderline, or even legal practices of international corporations that move capital across borders with the aim of "optimising" their tax burdens (Fuest et al., 2022; Hebous & Johannesen, 2021; Johannesen & Zucman, 2014; Tørsløv et al., 2023; Zucman, 2014, 2015). Profit shifting has increased in countries that have abolished taxation of profits earned abroad, such as UK(Langenmayr & Liu, 2023).In response, some countries have implemented rules on controlled foreign corporations in their tax systems (Clifford, 2019; Fonseca et al., 2023), which limit the extent of tax avoidance practices, particularly when adopted cooperatively (Amendolagine et al., 2021; Haufler et al., 2018). Recent research has examined how the global minimum tax will shape national tax policies and welfare (Johannesen, 2022) and has made projections of its effects on revenue (Barake et al., 2021; Clausing et al., 2021; Janeba & Schjelderup, 2022). These studies have three main messages: the overall welfare effect of GMCTR will not be negative in tax havens; the overall welfare effect of GMCTR will be unambiguously positive when the global minimum tax rate is sufficiently high to mitigate profit shifting; the revenue effects of GMCTR depend on the instruments governments use to attract firms.

Finally, works associated with the "new economic geography" literature have highlighted the role of firm heterogeneity in shaping profit-shifting opportunities. Krautheim and Schmidt- Eisenlohr (2011) modelled the impact of firms' heterogeneity on the propensity of MNEs to shift profits abroad via capital outflows, which

both increases tax competition and reduces tax receipts at home with detrimental effects to the provision of public goods. Baldwin and Okubo (2009); Davies and Eckel (2010) investigate how firms' (size) heterogeneity and asymmetric tax provisions from different countries effectively impact location choices.

3 Un-bundling the mechanisms: a simple theoretical model

The gravity model provides a suitable framework for analysing the mechanisms and ideas embedded in the ensuing empirical strategy. Building upon the empirical modelling of Bradley et al. (2024), we go one step forward and look at both the corporate income tax of the destination *and* the corporate income tax of the origin to gauge the propensity to engage in merger and acquisition activities:

$$\mathrm{M\&As_{ifh,jz,t}} = \chi \frac{GDP_{i,t}^{\alpha_1} GDP_{j,t}^{\alpha_2}}{D\left(h-z, i-j, Z_{i-j,t}\right)^{\beta}} \tag{1}$$

- $M\ \&As_{ifh,jz,t}$: the value of mergers and acquisitions of firm "f" operating in sector "h" in the country "i" to sector "z" in country "j" in year t;
- χ: Gravitational constant (also interpreted as technology or broadly speaking as knowledge spillovers.);
- $GDP_{i,t}$: GDP of country"i" at time"t";
- $GDP_{j,t}$: GDP of country"j" at time"t";
- $D(h-z,\ i-j,\ Z_{i-j,t})^{\beta}$: Distance(s) between two time-invariant countries' characteristics "i-j", or two time-invariant sectors' characteristics "h-z", or two time-variant countries' characteristics "$Z_{i-j,t}$" at the power of β.

In turn, we can dissect the distance variable in its sub-components: $D(h-z,\ i-j,\ Z_{i-j,t}) = \mu_{h-z} + \mu_{i-j} + Z_{i-j,t}$ where the first two terms represent the countries and sectors dyads, respectively. The last term captures elements which vary over time. In an empirical gravity model, the former will be proxied by fixed effects and the latter by additional right-hand-side variables.

4 The double role of taxes

Let's further unbundle the role of taxes and their theoretical impact on M&A. In the market for corporate control, taxes are a distortionary element in terms of investment decisions (Griffin, 2018). They increase (or lower[2]) the marginal trans-national cost of any company engaging in cross-border M&A. We characterise this distortionary effect into two channels: direct and indirect.

[2] Examples include tax breaks implemented by governments to attract FDI.

The direct effect can be formalised as a proportional tax rate ($Tr_{j,t}$) on the M&A value for each operation in the receiving country j, see (Huizinga & Voget, 2009). This entails a proportional value increase of $M\,\&As_{ifh,jz,t}(1+Tr_{j,t})$.[3]

As far as the indirect impact is concerned, a different tax rate between the sender and the receiver increases transaction costs. It imposes a double-standard tax, on the qualitative and the quantitative side. Firstly, following the line of argument of Huizinga and Voget (2009), the literature has shown that the parent-subsidiary structure of multinationals is indeed affected by the prospect of international double taxation. Venturing in a country with a different tax rate is always (or potentially) a cost, even if the host country has a lower tax rate.[4] Secondly, the overall "distance" effect could be harsher when the receiving country has higher tax rate. Adding the direct effect on the left-hand-side and the absolute distance indirect effect on the right-hand-side, Eq. 1 becomes:

$$\mathrm{M\&As_{ifh,jz,t}}(1+\mathrm{Tr_{j,t}}) = \chi \frac{GDP_{i,t}^{\alpha_1} GDP_{j,t}^{\alpha_2}}{\left(\mu_{h-z} + \mu_{i-j} + |Tr_{j,t} - Tr_{i,t}|\right)^{\beta}} \tag{2}$$

$$\mathrm{M\&As_{ifh,jz,t}} = \chi \frac{GDP_{i,t}^{\alpha_1} GDP_{j,t}^{\alpha_2}}{\left(\mu_{h_{-z}} + \mu_{i_{-j}} + |Tr_{j,t} - Tr_{i,t}|\right)^{\beta}(1+Tr_{j,t})} \tag{3}$$

5 The asymmetric impact of taxes

We posit that even if the absolute tax difference $|Tr_{j,t} - Tr_{i,t}|$ hinders the dependent variable, still there is an asymmetric impact depending on its direction. Case 1 ($Tr_{j,t} - Tr_{i,t} > 0$) and case 2 ($Tr_{j,t} - Tr_{i,t} < 0$) are in order:

$$M\&As^{\oplus}_{ifh,jz,t} = \frac{GDP_{\mathrm{i,t}}^{\alpha_1} GDP_{\mathrm{j,t}}^{\alpha_2}}{(\mu_{h_{-z}} + \mu_{i_{-j}} + Tr_{j,t} - Tr_{i,t})\beta(1+Tr_{j,t})} \tag{4}$$

$$M\&As^{\Theta}_{ifh,jz,t} = \frac{GDP_{\mathrm{i,t}}^{\alpha_1} GDP_{\mathrm{j,t}}^{\alpha_2}}{(\mu_{h_{-z}} + \mu_{i_{-j}} + Tr_{j,t} - Tr_{i,t})\beta(1+Tr_{j,t})} \tag{5}$$

What is the impact of a change in the host country tax rate, given the value of the other variables? To answer this question we simplify the model, without

[3] We are treating t_j as an ex-ante "ad-valorem" tax for mathematical tractability. The model can be easily generalised using a corporate income tax framework without qualitative changes on the gravity equation specification.

