

4 Investment Impacts of Pillar One and Pillar Two

4.1. Summary

4.1.1. *New tax rules impact incentive structures of MNEs and governments*

291. **The Pillar One and Pillar Two proposals would introduce significant changes to the international tax rules, affecting global investment through their impacts on the incentives faced by MNEs and governments.** Amount A of Pillar One involves the creation of a new taxing right and the reallocation to market jurisdictions of a share of residual profit determined at the MNE group level, based on a formulaic approach. Pillar Two addresses remaining BEPS challenges and is designed to ensure that large internationally operating businesses pay a minimum level of tax regardless of where they are headquartered or the jurisdictions they operate in. Without prejudging the final design and parameter choices, which are still the subject of discussions among members of the Inclusive Framework on BEPS, the structural changes embedded in these new rules could have substantial direct and indirect effects on investment and economic output.

292. **The new rules will not affect all MNEs, but are targeted to large, highly profitable MNE groups (Pillar One) and large MNE groups with low effective tax rates (Pillar Two).** The inclusion of several scope restrictions would imply that the effects of Pillar One and Pillar Two on investment costs would not affect all firms, but would be targeted to a subset of MNEs. For example, although it remains subject to political decision, the scoping criteria currently being discussed for Amount A of Pillar One only includes businesses or business segments that perform activities within the definitions of the Automated Digital Services (ADS) and Consumer Facing Businesses (CFB) under discussion. Importantly, it includes a profitability threshold that is determined at the MNE group level, which targets the impact of the rules to highly profitable MNEs. Pillar One will also incorporate a global revenue threshold, ensuring that only larger MNE groups are targeted. Pillar Two, on the other hand, is focussed on large MNEs with low effective tax rates, which will mainly affect firms reporting large profits in low-tax jurisdictions. This will especially be the case if a formulaic substance-based carve-out is provided.

4.1.2. *Investment responses at the MNE entity level*

293. **At the MNE entity level, increases in investment costs could lead to some relocation of investment away from low-tax jurisdictions.** Increases in investment costs are mostly driven by Pillar Two, notably affecting MNE entities that would otherwise have realised effective tax rates (ETRs) below the minimum tax rate. Confirming the established literature, new empirical research on the tax sensitivity of investment suggests that affected MNE entities would be expected to respond to potential cost increases by decreasing or relocating investment, in the absence of other commercial considerations.

294. **Investment relocation across jurisdictions does not necessarily lead to a decrease in global investment if it is linked to an investment increase in another location.** Relocation of MNE activities

can increase the efficiency of capital allocation across jurisdictions, in situations where investment decisions were previously driven mostly by tax considerations. MNEs make investment decisions based on a range of commercial considerations, including taxation. To the extent that taxation has an influence, investment decisions are driven by post-tax rather than pre-tax returns. Given that ETR differentials can be substantial, MNEs could potentially be induced to choose locations where investments yield lower pre-tax, but higher post-tax returns. The Pillar One and Pillar Two proposals reduce ETR differentials across jurisdictions, thus reducing the scope for tax-induced distortions of investment decisions and potentially leading to a more efficient capital allocation and higher global output.

4.1.3. Government responses can have indirect effects on investment

295. **Additional tax revenues can have positive indirect effects on the economy, for example, supporting domestic resource mobilisation in developing countries.** While the optimal level of tax revenues, the optimal tax mix, and the optimal use of public funds depend on the country-specific context, additional tax revenues could have positive effects on the economy, as they can be used, e.g., to support public or private investment, to reduce public debt levels or to finance reductions in other taxes. Lower ETR differentials reduce the potential gains from profit shifting, implying that corporate tax bases may become less elastic and public funds may be able to be raised more efficiently. These positive indirect impacts on fiscal capacity are particularly important for developing countries, which often face more stringent capacity constraints.

296. **Governments' responses to changes in the international tax system could have important indirect effects on the attractiveness of their jurisdiction for foreign investment.** Pillar Two may reduce the effectiveness of certain tax incentives provided through the corporate income tax (CIT) system. Notwithstanding this, governments will continue to be able to draw upon a wide range of tax and non-tax instruments to support policy objectives such as increased innovation or economic development. However, in response to structural changes, some jurisdictions could adapt their policies to improve attractiveness for foreign investment over and above simple tax-cost considerations. For example, a more limited and cost-efficient use of investment tax incentives could strengthen domestic resource mobilisation in developing countries. Both responses would reinforce positive effects on international capital allocation.

4.1.4. Investment responses at the MNE group level

297. **At the MNE group level, the GDP-weighted average increase in effective marginal tax rates could be around 1.4 percentage points, suggesting only limited impacts on global investment levels.** The global GDP-weighted average increase in effective average tax rates (EATRs) is estimated to be around 0.3 percentage points, representing a small impact compared to the weighted average EATR in the sample (24%) or the six percentage point reduction in the unweighted average EATR that was observed between 1999 and 2017. The corresponding increase for effective marginal tax rates (EMTRs) is estimated to be around 1.4 percentage points, again representing a small change compared to the weighted average EMTR of around 25%. These effects represent global averages across all MNEs; the corresponding increase in EATRs and EMTRs would generally be higher for MNEs that are within the scope of Pillar One or Pillar Two. These effects are mostly driven by Pillar Two and are larger for projects located in investment hubs, most of which currently face comparatively low effective tax rates.¹

298. **The response of investment is expected to be weak for entities in MNE groups affected by the reforms,** as new evidence suggests that MNE entities in more profitable MNE groups are less sensitive to tax increases than entities in MNE groups that are out of scope. Specifically, entities in MNE groups with a profitability rate between 0% and 10% would, on average, reduce their domestic investment rate by around 0.15 percentage points following a one percentage point increase in the jurisdiction's EMTR. The size of this effect is almost half as large for entities in MNE groups with profitability ratios above 10% and more than three times smaller for entities in MNE groups with profitability rates above 15%.