[4] "Multinational firms are more likely to be concerned about the amounts of international double tax to be paid than about double tax rates per se" page 1226 in (Huizinga & Voget, 2009). For a critical view of M&A see (Griffin, 2018).

loss of generality we assume $\alpha_1 = \alpha_2 = \beta = 1$ and write $\mu_{h-z} + \mu_{i-j} = g(...)$, $\chi \times GDP_{i,t}GDP_{j,t} = f(...) > 0$[5]:

$$\frac{\partial M\&As^{\oplus}_{\text{ifh,jz}}}{\partial Tr_j} = \frac{f(...) \times (1 + 2Tr - Tr_i)}{-[g(...) + (Tr_j - Tr_i)(1 + Tr_j)]2} < 0 \tag{6}$$

$$\frac{\partial M\&As^{\Theta}_{\text{ifh,jz}}}{\partial Tr_j} = \frac{f(...) \times (Tr_i - 1 - 2Tr)}{-[g(...) + (Tr_i - Tr_j)(1 + Tr_j)]2} \lessgtr 0 \tag{7}$$

Equation 6 is in line with the intuition that higher taxes in host countries $Tr_j > Tr_i$ discourage investments, the reason being the direct and indirect impacts reinforce each other[6]: higher tax rate in the receiving country increases the direct cost and further separates the rate from the home tax rate, increasing the indirect transaction cost too. Hence, the sign of the derivative is clearly negative. Equation 7 signals a much more nuanced picture, the negative sign of the derivative is less pronounced or potentially reversed. When $Tr_j < Tr_i$, the impact of host country taxes attenuates, because the direct impact is still negative, but an increasing host country tax rate is accompanied by a reduction of the transaction cost (the indirect one), due to the convergence of the two tax rates. This is the case relevant for profit-shifting scenarios (moving money to lighter fiscal regimes or fiscal paradises altogether). A simple numerical example could explain the logic: if the host country promotes tax breaks or incentive schemes (e.g. 20% subsidies $Tr_j = -0.2$) then the condition under which the derivative sign could even be reversed (from negative to positive) is the following $Tr_i - 1 - 2Tr_j < 0 \Rightarrow\ Tr_i - 1 - 2(-0.2) < 0 \Rightarrow\ Tr_i < 0.6$. We have shown that for taxes on capital of less 60% at home and clear tax incentives to send money abroad, the sign of the derivative becomes positive. Ultimately, the signs of the coefficients remain an empirical question. In the next section, we move to the empirical model.

Finally, to provide an example and facilitate the understanding of Eqs. 1–7, one should consider that M&A flows between different countries and sectors depend on various drivers that influence the agent's decision regarding the target destination. These include the GDPs of the host and home countries, time-invariant factors (such as the characteristics of the origin and destination countries and sectors), and time-variant factors (such as corporate income taxation in both countries, as illustrated in Eqs. 1, 2, and 3.

Destination country taxation can impact the value of M&A both directly and indirectly. The direct effect is driven by the increase in transaction costs, which are proportional to the taxation imposed by the destination country: the higher the tax rate, the greater the cost. This effect is always negative, as an increase in the tax rate leads to higher taxes regardless of the tax rates in other countries.

In contrast, the indirect effect depends on the difference in tax rates between the destination and origin countries. The larger this difference, the greater the

[5] We also omit the time subscript for conciseness.

[6] $Tr_j > Tr_i \Longrightarrow 1 + 2Tr_j - Tr_i > 0$.

transaction costs faced by investors. The overall effect of destination country taxation depends on whether it is higher or lower than the tax rate in the origin country. If the destination country's tax rate is higher (Eq. 4), the indirect effect will have the same negative sign as the direct effect (Eq. 6).

However, if the destination country's tax rate is lower (Eq. 5), an increase in its taxation (which is still lower than that of the origin country) will have two opposing effects: on the one hand, it increases the transaction costs due to a higher tax rate, leading to a negative direct effect; on the other hand, it reduces the tax rate differential between the origin and destination countries, thereby lowering the transaction costs associated with the indirect effect and mitigating the cross-country heterogeneity.

6 Empirical strategy

We run the Poisson Pseudo-Maximum Likelihood (PPML) estimator, which exploits the Poisson distribution to take into account data with zero values on the left-hand side. Our approach does not require a model transformation, making the PPML estimator identified and, accordingly, consistent (Gourieroux et al., 1984a, 1984b).[7]

The model specification adopted to assess how the difference in corporate tax rates affects M&As flows between those countries reads as follows:

$$M\&As_{ifh,jz,t} = exp\left[\alpha + \beta TrDiff_{ji,t} + \chi GRAVITY + \gamma_{ifh} + \delta_{jz} + \eta_{hz} + \theta_t\right] \times \varepsilon_{ifh,jz,t} \tag{8}$$

where $M\ \&As_{ifh,jz,t}$ is the value of mergers and acquisitions from firm "*f*" operating in sector "*h*" in country "*i*" to sector "*z*" in country "*j*" in the year *t*.

As far as transaction costs are concerned, the empirical trade literature on FDI flows highlights the role of geography, i.e. the distance between the main cities of country "i" and country "j". To capture the costs involved in cross-border M&As operations, the vector *GRAV ITY* includes the standard gravity variables: the logarithm of the distance and economic size; dummy variables for a common border, common language, colonial links (dyads); countries are part of a regional trade agreement (regional dummies).

We have enhanced the robustness of our specifications by introducing a set of dummy variables to account for unobservable or imperfectly measured factors. These dummies include firm acquirer-sector γ_{ifh}, target-sector δ_{jz}, sector-pair η_{hz}, and time-specific θ_t components. This addition helps us address concerns that any observed effects in our results could be attributed to endogeneity issues stemming from omitted variables simultaneously influencing both M&As and tax rates.

Since M&As patterns are not homogeneous over time and tend to come in waves, the dependent variable is constructed as the average value over five periods of four years, taken from pooled data from 2001 to 2020. For all gravity controls, we take

[7] In case of model transformation, the shape of the distribution is different from Poisson and Gaussian and, therefore, the procedure proposed by Gouri´eroux et al. (2019) should be adopted.

the initial value in each period. For the tax rate differential for each period, we take the four-year average value with a 1-year lag.[8]

The variable of interest is the difference in tax rates between the host country ("j") and the home country ("i"):

$$TrDiff_{ji,t} = Tr_{j,t} - Tr_{i,t} \tag{9}$$

We use the effective tax rates on capital compiled by Bachas et al. (2022), which capture all taxes paid at all levels of government (corporate income, individual income, payroll, property, estate and inheritance, consumption, and other indirect taxes), based on national accounts harmonised across countries.[9] The authors specify that the OECD Revenue Statistics database is a reference point for extracting data on tax rates. However, it has limited coverage of non- OECD countries and provides data on developing countries only for recent years. To overcome this drawback, they added data from the International Center for Tax and Development (ICTD), which added 1,246 country-year observations, and from "government budgets and national statistical yearbooks", which added 2011 new country-year observations. Due to the global scope of the tax rate on which this work is founded, our first concern was to have a comprehensive dataset including records of as many countries as possible. This reason endorses the choice of using the tax rate measured with this dataset.