299. **The proposals are expected to produce a more level playing field among MNEs, and vis-à-vis their smaller and domestic competitors.** Pillar One would be targeted towards large and profitable MNEs, while Pillar Two would ensure that all MNEs pay a minimum level of tax in each jurisdiction in which they operate irrespective of where they are based.

4.1.5. Impacts on the global economy in case no consensus is reached

300. **These results must be compared to the implications for the global economy in a counterfactual scenario where a multilateral consensus-based solution cannot be secured.** It would be incorrect to assume that the counterfactual scenario looks like the status quo. Equally important, the evaluation has to acknowledge that the baseline scenario has changed due to the COVID-19 pandemic.

301. **Failure to secure a consensus-based solution would increase the domestic pressures on governments** to address the tax challenges arising from digitalisation unilaterally, and would likely lead to the introduction of digital service taxes or similar measures in a growing number of jurisdictions. An increasing number of jurisdictions have implemented, or are considering the introduction of digital services taxes; other unilateral measures include alternative applications of the permanent establishment threshold, withholding taxes or diverted profit taxes. The introduction of such measures, as well as potentially more aggressive actions by tax administrations, could affect investment indirectly by leading to a rise in disputes between countries and MNEs which generates significant administration and compliance costs.

302. **A proliferation of digital services taxes (DSTs) would lead to economic inefficiencies, reducing global investment and output.** DSTs are not designed as taxes on corporate profits, but as taxes on total revenues associated with specific types of digital transactions. They could lead to positive tax liabilities imposed on loss-making firms as well as to economic double taxation, and are thus more distortive than profit-based taxes, potentially leading to higher prices, lower sales, and less investment in the affected sectors. Since they are typically levied on intermediate services, e.g., online advertisement, these effects are expected to flow through to a much larger number of firms and sectors, an effect that could be larger if intermediate services are provided by online platforms with some degree of market power.

303. **More widespread adoption of DSTs would likely give rise to an increase in trade disputes,** in addition to the immediate negative impacts on economic efficiency.

304. **The negative economic implications of protracted tax- and trade-related conflicts are likely to be significant, ranging between around -0.1% to -1.2% of global GDP.** Based on different DST rates and retaliatory tariffs, global GDP is simulated to be reduced by -0.1% to -0.2% if a smaller group of jurisdictions is involved in the conflict, and between -0.4% to -1.2% if a larger number is involved, compared to a scenario without tax- and trade-disputes. These results represent a substantial reduction in global GDP, stemming from efficiency losses due to the tariffs compounded with reductions in wages and capital returns as well as a slow-down in investment driven by declining exports. Household income would be impacted to the same extent as GDP, indicating that households would bear most of the costs of the shrinking economy. World trade, measured as real global import volumes, falls by about twice the rate of real GDP.

305. **In contrast, an approximation of the impacts of investment cost increases under the consensus scenario suggests a reduction of less than 0.1% of global GDP,** compared to a hypothetical scenario where failure to secure consensus does not lead to any future tax- and trade-disputes.

4.1.6. Overall Assessment against the background of COVID-19

306. **Under both scenarios, global investment and output are being severely affected by the COVID-19 pandemic.** The COVID-19 crisis is affecting firms, economies and governments in ways that could modify the expected impact of the reform. For example, the economic crisis will have strong negative

effects on the profitability of most MNEs in the short- and possibly medium-term. Under the consensus scenario, loss carry-forward provisions could imply that any impacts of Pillar One and Pillar Two on investment costs, and therefore global investment, are likely to be less than estimated and will take effect over a much longer timeframe. Given the structure of certain highly-digitalised markets, increased demand for digital services could translate into higher profitability for certain large MNE groups, implying that a larger share of profits will likely be subject to Pillar One over time, in line with profitability increases.

307. **Against the background of the COVID-19 crisis, the negative consequences of a failure to secure consensus are likely to be more severe.** As the global economy is very fragile, aggravated tax- and trade disputes could compound the effect of the COVID crisis or hinder the post-crisis recovery. DSTs could lead to double taxation and asymmetric corporate taxation, inducing firms to forego investment opportunities that would be economically viable in the absence of DSTs. Political pressure on governments will increase, as the tax challenges from digitalisation remain unresolved at a time when many highly-digitalised MNEs are experiencing higher sales and rising valuations.

308. **Securing a consensus-based solution to the tax challenges arising from digitalisation will support global investment** compared to alternative counterfactual scenarios, which are likely to exacerbate an already negative economic outlook. While increases in investment costs could slightly weigh on global investment under the consensus scenario, this negative effect would be quantitatively small compared to alternative scenarios capturing the potential costs of the tax- and trade-related conflicts that may arise if a consensus-based solution cannot be secured. In addition, the reform would enhance tax coherence and tax certainty, and the efficiency of capital allocation compared to the no-consensus scenario, which would also support investment and growth.

4.2. Introduction

309. The OECD/G20 Inclusive Framework on BEPS adopted a Programme of Work to Develop a Consensus Solution to the Tax Challenges arising from the Digitalisation of the Economy in May 2019 (the Programme of Work) (OECD, 2019^[1]), which was approved by the G20 Finance Ministers and Leaders at their meetings in June 2019 meeting. The purpose of the Programme of Work is to develop international corporate tax reform proposals, building on two pillars: Pillar One involves revised profit allocation and nexus rules to reallocate taxing rights to market jurisdictions; and Pillar Two involves rules to ensure a minimum level of effective taxation to address remaining BEPS concerns.

310. As part of the Programme of Work, the Inclusive Framework requested that the OECD Secretariat carry out an economic analysis and impact assessment of the Pillar One and Pillar Two proposals, with an emphasis on both the revenue and investment effects of the proposals. Analysis of the revenue and investment impacts of the proposals will provide valuable information to governments, businesses, civil society organisations and the broader public. In the context of this work, this chapter focusses on the OECD Secretariat's analysis of the effects of the Pillar One and Pillar Two proposals on global investment and economic output.

4.3. Conceptual approach

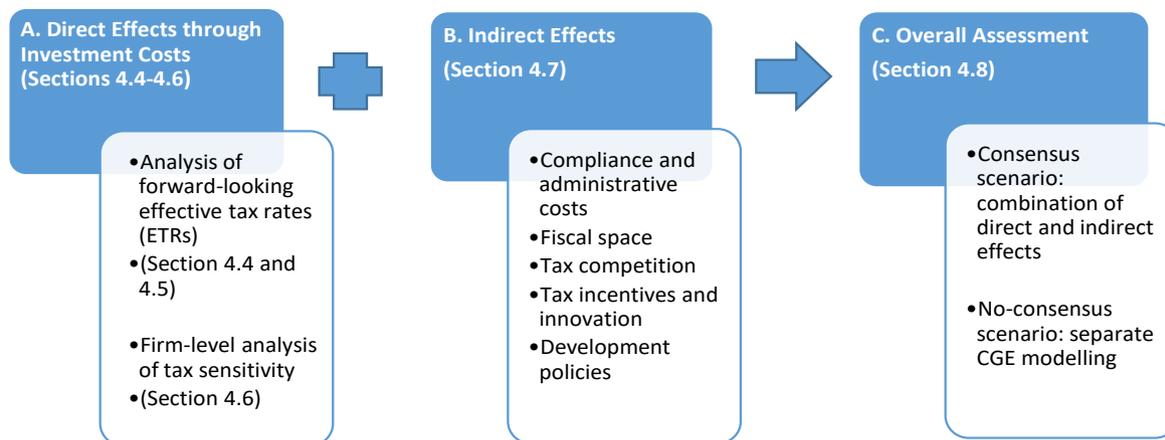
311. The proposals would introduce several novel elements into the international architecture for the taxation of corporate profits that would lead to a number of significant changes in the way multinational enterprises (MNEs) are taxed. While a number of design choices remain open at this point, the most significant changes to the incentives faced by MNEs and governments are expected to come from the following stylised elements.

- Under Pillar One, Amount A involves the creation of a new nexus, not dependent on physical presence, and the reallocation to market jurisdictions² of a share of residual profit determined at the MNE group level, based on a formulaic approach.
- Under Pillar Two, a number of interlocking rules seek to address remaining BEPS challenges and ensure that large internationally operating businesses pay a minimum level of tax regardless of where they are headquartered or the jurisdictions they operate in.

312. Notwithstanding other relevant and novel elements of the proposals as well as a number of design choices that remain open at this point, the proposed reforms represent a significant structural reform of the international tax system, which can be expected to have an impact on MNE investment decisions. For example, the implementation of Pillars One and Two could lead to changes in organisational structure and global investment levels, as well as the potential relocation of real economic activities. While these potential behavioural responses³ of MNEs may not be immediately observable after implementation, the reforms are likely to have effects on global economic growth, as well as public revenues, over the longer term.

313. Analysing the investment impacts of the proposals is a challenging task for a number of reasons. First, some key aspects of policy design are still under development. Second, the proposals that are currently contemplated are ambitious in terms of their underlying policy goals as well as their technical complexity and jurisdiction coverage. Third, the available data is limited and, fourth, the economic impact of the COVID-19 pandemic represents a significant change in the baseline scenario underlying the analysis (see Box 4.1 for a discussion).

Figure 4.1. Conceptual Approach



Source: OECD Secretariat.

314. Notwithstanding these challenges, this chapter presents a comprehensive discussion, covering the most pertinent aspects of the ongoing policy debates surrounding the investment impacts of the proposals, based on original research contributions and insights from the relevant economic literature. Conceptually, the analysis builds on three different components, as outlined in Figure 4.1:

- **Investment impacts operating through investment costs:** This component brings together two new empirical studies. The first study estimates the impact of the proposals on forward-looking effective tax rates (ETRs) calculated at the MNE group level. The second study builds on firm-level data to estimate the tax sensitivities of MNE investment at the entity level, taking into account differences in profitability across MNE groups. Taken together, these two studies produce important empirical insights on the effect of the proposals on MNE investment.

- **Indirect effects on MNE investment and economic output:** Drawing upon the existing economic literature, this component analyses the effects of the proposals on MNE investment and economic output operating through a range of indirect channels. For example, substantial impacts could occur through additional fiscal space, compliance and administrative costs or through changes in taxpayer and government behaviour in response to international tax competition, tax incentives and competition between firms.
- **Overall assessment of the investment and growth impacts:** This component brings together the quantitative results on investment costs and additional insights on indirect effects to form an overall assessment of the likely effects of the proposals on MNE investment and growth. This assessment is compared to a range of counterfactual scenarios, which will be modelled using a computable general equilibrium (CGE) model (OECD METRO Trade Model), to assess the trade related implications of a proliferation of unilateral measures that may flow from not reaching international consensus.

315. The Section 4.4 introduces the distinction between MNE investment at the MNE group and entity level. The Section 4.5 discusses the analysis of forward-looking ETRs, while Section 4.6 discusses the firm-level analysis of the tax sensitivity of MNE investment. The Section 4.7 presents the discussion of the indirect effects on MNE investment and economic output. The Section 4.8 presents an overall assessment of the impacts on investment and output with and without a multilateral consensus.

Box 4.1. Effects of the COVID-19 pandemic on the evaluation

The COVID-19 crisis is affecting firms, economies and governments in ways that could modify the expected impact of the reform, primarily in the short term, but also in the longer term. First, concerns about security of supply in a post COVID-19 environment may induce MNEs to revisit their global value chains (GVCs) to reduce vulnerability to supply disruptions, potentially leading to onshoring or re-shoring of the production of certain goods closer to the markets where they are consumed. Under the consensus scenario, discussed in detail in the Section 4.8, ETR differentials will be lower and the relative weight of non-tax factors in location decisions will be correspondingly higher; as a result, considerations about the vulnerability of supply chains could become a more important factor for location decisions. However, under a scenario where no multilateral consensus is reached this would be less likely be the case; as corporate taxation becomes more incoherent across jurisdictions, MNEs might be more inclined to prioritise tax savings over other considerations.