The difference in tax rates may be positive or negative. A positive difference means that the host country has a higher effective tax rate on capital than the home country; therefore, sending capital abroad would entail being subject to higher taxes. Why would an MNE send its capital to a country where it would be taxed more? Actually, many reasons could justify such a decision. The benefits of access to a range of human capital, physical capital or specialised capital could offset the increased tax costs. Vice-versa, a negative difference signifies that the host country has a lower effective tax rate on capital vis-`a-vis the home country. In line with the theory, the empirical model captures this dichotomy by classifying a "directional" dummy $D_{ji,t}$ (0 = positive or null difference and 1 = strictly negative difference).

While FDI might be important for economic growth (Bruno et al., 2018), not all FDI is of the same nature. One way to classify FDI is by the investor's motivations for it, using a framework established by British economist John Dunning (Dunning & Lundan, 2008):

- Natural resource-seeking investment: Motivated by investor interest in accessing and exploiting natural resources.

[8] By incorporating these lagged values, we aim to capture the dynamic effects over time and mitigate potential endogeneity concerns.

[9] Bachas et al. (2022) page 1: "The construction of our effective tax rates proceeds in three steps. Using national accounts data, we first compute total labour and capital income in each country. Using government revenue statistics, we then classify all government revenue sources into either labour taxes, capital taxes, or indirect taxes. Combining these two inputs, we compute effective macroeconomic tax rates on labour and capital by dividing the labour or capital tax paid by the corresponding income flow. The database—including detailed decomposition by type of tax—is available online at https://globaltaxation.world."

- Market-seeking investment: Motivated by investor interest in serving domestic or regional markets.
- Strategic asset-seeking investment: Motivated by investor interest in acquiring strategic assets (brands, human capital, distribution networks, etc.) that will enable a firm to compete in a given market. It takes place through mergers and acquisitions.
- Efficiency-seeking investment: FDI that comes into a country seeking to benefit from factors that enable it to compete in international markets.

The last category, efficiency-seeking FDI, comprises companies that choose to become international to lower the total amount of tax paid to governments and also to acquire market power. By operating in several countries, these efficiency/market power seekers might be able to lower their tax burden. Firms are incentivised to locate FDI in countries with lower corporate tax rates as discussed in the theoretical section 2.

7 Non-linearities

Multiplicative interaction models are common in quantitative social science literature (Brambor et al., 2006). Researchers include interaction terms when conditional hypotheses have to be tested. A conditional hypothesis is one in which a relationship between two or more variables depends on the value of one or more other variables.[10] Extending Eq. 8 (this time omitting dummies and control variables for simplicity), we can write:

$$M\&As_{ifh,jz,t} = exp\left[\alpha + \beta_1 TrDiff_{ji,t} + \beta_2 D_{ji,t} + \beta_3 (TrDiff_{ji,t} \times D_{ji,t}) + ...\right] \times \varepsilon_{ifh,jz,t} \tag{10}$$

It is now possible to interpret the coefficient as follows:

$$\{\beta_1 TrDiff_{ji,t} + \beta_3 TrDiff_{ji,t} \times 1 = \left(\beta_1 + \beta_3\right) TrDiff_{ji,t} \beta_1 TrDiff_{ji,t} + \beta_3 TrDiff_{ji,t} \times 0 = \beta_1 TrDiff_{ji,t} \tag{11}$$

The impact of the tax differential on M&As conditional to a **negative** difference is $(\beta_1 + \beta_3)$, whilst the effect of the tax differential on M&As conditional to a **positive** difference is β_1.

To additionally test for any impact owing to similarities or differences in countries' tax system, we use the Grubel-Lloyd as follows:

$$\text{GrubelLloyd}_{ji,t} = 1 - \frac{\left|Tr_{j,t} - Tr_{i,t}\right|}{Tr_{j,t} - Tr_{i,t}} \tag{12}$$

The advantages of the Grubel-Lloyd index are its convenient scaling between bounded values [0, 1] and its methodologically stronger affinity with the concept of

[10] The simplest conditional hypothesis is: H_1: An increase in X is associated with an increase in Y when condition Z is met, but not when condition Z is absent.

proximity (1 being identical, 0 completely disparate). Countries with a G-L index approaching 1 tend to have more similar respective tax rates. Vice-versa, country pairs with a low G-L index will have tax systems with substantially different characteristics.

8 GMCTR effects on FDI

Finally, we use the estimated coefficients to compute the FDI flow increase due to the hypothetical introduction of a 15% global minimum tax rate on cross-border investments by firms whose revenue exceeds €750 millions, whenever the target country's corporate tax rate is lower than 15%, as follows (Lai & Zhu, 2004):

$$Tr^{min}effect = \sum_{ifh,jz=1} (E[M\&As_{ifh,jz}|TrDiff_{ji}^{min}] - E[M\&As_{ifh,jz}|TrDiff_{ji}]) \quad (13)$$

In calculating these results, we use the estimated coefficients to predict the change in the dependent variable ($M\ \&As_{ifh,jz}$) that would follow from the implementation of the global minimum corporate tax as planned by the OECD.

According to Eq. 13, the difference represents the M&As activity that either would (if positive) or would not (if negative) take place under the minimum global tax.

9 Data

The empirical investigation builds upon the compilation of a M&As database drawn from the Bureau van Dijk Zephyr database[11], which provides information on the deal value, the industry sector and the geographical location of both the acquirer and the target company, along with their financial profiles.[12] Most (97%) of the deals included in the M&As database consist of an acquisition of a majority target company's stake (i.e. larger than 50%). We consider worldwide cross-border deals carried out between 2001 and 2020. The final dataset in our analysis includes information on M&As of 13,562 investor-firm operating in 516 industries, defined at the 4-digit level of the NACE Rev. 2 classification, in 109 "source" countries, matched with 559 industries in 161 "target" countries, respectively. The dataset includes the NACE-4 digit industry and country-level location for both the acquirer and the target company. For the acquirer, it also contains operating revenue for the latest year

[11] https://www.bvdinfo.com/en-gb/.

[12] In case of multi-deals we keep only the first deal provided by the Zephyr database. We do not handle the complex nature of multi-deals, because our main aim is to understand the impact of the Minimum Global Tax on the choice to invest in a country. In case of multi-deals, Zephyr only provides the aggregate value of the deal, so we do not have information on the value of each deal's part. However, we note that: only 9% of the deals in our sample is a multi-deal; there are not deals targeting more than one country; only 3% of the deals target more than one industry classified at the 2-digit level.