Second, the economic crisis will have strong negative effects on the profitability of many MNEs in the short and, possibly, medium term. As a result, the amount of residual profit for reallocation under Pillar One is expected to decrease as well as the global amount of MNE profit, thereby reducing the pools of low-taxed profit subject to top-up tax under Pillar Two. While these effects will fade out when economies and MNE profits recover from the crisis, carry-forward provisions allow businesses to offset losses against future profits, which means that any impacts of Pillar One and Pillar Two on investment costs, and therefore global investment, are likely to take effect over a longer timeframe. As a result, even if consensus is reached in 2020 and the reform is implemented swiftly afterwards, any potential effects on investment costs, which are only expected to be small based on this analysis, are only likely to materialise over a period of time, i.e., after MNE profitability has returned to pre-crisis levels.

In contrast, as noted in Section 4.8, failure to secure a consensus-based solution through the multilateral process of the Inclusive Framework could lead to a rapid proliferation of unilateral measures such as DSTs, among others. As the DST is essentially a turnover-based tax, it would impose significant cross-jurisdictional tax liabilities, not only on profitable firms but also on loss-making firms, making recovery much more difficult. In addition, DSTs could lead to double taxation and asymmetric corporate taxation, thus distorting investment decisions away from risky projects, i.e., inducing firms to forego investment opportunities that would be economically viable in the absence of DSTs, at a point in time when additional investment would be most needed. These issues will be particularly acute in the context of the economic crisis resulting from the COVID-19 pandemic.

Third, consumers' and firms' reliance on digital services was already on a rising trend before the crisis. However, the lockdowns and travel restrictions implemented during the crisis have accelerated this structural trend, thus likely leading to a permanent shift towards greater digitalisation and a corresponding increase in the size of the ADS activities. Given the structure of certain highly-digitalised markets, sometimes characterised by winner-takes-most dynamics, increased demand for digital services could translate into higher profitability for certain large MNE groups (Calligaris, Criscuolo and Marcolin, 2018^[2]) (Bessen, 2017^[3]). Under the consensus scenario, this implies that more MNEs, particularly those engaging in ADS activities, will move into the scope of Pillar One over time, in line with profitability increases. Under the no-consensus scenario, however, political pressure on governments would strongly increase, as the tax challenges from digitalisation remain unresolved at a time when highly-digitalised MNEs are doing increasingly well. As a response, an increasing number of governments might resort to unilateral measures, thus further contributing to the fragmentation of the international tax system and increasing the threat of damaging trade disputes, hampering economic efficiency and undermining the global recovery.

Against the background of the COVID-19 crisis, the negative consequences of a failure to secure a consensus-based solution through the multilateral process of the Inclusive Framework discussed in the Section 4.8 are, therefore, likely to be even more severe. Fragmentation of the international tax system would make the restructuring of GVCs more costly; political pressure would further increase and induce governments to rely increasingly on inefficient unilateral tax measures; and loss-making firms would have to absorb even stronger adverse effects. In addition, the risk of protracted trade disputes would be further heightened, potentially increasing the duration and depth of an already extremely severe worldwide economic crisis.

4.4. Investment responses at MNE group and entity level

316. Empirical evidence suggests that taxation is one among many factors, including e.g. political risk, openness, wage levels, infrastructure or the functioning of product markets, affecting MNE investment decisions (Hajkova et al., 2006^[4]) (Arnold et al., 2011^[5]) (Feld and Heckemeyer, 2011^[6]) (Sorbe and Johansson, 2017^[7]). All else equal, corporate income taxation increases the user cost of capital, i.e., the minimum pre-tax rate of return that a firm needs to earn in order to break even after tax (Creedy and Gemmell, 2017^[8]). While other channels through which the reform could affect investment and global output are discussed in the Section 4.7, Section 4.5 focusses on investment impacts operating through investment costs.

317. The introduction of Pillars One and Two could have significant impacts on the taxation of those MNEs that are within the scope of the proposed measures, depending on specific design choices regarding thresholds and carve-outs. Insofar as the proposals lead to changes in their investment costs, MNEs may be expected to respond by adjusting their investment decisions, possibly both in terms of location and scale.

318. In empirical work, impacts of corporate tax reforms on investment costs are often evaluated based on forward-looking effective tax rates (ETRs), i.e., synthetic, model-based tax policy indicators that combine information about corporate tax systems in an internationally comparable framework (Devereux and Griffith (2003^[9]); Hanappi (2018^[10])). Compared to statutory CIT rates, forward-looking ETRs have the advantage that they also capture standard components of the corporate tax base, e.g. depreciation. In empirical investment studies, forward-looking ETRs are the preferred measure because they avoid endogeneity inherent in backward-looking ETRs, computed as empirically observed taxes paid over a profit measure (Feld and Heckemeyer, 2011^[6]).

319. When evaluating the investment impacts of changes in corporate taxation, an important distinction needs to be made between relocation of investment at the MNE entity level and changes in overall investment at the MNE group level.

- **Entity level investment** represents investments undertaken by subsidiaries that are part of an MNE group but not necessarily located in the jurisdiction of the ultimate parent entity; the investment decisions of these subsidiaries tend to consider the prevailing ETRs based on the domestic tax rules of the particular jurisdiction.
- **Group level investment** represents the combined investments of a given MNE group. While the ultimate parent entity of the MNE group will be located in a specific jurisdiction, MNE group level investment aggregates investments undertaken in any other subsidiary entity within the particular MNE group; MNE group level ETRs reflect the organisational structure of the MNE group as well as the relevant tax rules in the respective jurisdictions.

320. Although the empirical literature confirms that entity level investment responds negatively to an increase in the effective marginal tax rate (EMTR) in a given location (Feld and Heckemeyer, 2011^[6]), this finding does not necessarily imply that investment at the MNE group level will decline as well. For example, a decrease in investment, which could be observed in response to an increase in the EMTR in a given location, could go together with a relocation of activities to other locations where the MNE group has subsidiaries (or even potentially to a location where the group would establish a new subsidiary). In this case, MNE group level investment would remain at a similar level and global output⁴ would remain the same. In fact, this outcome would suggest that taxation has distorted previous location decisions; relocation thus creates the potential for an increase in the efficiency of capital allocation and, in turn, global output due to the relocation.

321. While it is difficult to disentangle entity- and group-level effects with the available data, recent evidence on the effect of the introduction of transfer pricing rules suggests that changes in jurisdiction level tax rules result mainly in a relocation of an MNE's investment rather than a reduction in the MNE group's overall level of investment (de Mooij and Liu, 2020^[11]). Although relocation effects are certainly important from the perspective of individual countries, effects on MNE group level investment are likely to be more relevant drivers of global economic growth. The Section 4.5 discusses impacts on investment costs at the MNE group level, while the Section 4.6 focusses on investment responses at the entity level. The indirect effects discussed in the Section 4.7, however, could operate at the MNE entity as well as the group level.

4.5. Impacts on MNE group level investment costs

322. To derive an estimate of the impacts of the proposals on MNE group level investment costs, the analysis builds on the theoretical framework for forward-looking effective tax rates developed by Devereux and Griffith (2003^[9]) and extends it in two important respects. First, the analysis incorporates the possibility that MNEs use their organisational structure to obtain tax advantages through profit shifting. Second, it evaluates the impact of stylised tax provisions⁵ proposed under Pillar One, focusing on Amount A, and Pillar Two. Both extensions are described in detail in Hanappi and González Cabral (2020^[12]). The results presented in this chapter are intended to be aligned with the latest discussions of the Inclusive Framework,

as described in the Pillar One and Pillar Two Blueprint reports (OECD, 2020_[13]; OECD, 2020_[14]), covering the majority of recent design choices. In particular, although political decisions remain to be made, Amount A of Pillar One is assumed to be restricted to Automated Digital Services (ADS) and Consumer-Facing Businesses (CFB); the effects of Pillar Two consider only the impact of the Income Inclusion Rule (IIR, cf. Section 4.7.3) and account for a formulaic substance-based carve-out on depreciation expenses while the impact of a carve-out on payroll cannot be covered in this chapter due to data limitations (see Hanappi and González Cabral (2020_[12]) for a detailed description of the modelling approach).⁶

4.5.1. Methodological approach

323. Consistent with the MNE group level perspective, the empirical approach considers a stylised organisational structure that is held constant throughout the analysis and calibrated based on jurisdiction-specific data on profit and asset location. For the purposes of the empirical calibration, it is assumed that the ultimate parent entity of the MNE group carries out an investment in the jurisdiction where it is located, conducts operations through its subsidiaries located in other jurisdictions included in the dataset and produces a final consumer good that is sold to a global consumer base. Further assumptions are that the firm is a large MNE in a profit position and that investment is financed by retained earnings; the treatment of loss-making firms is, therefore, not considered. The investment is constructed as an unweighted average across three broad asset categories, non-residential structures, tangibles assets and acquired intangibles; statutory tax rates, depreciation rules and macroeconomic parameters are taken from OECD Corporate Tax Statistics (OECD, 2020_[15]).⁷ Personal income taxation and other taxes at the international level, e.g., withholding taxes, are not considered.

324. Effective marginal tax rates (EMTRs) and effective average tax rates⁸ (EATRs) are calculated at the MNE group level with respect to an additional investment in the jurisdiction of the ultimate parent entity⁹, assuming that a share of its profits are shifted to other group subsidiaries located in jurisdictions with lower tax rates. The extent to which profits are shifted is approximated based on the consensus estimate from the profit shifting literature (Johansson et al., 2017_[16]), (Heckemeyer and Overesch, 2017_[17]), (Beer, de Mooij and Liu, 2020_[18]). The location of shifted profits as well as the revenue structure are empirically calibrated, consistent with the data matrices constructed for the development of the tax revenue estimates (see Chapter 5), and shifted profits are taxed at the respective statutory CIT rates (see Hanappi and González Cabral (2020_[12]) for a sensitivity analysis). This approach ensures that cross-country heterogeneity in the activities of MNEs, and thus in the potential impact of the proposals, is reflected in the analysis.

325. To capture the impact of the proposals, ETRs are first calculated¹⁰ for a baseline case with profit shifting, building on data from 2019 on corporate tax rates and bases as published in OECD Corporate Tax Statistics (OECD, 2020_[19]). Holding organisational structure and profit location constant, the baseline case is then compared to the post-implementation case to determine ETR changes at the MNE group level. Pillars One and Two include several design features that determine the extent to which the MNE group level ETRs will be affected. While the specific parameters are yet to be determined, the analysis relies on a set of assumptions, on a without prejudice basis, to model the expected effects of both pillars.¹¹ The specification underlying the analysis discussed below assumes¹² that Amount A¹³ under Pillar One entails a 10% profitability threshold based on profit before tax over turnover, a 20% reallocation percentage to market jurisdictions and a restriction to ADS and CFB. In considering Pillar Two, a 12.5% rate with jurisdiction blending is assumed; the carve-out on depreciation expenses is assumed to be 10% and approximated using the value and location of tangible assets while the carve-out on payroll cannot be covered in this chapter due to data limitations. A revenue threshold of EUR 750 million is modelled for both Pillars. Using these parameters, the share of firms and profits that are in scope of Pillar One and Pillar Two are calibrated using jurisdiction-specific, firm-level data.¹⁴ Additional results for a range of design options and parameter values are presented in Hanappi and González Cabral (2020_[12]).