Table 1 Descriptive statistics

	# Deals	%	Aggreg. value (in € million)	%
Type				
Horizontal (Acquirer sector = Targer sector)	7570	33	2450	42.6
Vertical (Acquirer sector/ = Target sector)	15,345	66.9	3290	57.4
Direction (from-to)				
High Income—High income	16,038	69	4850	84.4
High Income—Low/Middle Income	4882	21.3	570	9.9
Low/Middle Income—High Income	1417	6.2	272	4.8
Low/Middle Income—Low/Middle Income	578	2.5	53.7	0.9
Period				
2001–2004	4114	18	802	13.9
2005–2008	5953	26	1300	22.6
2009–2012	4190	18	787	13.7
2013–2016	4579	20	1580	27.5
2017–2020	4079	18	1280	22.3
Total	22,915	100	5749	100

available.[13] After removing any deals where the information on any of the dimensions listed above is missing or incomplete, we end up with 22,915 deals, for an aggregate transactions' amount of €5.7 billion. These operations were undertaken by 13,579 distinct investors, operating in primary (5.5%), manufacturing (41%) and service (53.5%) sectors. Notably, about 3,000 investors (22% of the total) exceed the €750 million revenue threshold, which implies they are subject to the OECD global minimum tax. As shown in Table 1, the acquirer and target companies share the same sector in about one-third of the deals. Furthermore, 90% of M&As transactions in our dataset originate in high-income countries (96% in value), 70% originate and end in high-income countries (84.4% in value)[14] About three- quarters of the deals from low/middle-income countries target high-income countries. In terms of time deals' distribution, the largest share was carried out during the four years before the financial crisis (26%), while the other periods (2001–2005, 2009–2012, 2013–2016, 2017–2020) each accounted for about 18% of the total. However, in terms of aggregate value, 2013–2016 was the period with the highest value of deals in our dataset (27.5% of the total) who extracted the data from the System of National Accounts (SNA) developed by the United Nations.

[13] We prefer using the last available year rather than the pre-deal one-year lagged value since the latter is missing in about 8% of cases.

[14] We use World Bank income classification: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

Data for the *GRAVITY* variables are extracted from the CEPII dataset.[15] The gravity variables are:the origin and destination nominal GDP per capita, in US dollars, respectively, $GDP_{i,t}$and $GDP_{j,t}$;

- the geodesic weighted distance between country *i* and country *j*, $Distance_{ij}$;
- the dummy $Colony_{ij}$ equal to 1 if *i* and *j* are linked by colonial ties;
- the dummy $Language_{ij}$ equal to 1 if *i* and *j* share the same official language;
- the dummy $Contiguity_{ij}$ equal to 1 if *i* and *j* share a land border;
- the dummy for membership in a shared regional trade agreement, RTA_{ij}.

In the Appendix A, we provide descriptive statistics of the main variables in our dataset used in the empirical analysis.

10 Econometric results

10.1 How differences in corporate tax rates affect cross-border M&As

Our results show that an increase in the absolute difference between target home tax entails a drop in M&As investments. This is illustrated numerically in Table 2 below, which shows the output of Eq. 8 in column (1), of the sample split for the dummy $D_{ji,t}$ in columns (2) and (3), and finally of the interacted model formulated in Eq. 10 in column (4). [16]The coefficient β_1 in column (1) is negative and statistically significant at the 1% level. The estimated coefficient β_1 of −0.74 (column (1) in Table 2) implies that an increase in the tax rate differential of one standard deviation (0.17%) reduces cross-border M&As by 0.13%.

However, it must be highlighted that this "overall' coefficient comprises both instances, when the difference is negative or positive (including zero). In the former case, the host country has a lower tax rate than the home country; this set is presented in column (2) of Table 2 (for simplicity we can call this tax heaven case). For a more concise interpretation of the coefficient, the $TrDiff_{ji,t}$ variable is taken in absolute terms. We show that the increase in the absolute value of the difference still implies lower investment in *M &As*: the lower the tax rate in the target country (compared to the acquirer country's tax rate), the lower the incentive to invest. Column (3) in Table 2 shows the results for the set of transactions involving positive tax rate differences (for simplicity we can call this tax burden case). The Column (3) difference in tax rate is positive (by definition) and there is no need for the absolute value.

These results suggest that the higher the tax rate of the target country (again, relative to that of the acquirer country), the lower the incentive to invest. There is

[15] http://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele_item.asp?id=8

[16] Appendix B provides a sensitivity analysis using 2-year and 3-year periods (Tables B7 and B8, respectively). The results are consistent with those obtained using the 4-year period, confirming the robustness of our findings.

Table 2 Baseline results

	(1) Full sample	(2) $\lvert Tr_{j,t} < Tr_{i,t} \rvert$	(3) $Trj,t \geq Tri,t$	(4) Interacted model
β_1: $TrDiff_{ji,t}$	−0.74***	−2.03***	−3.34***	−3.23***
	(0.27)	(0.51)	(0.63)	(0.61)
$ln(Distance_{ij})$	−0.12*	0.16*	−0.42***	−0.11
	(0.07)	(0.09)	(0.10)	(0.07)
$Contiguity_{ij}$	0.51***	1.33***	−0.50*	0.60***
	(0.17)	(0.20)	(0.25)	(0.16)
$ln(GDP_{i,t})$	0.79	1.48	0.59	0.77
	(0.64)	(1.06)	(0.65)	(0.65)
$ln(GDP_{j,t})$	0.75***	0.64***	0.74***	0.70***
	(0.07)	(0.09)	(0.11)	(0.07)
$Language_{ij}$	0.74***	0.28**	1.34***	0.69***
	(0.10)	(0.13)	(0.16)	(0.10)
$Colony_{ij}$	0.23	0.22	0.48*	0.22
	(0.20)	(0.20)	(0.27)	(0.19)
RTAij	−0.46***	−0.14	−0.90***	−0.44***
	(0.12)	(0.14)	(0.21)	(0.12)
$\beta 2$: *Dji,t*				−0.24*
				(0.13)
β_3: $(TrDiff_{ji,t} \times D_{ji,t})$				2.54***
				(0.90)
Constant	0.23	−4.02	4.66*	0.78
	(2.45)	(4.04)	(2.49)	(2.47)
N. of Obs	486,662	327,226	159,436	486,662
Pseudo R^2	0.46	0.46	0.55	0.46

PPML results; $TrDiff_{ji,t}$ in columns 2–4 is in absolute terms;

***, ** and * refer to significance level at 1%, 5% and 10%, respectively. Robust standard error in parentheses. Fixed Effects: firm acquirer-sector γ_{ijh}, target-sector δ_{jz}, sector-pair η_{hz}, and time-specific θ_t components

a notable difference: the coefficient in column (2) is much lower (and statistically different) from the coefficient in column (3). Indeed, the distance effect curtailing M&As in the two sub-cases is different, where the negative distance case (tax heaven) strongly attenuates this mechanism, possibly due to profit shifting. If the money is invested in countries with lower tax rates than home, there is less concern in "tax system" distance (see literature review and the theoretical model). Column (4) in Table 2 allows us to make the distinction between negative and positive differences for the full set directly within an interacted model (Eq. 10), where the difference needs to be transformed into absolute value (|…|) for comparability with columns (2) and (3).

To interpret the overall effect of tax differences on M&As, we rely upon Eq. (11). For negative tax rate differences, we need to look at the sum of β_1 and β_3. We show that this is still negative ($-3.23+2.54=-0.69$), meaning that when the target country tax rate is lower than the home country tax rate, there is a *relatively* greater incentive for M&As to flow than the opposite. In other words, the "tax system distance" (proxied by the absolute tax difference) matters *much less* if the decision to invest is rooted in fiscally less stringent countries (e.g. tax heavens). This statistical evidence suggests that profit shifting may be taking place. Where the tax rate difference is positive, we need to look at the coefficient of β_1 only, which is negative with an order of magnitude of -3.23. When the host country's tax rate is higher than the home country's tax rate, the incentive to invest in M&As is definitively lower.

As regards the role of geographical settings on FDI flows, the coefficient of the distance between countries, indicated by $Distance_{ij}$, is negative and significant in models (1) and (3), while being negative and not significant in model (4). It captures the greater costs associated with investing further from home. The only exception occurs where the tax differential is negative: in this case, distance does not seem to negatively affect FDI, which may be given by the fact that the operators find higher opportunity in a lower tax rate of the host country, which offsets the costs of investing abroad. As expected, the economic variables ($GDP_{i,t}$ and $GDP_{j,t}$) have a positive impact on FDI, but significant only for the target country ($GDP_{j,t}$). Similarly, the positive and statistically significant coefficients of the variables *Language*, and *Contiguity* imply that if two countries share the same language or a land border, the transaction costs for investing are reduced and stimulate FDI flows between these two countries. The only exception arises for the *Contiguity* variable where the coefficient turns negative with weak significance in the model (3), capturing the effect for the deals where the target country has a greater tax rate than the home one. For the *Colony*, when two countries are linked by colonial ties, we see that while being positive across the four models, it is weakly significant only in the model (3). The regional trade agreement coefficient is negative and significant, which incidentally supports literature that views FDI as a substitute for trade (Helpman, 2006); M&As tend to be higher in countries that do not belong to a trade agreement. Although our primary focus is on deal values to capture the overall economic significance of investment flows, we have also analyzed the impact of the global minimum tax on the extensive margin (measured by the number of deals). The results of this analysis are presented in Appendix B (Table B6), where we show that the effect on the number of deals is less pronounced than the impact on the value of the deals, but still statistically significant.

All results in the baseline (Table 2) are confirmed by the robustness check performed using a similarity index in Table 3, where the G-L index coefficient (Eq. 12) is positive and significant (the interpretation is the opposite): countries that have tax system "similar" to each other register higher M&As activity, but the effect is attenuated in the context of negative host-home tax rate differences (when the home country tax rate is higher).

A hypothetical change in the tax system distance from null (0) to total proximity (1) will translate into higher M&As. The estimated coefficient of β_1 is equal to

Table 3 Similarity index

	(1) Full sample	(2) $\lvert Tr_{j,t} < Tr_{i,t} \rvert$	(3) $Tr_{j,t} \geq Tr_{i,t}$	(4) Interacted model
β_1: $Grubel-Lloyd_{ji,t}$	1.21***	1.34***	2.42***	1.98***
	(0.22)	(0.31)	(0.48)	(0.43)
$ln(Distance_{ij})$	−0.12	0.16*	−0.42***	−0.12
	(0.07)	(0.09)	(0.10)	(0.07)
$Contiguity_{ij}$	0.56***	1.33***	−0.55**	0.57***
	(0.17)	(0.19)	(0.25)	(0.17)
$ln(GDP_{i,t})$	0.75	1.47	0.55	0.74
	(0.65)	(1.06)	(0.65)	(0.65)
$ln(GDP_{j,t})$	0.63***	0.61***	0.75***	0.67***
	(0.06)	(0.09)	(0.11)	(0.07)
$Language_{ij}$	0.68***	0.29**	1.36***	0.69***
	(0.10)	(0.13)	(0.16)	(0.10)
$Colony_{ij}$	0.24	0.24	0.50*	0.24
	(0.19)	(0.20)	(0.27)	(0.19)
RTAij	−0.43***	−0.13	−0.90***	−0.43***
	(0.12)	(0.14)	(0.21)	(0.12)
$\beta 2$: *Dji,t*				1.07**
				(0.50)
β_3: $(Grubel-Lloyd_{ji,t} \times D_{ji,t})$				−1.18**
				(0.59)
Constant	−0.19	−5.22	2.44	−1.02
	(2.42)	(3.91)	(2.54)	(2.53)
N. of Obs	486,662	327,226	159,436	486,662
Pseudo R^2	0.46	0.46	0.55	0.46
Notes: PPML results				

***, ** and * refer to significance level at 1%, 5% and 10%, respectively. Robust standard error in parentheses. Fixed Effects: firm acquirer-sector γ_{ijh}, target-sector δ_{jz}, sector-pair η_{hz}, and time-specific θ_t components

1.21 (column (1) in Table 3), statistically significant at the 1% level. This implies that an increase in the G-L index of one standard deviation (0.19%) generates an increase in cross-border M&As of 0.36%. The β_1 coefficient in column (2), equal to 1.34, is lower than the β_1 coefficient in column (3) of 2.42, the latter estimated taking the set of positive host-home tax rate differentials. Meanwhile, the β_3 coefficient in the interacted model in column (4) is −1.18, lower than the 1.98 β_1 coefficient, again confirming the previous result: the sum between the two coefficients $(1.98-1.18=-0.8)$ indicates that the more similar the tax rates of a country pair, the higher the incentive to pursue M&As.

11 Robustness checks

We now turn to further robustness checks based on the nature of M&As vertical versus horizontal (Table 4), the period of analysis (Table 5), and target country income level (Table 6).

Table 4 reports the results of the interacted model (column 4 in Tables 2 and 3) and splits the set between M&As related to horizontal and vertical investments, respectively. The impact of the tax differential is generally negative and significant in both cases. The magnitude is similar when investments are directed towards countries with higher taxes on capital: β_1 is equal to −3.25 and −3.30, respectively,

Table 4 Results by type of M&As

	(1) Horizontal	(2) Vertical
β_1: $\lvert TrDiff_{ji,t}\rvert$	−3.25***	−3.30***
	(0.95)	(0.80)
$\beta 2$: Dji,t	−0.39*	−0.12
	(0.21)	(0.15)
β_3: $(\lvert TrDiff_{ji,t}\rvert \times D_{ji,t})$	3.21**	2.03*
	(1.50)	(1.09)
$ln(Distance_{ij})$	−0.18	−0.06
	(0.12)	(0.08)
$Contiguity_{ij}$	0.56**	0.63***
	(0.28)	(0.20)
$ln(GDP_{i,t})$	0.84	0.88
	(0.65)	(1.32)
$ln(GDP_{j,t})$	0.58***	0.83***
	(0.11)	(0.07)
$Languange_{ij}$	0.73***	0.65***
	(0.19)	(0.11)
$Colony_{ij}$	0.37	0.09
	(0.34)	(0.16)
RTA_{ij}	−0.58***	−0.33**
	(0.22)	(0.13)
Constant	1.64	−0.67
	(2.64)	(4.90)
N. of Obs	165,564	321,098
Pseudo R^2	0.432	0.487

PPML results; $TrDiff_{ji,t}$ is in absolute terms;

***, ** and * refer to significance level at 1%, 5% and 10%, respectively

Robust standard error in parentheses.