4.5.2. Empirical results

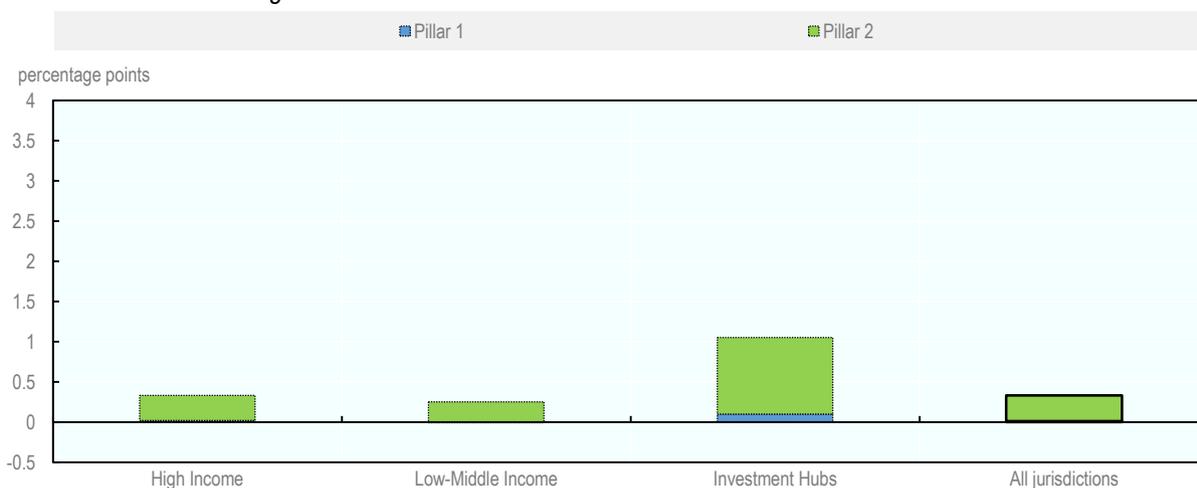
326. Consistent with the assumptions about stylised organisational structures, the results in Figure 4.2 identify MNE group level changes in ETRs associated with real investments in the jurisdiction of the ultimate parent entity.¹⁵ Changes in profit shifting due to the implementation of the proposals are not captured in the calculation of the MNE group level ETRs. As discussed in Chapter 3, the new provisions are expected to reduce the amount of profits shifted to low-tax jurisdictions; this means that overall effective taxation would increase, on average, while tax liabilities under Pillar Two would fall if changes in profit shifting are accounted for. Insofar as that is the case, the direct impact of minimum effective taxation on the group level ETR would be lower. Following the approach taken with respect to the revenue results, the jurisdiction-specific results are aggregated into three groups based on GDP per capita: high income jurisdictions, low and middle income jurisdictions, and investment hubs.¹⁶ GDP-weighted aggregated results are shown, for each of the three groups as well as the global average, in Figure 4.2.

327. Several initial insights emerge from the analysis of MNE group level ETRs. First, the share of MNEs that will be unaffected by the new rules is significant due to the revenue threshold and various scope restrictions.¹⁷ Second, the results suggest small effects of Pillars One and Two on MNE group level effective average tax rates (EATRs) and effective marginal tax rates (EMTRs), based on an average across all MNEs. The global GDP-weighted average change in the EATRs from Pillar One and Two is estimated to be just over 0.3 percentage points (Panel A), representing a small impact compared to 24%, i.e., the weighted average EATR in the sample, or the 6 percentage point reduction in the EATR observed over 1999-2017 (Section 4.7.3). The corresponding change for the EMTR is around 1.4 percentage points, again representing a small change compared to the weighted average EMTR of around 25%. Third, much of this increase is driven by Pillar Two. While the global weighted-average change in the EATR due to Pillar One is close to zero (0.01 percentage points), the change due to Pillar Two is estimated to be around 0.3 percentage points. The same pattern is observed for the EMTR (Panel B in Figure 4.2). Fourth, the effect of the new rules on ETRs realised on investments in investment hubs is larger compared to investments in other jurisdictions.

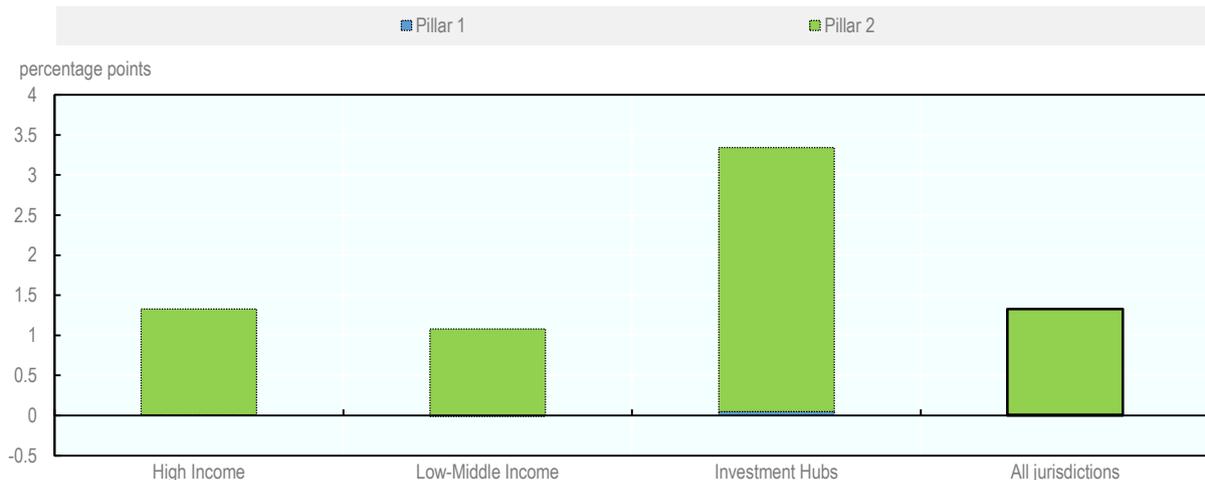
Figure 4.2. Changes in Effective Tax Rates due to Pillars One and Two

ETRs are calculated at the MNE group level assuming an investment in the jurisdiction of the ultimate parent entity; the vertical axis shows GDP-weighted average changes in ETRs in percentage points by income groups.

Panel A: Effective Average Tax Rates



Panel B: Effective Marginal Tax Rates



Note: Pillar One (Amount A only) considers a 10% profitability threshold on Profit/Turnover, 20% reallocation percentage to market and a scope that is restricted to ADS and CFB. Pillar Two considers a 12.5% rate with jurisdiction blending and a 10% carve-out on depreciation expenses (approximated using the value of tangible assets). In addition, it is assumed that an MNE group that claims the benefit of the carve-out should be required to make a corresponding and proportional adjustment to the covered taxes for the calculation of the ETR. The alternative option (i.e. not making a corresponding and proportional adjustment to the covered taxes) would be difficult to model with the available data. See Chapter 3 for more details. As described in endnote 12, real investments in jurisdictions without a full-fledged CIT system are not considered; those jurisdictions are thus excluded from the Figure, but profits can still be shifted to these jurisdictions. A revenue threshold of EUR 750 million is assumed, on a without prejudice basis, for the modelling of both Pillars. The combined effect does not include interaction effects of both Pillars. The results in the Figure reflect the average effects across all MNEs. The number of jurisdictions is restricted to those available in the OECD's Corporate Tax Statistics (OECD, 2020^[19]), with the exception of Estonia and Latvia where profits are only taxed upon distribution. Jurisdiction groups are based on the World Bank classification of countries by income group. Investment hubs are defined as jurisdictions with a total inward FDI position above 150% of GDP, based on raw FDI data.

Source: Hanappi and González Cabral (2020^[12]).

328. A range of further issues should be considered when interpreting these results in terms of their impacts on investment and global output. Although the quantitative analysis discussed above focuses on group level ETRs, some additional insights on entity level ETRs emerge as a corollary; in particular, both Pillars narrow the dispersion of entity and group level EATRs and EMTRs across jurisdictions. The reduced dispersion in tax rates reduces the tax gains from profit shifting, thus likely resulting in a corresponding reduction in the amount of shifted profits. As the marginal gain from profit shifting falls, corporate tax bases may become less elastic and, as a consequence, a given tax rate increase may be associated with lower costs in terms of tax base lost due to relocation – governments may thus be able to raise funds more efficiently.

329. In addition, a reduction in ETR differentials across jurisdictions is likely to improve the efficiency of the international allocation of capital (Englisch and Becker, 2019^[20]). Firms make investment decisions based on post-tax rather than pre-tax returns. If profits are taxed at source and foreign income is tax-exempt, as is increasingly the case,¹⁸ ETR differentials can be substantial, potentially inducing firms to choose locations where investments yield lower pre-tax, but higher post-tax returns. As entity level ETR differentials decrease due to the new tax rules, there is less scope for tax-induced distortions and global output¹⁹ could thus increase as capital allocation across jurisdictions becomes more efficient.²⁰

4.5.3. Tax Incidence

330. The tax incidence of the reform can impact economic agents and their investment behaviour and should thus be considered in the evaluation. As opposed to statutory incidence (i.e., the legal obligation to remit a tax), the economic incidence associated with a new corporate tax liability may be borne by shareholders or may be shifted onto other economic agents, e.g., workers or consumers, through price adjustments. The extent to which these different economic agents bear the incidence of the reform could affect the impact of cost increases on firms' investment, therefore having important implications for the assessment of the new rules in terms of efficiency.²¹ For example, if an increase in investment costs would fall mostly on workers or consumers, it could lead to a smaller reduction in firms' investment compared to the case where a larger share is borne by shareholders.

331. In general, the extent to which the economic incidence can be shifted onto others depends on a range of factors including supply and demand elasticities as well as market structure (Fullerton and Metcalf, 2002^[21]) (Auerbach, 2006^[22]). In the context of corporate taxation, it is typically assumed that in open economies (with competitive product markets), where capital is relatively mobile across jurisdictions while labour tends to be less mobile, firms will be able to shift a comparatively large share of the burden onto workers through wage decreases. However, only a few empirical papers directly investigate these theoretical insights and subsequent research has questioned the underlying assumptions, suggesting that, based on empirical estimates, shareholders bear a larger share of the economic incidence than previously assumed (see Gravelle (2013^[23]), Clausing (2012^[24]) (2013^[25]) and references therein).

332. While empirical research on tax incidence is not conclusive due to the scarcity of disaggregated firm-level data, recent studies suggest that price adjustments to tax changes often follow more complex patterns, specifically when standard theoretical assumptions are not fully satisfied. For example, if firms earn more than the normal return to capital, e.g., due to their dominant position in a given market, corporate tax would fall, at least in part, on economic rents; as a consequence, capital allocation would be less distorted and downward pressure on wages would be lower (Auerbach, 2006^[22]). Furthermore, Clausing (2013^[25]) argues that profit-shifting allows multinational firms to decouple the location where profits are reported from the location of economic activities, thus partially insulating workers in high-tax jurisdictions from adverse wage effects associated with a given corporate tax increase. In addition, recent studies based on disaggregated data suggest that firm-level heterogeneity and rent-sharing between workers and shareholders could have implications for tax incidence (Arulampalam et al. (2012^[26]); Serrato and Zirdar (2016^[27]); Fuest, Peichl and Siegloch (2018^[28])). Furthermore, the evidence discussed in Section 4.6 suggests that investment of entities in more profitable MNE groups is less sensitive to taxation, a result that could also be driven by the existence of economic rents at the MNE group level.