Fixed Effects: firm acquirer-sector γifh, target-sector δjz, sector-pair ηhz, and time-specific θ_t components.

Table 5 Results by period

	(1) 2001–2004	(2) 2005–2008	(3) 2009–2012	(4) 2013–2016	(5) 2016–2019
β_1: $\lvert TrDiff_{ji,t}\rvert$	−2.52	−3.51***	−2.48***	−3.00**	−4.10***
	(1.54)	(1.25)	(0.90)	(1.16)	(1.25)
$\beta 2$: Dji,t	−0.15	−0.13	−0.08	−0.55**	−0.18
	(0.25)	(0.25)	(0.24)	(0.25)	(0.27)
β_3: $(\lvert TrDiff_{ji,t}\rvert \times D_{ji,t})$	3.74*	0.52	1.08	3.78**	2.81
	(2.07)	(1.73)	(1.53)	(1.83)	(1.73)
$ln(Distance_{ij})$	0.19	−0.30	−0.04	−0.20	0.00
	(0.15)	(0.20)	(0.15)	(0.13)	(0.11)
$Contiguity_{ij}$	0.91***	0.34	0.60*	0.23	1.03***
	(0.33)	(0.29)	(0.33)	(0.38)	(0.34)
$ln(GDP_{j,t})$	0.98***	0.39**	0.59***	0.86***	0.85***
	(0.12)	(0.16)	(0.12)	(0.13)	(0.10)
$Language_{ij}$	0.59***	0.33*	0.62***	1.16***	0.52***
	(0.19)	(0.17)	(0.21)	(0.21)	(0.19)
$Colony_{ij}$	0.37	0.41	0.13	0.40	−0.11
	(0.31)	(0.29)	(0.29)	(0.46)	(0.31)
RTAij	0.43	−0.36	−0.41	−0.76***	−0.48**
	(0.27)	(0.25)	(0.30)	(0.26)	(0.23)
Constant	−0.45	6.58***	2.70*	4.04***	2.30*
	(1.43)	(2.09)	(1.49)	(1.06)	(1.18)
N. of Obs	91,701	123,162	86,795	98,205	84,185
Pseudo R^2	0.490	0.494	0.423	0.520	0.483

PPML results; $TrDiff_{ji,t}$ is in absolute terms;

***, ** and * refer to significance level at 1%, 5% and 10%, respectively. Robust standard error in parentheses. Fixed Effects: firm acquirer-sector γ_{ijh}, target-sector δ_{jz}, sector-pair η_{hz}, and time-specific θ_t components

for horizontal and vertical investments. The tax rate differential impact is different, however, when investments are directed towards destinations with lower taxes on capital: $(\beta_1+\beta_3)$ stands at −0.04 for horizontal M&As and −1.27 for vertical M&As. The tax rate seems to be a more relevant factor in vertical (efficiency-seeking) investments (Dunning and Lundan, 2008), which typically aim to reduce costs (possibly including taxes on capital), by moving a portion of production abroad.

Table 5 displays a chronological breakdown of the results. From column (1), we notice that for the 2001–2004 period, the overall impact on M&As is weak since only β_3 is significant at 10%, although the slope coefficient suggests a robust (3.74*) preference for countries with a lower tax rate than the home country. This may stem from the intensive increase in financial speculation on the real economy in these years, where economic operators were tempted to overlook strategic factors (Epstein, 2005).

Table 6 Results by target country income

	(1) High-High	(2) High-Low	(3) Low–High	(4) Low-Low
β_1: $\lvert TrDiff_{ji,t}\rvert$	−3.35***	−7.08*	−0.11	−7.62*
	(0.67)	(4.06)	(1.17)	(3.97)
$\beta 2$: Dji,t	−0.21	−0.59**	1.33***	−0.71
	(0.14)	(0.30)	(0.38)	(0.56)
β_3: $(\lvert TrDiff_{ji,t}\rvert \times D_{ji,t})$	2.80***	4.65	−17.86***	6.40
	(0.98)	(4.40)	(5.41)	(5.94)
$ln(Distance_{ij})$	−0.09	−0.21	0.03	−0.50
	(0.08)	(0.22)	(0.24)	(0.37)
$Contiguity_{ij}$	0.63***	1.21*	1.22**	−0.08
	(0.18)	(0.64)	(0.59)	(0.45)
$ln(GDP_{i,t})$	−0.31	4.51**	1.09	4.14*
	(0.79)	(1.89)	(1.65)	(2.21)
$ln(GDP_{j,t})$	1.04***	0.11	0.59***	−0.04
	(0.09)	(0.14)	(0.21)	(0.15)
$Language_{ij}$	0.63***	−0.17	0.83***	0.54
	(0.11)	(0.38)	(0.24)	(0.38)
$Colony_{ij}$	0.19	1.19***	−0.14	0.85
	(0.21)	(0.39)	(0.39)	(0.82)
$RTAij$	−0.58***	0.59**	−0.02	−0.67
	(0.14)	(0.26)	(0.22)	(0.60)
$Constant$	3.47	−9.49	0.06	3.60
	(3.05)	(7.34)	(3.23)	(5.38)
N. of Obs	275,120	34,642	15,486	2,305
Pseudo R^2	0.473	0.487	0.486	0.510

PPML results; $TrDiff_{ji,t}$ is in absolute terms;

***, ** and * refer to significance level at 1%, 5% and 10%, respectively. Robust standard error in parentheses. Fixed Effects: firm acquirer-sector γ_{ijh}, target-sector δ_{jz}, sector-pair η_{hz}, and time-specific θ_t components

Moving to Column (2), for 2005–2008, we observe that the aggregate coefficient $\beta_1 + \beta_3$ is negative and strongly significant only for β_1 (-3.51^{***}). This major difference from the previous four-year period can be attributed to the effects of the financial collapse in 2007 in the United States and then spread throughout the Eurozone before inflicting damage on economies worldwide.

International capital mobility dynamics show a sign of recovery from the 2007 financial crisis in the 2009–2012 period (column 3): the significance and sign of the slope coefficients are the same as in the previous period, but the negative impact is slightly weaker, at -2.48^{***} (β_3 is not significant). Turning to the 2013–2016 period (column 4), we see that both β_1 and $\beta 3$ are significant at 5% and equal -3.00^{**} and -3.78^{**}, respectively. The aggregate coefficient is positive and steered by the preference for host countries with lower tax rates ($D_{ji,t} = 1$).

This result suggests that during this period, the intense increase in capital mobility was linked to MNEs' efforts to recover from the effects of the 2007 crisis by pursuing efficiency (in some cases profit-shifting) strategies (Dunning & Lundan, 2008).

In subsequent years, debates unfolded over the pitfalls of a "race to the bottom" taxation scenario stemming from competition to attract such efficiency-seeking investments, drawing the attention of policymakers (Heckemeyer et al., 2021). This is the context behind the aggregate negative impact on the dependent variable observed for the 2016–2019 period, with $\beta_1 = -4.10^{***}$ and $\beta_3 = 2.81$ (not significant), as shown in column 5. This result is also partly attributable to the fact that other priorities rose to the top of many governments' agendas, such as the need to rebuild the fundamentals of socioeconomic systems to foster more sustainable development; in turn, economic actors were therefore encouraged to reallocate resources to focus on real economic value over speculative financial operations. It is also worth mentioning here that, as argued by Bilicka et al. (2022), the critical issue around tax avoidance through international capital mobility is that it endangers the sustainability of public budgets by eroding the taxable income base. In recent years, governments suffering from longstanding public debt burdens have established measures and enforced rules to prevent such profit-shifting and limit tax base erosion. An example of the effects of these recent tax policy changes can be seen in Clausing et al. (2021), who show that the percentage of American MNEs' income declared in the seven leading tax havens has dropped since 2016.

Table 6 documents the results from pairing subsets of countries based on income levels, defined according to the World Bank classification.[17] Specifically, in column (1) we investigate the relationship when both home and host countries belong to the *high income* group. In line with the baseline results, we find that: i) there is a negative overall impact as the sum of β_1 and β_3 is negative and strongly significant (−0.55); ii) relative to the *high income* group, host countries with lower tax rates are preferred over those that implement higher tax rates.

Column (2) provides evidence of the estimates where home countries with *high income* are paired with *low income* host countries. Slope coefficient results show that while β_1 is negative and significant at 10% (-7.08^{*}), β_3 is not significant (albeit positive).

Accordingly, the overall impact on M&As flows is negative when the difference between the tax rates of home and host countries rises. This case may account for those MNEs pursuing natural resource-seeking investments (Dunning & Lundan, 2008) as the endowment of natural resources essential to supply advanced economies is prevalently placed in *low income* countries (Besley & Persson, 2014; Sachs & Warner, 2001).

Column (3) reverses the pairing, by drawing attention to the slope coefficients of the subset of *low income* home countries and *high income* host countries. In this case, note that while β_1 is not significant, β_3 is strongly significant and negative, with a slope coefficient of -17.86^{***}. This suggests that M&As activity is firmly driven

[17] https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html.

Table 7 Effect of the global minimum tax rate by type of M&As

	(1) Missing Flows[a] (in € million)	(2) M&As decrease: % of predicted flows
Horizontal	−977	−0.2
Vertical	−369	−0.1
Overall	**−1,346**	**−0.1**

Note:[a] Simulation over the period 2016–2019

by institutional factors (both formal and informal) that are crucial to the success of the investment from a strictly economic standpoint (Besley & Persson, 2014), the type described by Dunning and Lundan (2008) as "strategic asset-seeking" investments.

Finally, in column (4), we report the estimates of the subset pairing *low income* countries together as both home and host. Only the β_1 slope coefficient is significant at 10%, amounting to -7.62^{*}. Overall, this means that an increase in the difference between tax rates leads to a decrease in M&As flows. Therefore, on the one hand, M&As intensity is decidedly lower than in other income-group subsets; on the other hand, it also suggests that when capital flows take place between *low income* countries, investors (on average) do pay attention to institutional factors.

12 How the global minimum tax rate will impact FDI

The overall results discussed in the section above have substantial implications. Firstly, it is apparent that significant home-host country tax rate differences are detrimental to FDI flows in the form of M&As, regardless of whether the host country's tax rate is higher or lower than home. Corporate tax rate differences seem to constrain the full expression of market globalisation. This implies that theoretically, an optimal scenario could be convergence toward a standard global corporate tax rate—***not just a minimum rate***. In such a scenario, international economic operators would seek value in tangible and intangible resources offered by each country, including formal and informal institutional quality. In this way, competition between countries for foreign investments would hinge upon productive capabilities; it would also make the investment more secure in the long term. In practice, however, given the major differences that currently exist between nations in terms of structural economic factors (for instance, in debt to GDP ratio), this scenario is completely unrealistic even a distant future. What is realistic is a global system where all countries are required to abide by a minimum rate.

Secondly, in a context where there are tax rate differences, major corporations prefer to invest in countries where they will be taxed less than they would at home (even if they are not tax heavens!). This naturally gives rise to race-to-the-bottom

practices by some governments to attract capital (e.g. subsidies), paving the way to profit-shifting. To tackle these implications, a global minimum tax rate has been agreed upon.

In this section, we employ Eq. 13 to gain insight into the scenario where a global minimum tax rate is set at 15%, as envisaged under Pillar Two of the OECD Inclusive Framework. For this analysis, it seems logical to focus on the most recent four-year time frame (2016–2019).

Table 7 presents the effect of the GMCTR on horizontal and vertical M&As flows. The overall effect on M&As flows is negative to the tune of €1.346 billion, but that is a mere 0.1% of the total predicted flows. When we consider horizontal and vertical investments separately, we find a greater loss of horizontal M&As.

Focusing on the region of the *acquirer-country*, Table 8 suggests that the biggest loss of M&As investments would come from the Europe and Central Asia regions, where flows would fall by €822 million, followed by the East Asia and Pacific region (€251 million in lost M&As) and then North America (€218 million). These are regions where the majority of M&As activity takes place (see Table 1 and descriptive statistics in the Appendix). In relative terms, though, the largest loss is registered by investing firms in the Middle East and North Africa (0.4% of predicted flows), followed by Latin America and the Caribbean (0.2%) and Sub-Saharan Africa (also 0.2%). The smallest loss would be regarding MNEs located in South Asia, from which M&As are predicted to fall by'just' €1 million (or 0.1% of the total predicted flows).

Table 8 Effect of the global minimum tax rate on acquirer countries

	(1) Missing Flows[a] (in € million)	(2) M&As decrease: % of predicted flows
Effect by regions		
East Asia & Pacific	−251	−0.1
Europe & Central Asia	−822	−0.1
Latin America & Caribbean	−14	−0.2
Middle East & North Africa	−20	−0.4
North America	−218	−0.1
South Asia	−1	−0.1
Sub−Saharan Africa	−19	−0.2
Effect by income		
High income: non-OECD	−6	0.0
High income: OECD	−1,259	−0.1
Upper middle income	−59	−0.1
Lower middle income	−22	−0.5
Overall	−1,346	−0.1

a Simulation over the 2016–2019 period

Breaking down the GMCTR effect on M&As by acquirer-country income level, flows from high-income OECD countries would be reduced by €1.259 billion. In relative terms, though, it is lower-middle-income countries that would be most affected, registering a 0.5% decrease in predicted flows.

Focusing on target countries, the most significantly affected regions are the Middle East and North Africa (where inward flows would drop by 2.7%), South Asia (2.3%) and Sub-Saharan Africa (1.2%).

Splitting target countries by income level, we see that all categories other than OECD countries would experience a decrease in inward flows. In relative terms, the most affected group would be *low income* countries, which would face a loss of 3.7% of predicted flows, while *lower middle income* countries would see a 1.6% drop. The majority of the missing flows, however, would be attributable to non-OECD high-income countries, amounting to €821 million (Table 9).

13 Conclusions

International capital mobility fosters markets' globalisation, which is, in turn, a key condition for a more competitive economy and long-term economic growth. Over the last two decades, foreign direct investment via mergers and acquisitions has been widely employed as a means of moving capital internationally. However, international capital mobility also provides a route to tax avoidance by means of profit

Table 9 Effect of the global minimum tax rate on target countries

	(1)	(2)
	Missing Flows[a] (in € million)	M&As decrease: % of predicted flows
Effect by regions		
East Asia & Pacific	−5	0.0
Europe & Central Asia	−123	0.0
Latin America & Caribbean	−80	−0.2
Middle East & North Africa	−843	−2.7
North America	−0	0.0
South Asia	−136	−2.3
Sub-Saharan Africa	−122	−1.2
Effect by income		
High income: non-OECD	−821	−0.7
High income: OECD	−4	0.0
Upper middle income	196	−0.3
Lower middle income	−306	−1.6
Low income	−18	−3.7
Overall	−1,346	−0.1

a Simulation over the 2016–2019 period

shifting. Governments around the world are concerned about profit shifting since it erodes their tax base and jeopardises public budgets. In July 2023, 138 countries agreed to commit to sign a multilateral convention. The convention is expected to enter into force in 2025. In January 2025, the United States of America, has already pulled out after the inauguration of its new President.

Initial attempts to address profit shifting for tax avoidance purposes date back to the 1990s when the Ruding Committee proposed a minimum corporate tax rate of approximately 30% on all European Union Member States (Devereux, 1992). The proposal never became law. In 2015, OECD countries released six indicators to track profit shifting (OECD, 2015). Based on these indicators, the OECD has estimated that BEPS practices cost countries $100–240 billion in tax revenue each year, equivalent to four to ten percent of global corporate income tax revenue. Such substantial losses are especially detrimental to countries already burdened by high levels of public debt, making them dependent on the strategic behaviour of international investors. In 2019, OECD members launched a policy plan known as the Inclusive Framework on BEPS, aiming to set minimum tax rates for all member states and implement coordinated measures to prevent BEPS (OECD, 2021). This framework consists of two pillars designed to address BEPS. *Pillar One* introduces the concept of profit reallocation for MNEs with global annual revenues exceeding €20 billion and profit margins above 10%. These companies are required to reallocate their excess profits to the jurisdictions where their consumers are located, irrespective of physical presence. *Pillar Two* establishes a minimum corporate tax rate of 15% for all MNEs with annual revenues surpassing €750 million.[18] The OECD policy package has been agreed upon by 137 countries (with Kenya, Nigeria, Pakistan, and Sri Lanka being the only members of the BEPS Inclusive Framework yet to sign). The OECD's initiative, aimed at curbing aggressive tax planning strategies used by MNEs, has led to changes in international tax rules that can influence FDI decisions and profits shifting.

With a step in the direction of international fiscal harmonisation now, hopefully, on the horizon, we have sought in this paper to investigate how differences in tax rates between the home and host countries of international corporate investors affect their propensity to invest when taking into account the direct as well as the *indirect* cost of venturing in countries with different tax rates and regimes.

Our results suggest that M&As activity is more intense when the relevant home and host countries have *similar* tax rates. Indeed, we observe that substantial tax rate differences are, on the whole, detrimental to investment flows. This highlights the relevance of tax system distance as a driver of capital flows Bruno et al. (2021); Jackson and Deeg (2008); Kostova et al. (2020), as greater tax system differences in

[18] [18]Three rules govern the application of this tax: the income inclusion rule (IIR), the under-taxed payments rule (UTPR), and the subject to tax rule (STTR). The IIR imposes a top-up tax on income earned in jurisdictions where corporate income tax falls below 15%, collected in the MNE's jurisdiction of registration. The UTPR comes into play if the registration jurisdiction has a tax rate below 15%, by applying a minimum tax of 15% regardless of location. Additionally, the STTR ensures that covered payments between connected entities are subject to a minimum tax rate of 9%, when neither the source country nor the country of residence applies a tax or withholding of at least 9% on the transaction.

a target foreign country tend to be associated with greater costs of doing business abroad for multinational enterprises (MNEs).

Moreover, a global scenario of significant differences in corporate tax rates from country to country gives rise to "race to the bottom" practices and the consequent issue of tax base erosion due to profit shifting, which has become a concern for governments. Within such a scenario, MNEs act opportunistically, preferring to invest wherever they will be taxed least rather than based on the competitive merits of the target market.

Our analysis suggests that, on the one hand, imposing a global minimum tax rate might not, by itself, prove to be an ideal solution to this market failure. We find that the GMCTR will have a negative but limited overall effect on M&As flows. In absolute terms, the biggest decrease in outflows (the sending side) will be among OECD countries, while the biggest drop in inflows (the receiving side) will be among high-income non-OECD countries. In relative terms (as a percentage of expected flows), however, developing countries would experience the largest decrease. As such, as far as FDI flows are concerned, the GMCTR scenario would seem to benefit mainly the North American region, unloading the burden of a lower aggregate value of M&As activity onto the less-developed regions of the world.

In light of the limited impact that the GMCTR will have as a percentage of the total predicted M&As flows (for any region), our results nevertheless indicate that governments would be wise to continue pursuing joint fiscal policy agreements. Only through multilateral initiatives such as the GMCTR will governments manage to prevent a so-called *race to the bottom*[19] and minimise profit-shifting tactics by MNEs. Indeed, if no joint actions are taken to curb fiscal competition, then MNEs will continue along the route of shifting capital into jurisdictions that comply with their desire for "unnaturally" low taxes. Finally, we acknowledge that our analysis is limited to one type of FDI, which is M&As, so excluding greenfield FDI. Nevertheles, on the one hand, we posit that this might avoid a possible bias related to the different sensitivity that different FDI modes have to destination country tax rates. On the other hand, we might expect the magnitude of our predictions to be even larger if greenfield FDI were also considered. This is because greenfield FDI seems being more sensitive to destination country corporate taxes than M&As (Davies et al., 2018; Hebous et al., 2011). Future analysis could investigate the joint impact of GMCTR on both the selection of FDI mode and FDI direction.

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[19] *Race to the bottom* here stands for initiatives or practices aimed at deregulating the business environment and reducing corporate tax rates to attract capital.

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