333. The literature on corporate tax incidence often assumes that product markets are competitive in which case it is impossible for firms to shift incidence onto consumers. Although this assumption may be warranted in more general settings, it is less likely to be the case in the context of highly-digitalised firms operating in markets characterised by winner-takes-all (or winner-takes-most) dynamics. In particular, the presence of multi-sided markets could have implications for tax incidence analysis, thereby potentially affecting investment decisions. Theoretical research suggests that in multisided markets optimal prices do not necessarily correspond to marginal costs (Rochet and Tirole (2003^[29]), (2006^[30])). If this is indeed the case, it is possible that tax changes induce an adjustment in the optimal price structure, for example, if the digital platform has some degree of market power and is sharing economic rents with different groups of end users. However, the academic literature on this particular topic is still limited and recent contributions suggest that there is a considerable degree of uncertainty with respect to tax incidence in multisided markets (Kind, Koethenbueger and Schjelderup (2008^[31]), (2010^[32]), Belleflamme and Toulemonde (2016^[33]), Kind and Koethenbueger (2017^[34]), Tremblay and Tremblay (2017^[35]), Bourreau, Caillaud and De Nijis (2018^[36]), Cui (2019^[37]), Bibler, Teltser and Tremblay (2019^[38])).

334. Compounding these considerations, the new rules are likely to elicit additional behavioural changes by MNEs and governments that could lead to further indirect effects on efficiency and global output relating, as discussed in the Section 4.7.

4.6. Tax sensitivity of MNE investment

335. While these results suggest that group level ETRs are expected, at the global average, to increase slightly, the impact of this increase on economic growth will depend on whether MNEs respond by adapting their investment behaviour. In particular, increases in group level ETRs could in turn affect the investment decisions of MNEs, with potential impacts on global investment and the location of investment across jurisdictions. Over the longer term, these changes in investment patterns could have impacts on global growth.

336. As discussed in the Section 4.4 by reducing after-tax returns on investment, higher corporate income tax can lead firms to forgo, downscale or relocate some investment projects. A corporate tax increase in one country, all else being equal, tends to result in lower MNE investment in that country (Sorbe and Johansson, 2017^[7]; Feld and Heckemeyer, 2011^[6]). However, the sensitivity of firm investment to corporate tax rates depends on the type of firm considered. Evidence from previous literature suggests that this sensitivity depends, for example, on characteristics such as investment financing structure and liquidity constraints (Zwick and Mahon, 2017^[39]), market structure, in particular firm market power (Kopp et al., 2019^[40]), and – more specifically for MNEs – tax planning possibilities (Sorbe and Johansson, 2017^[7]).

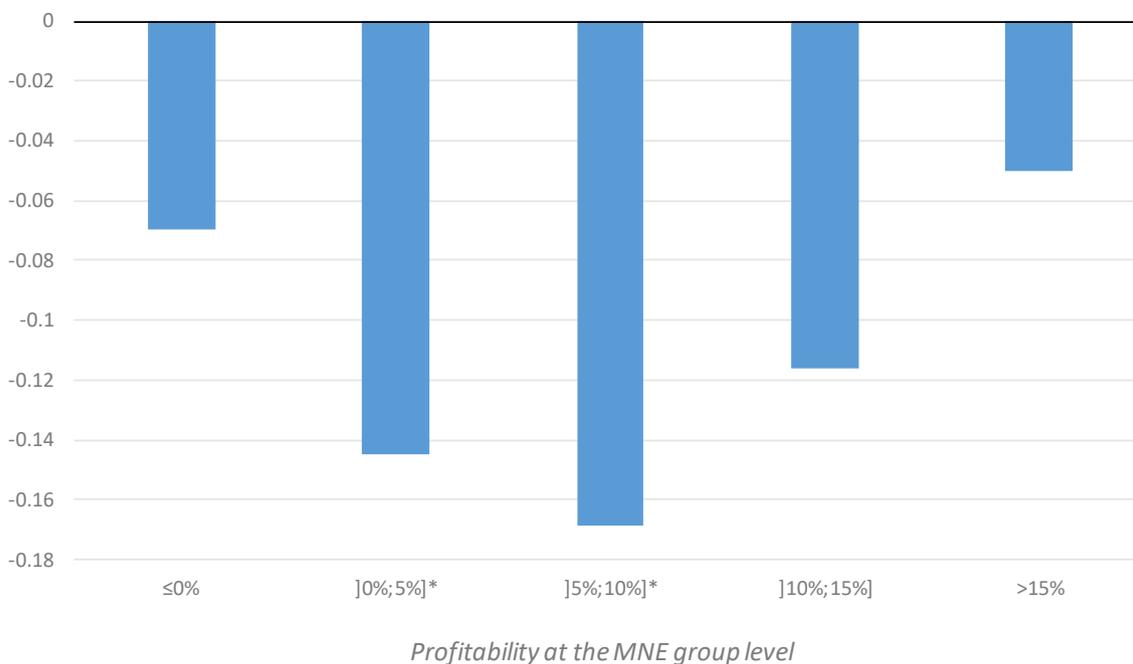
337. Recent literature has documented the rise of ‘superstar firms’, i.e., highly productive and innovative firms, which often rely intensively on intangible assets. These firms typically operate globally and increasingly dominate certain product markets, especially in digitalised industries and industries characterised by winner-takes-all or winner-takes-most dynamics (Calligaris, Criscuolo and Marcolin, 2018^[2]; Bajgar et al., 2019^[41]; Gutiérrez and Philippon, 2019^[42]; Autor et al., 2017^[43]). In the context of the international tax proposals currently under discussion, these patterns could be of particular importance, given the scope of the reform proposals.

338. In particular, entities in more profitable MNE groups could react differently to taxation from entities in less profitable groups for several reasons. First, more profitable groups are likely to have higher financial resources (e.g. available liquidities) than less profitable groups, which makes them less credit constrained and thus less sensitive to a potential increase in taxation. Second, their high profitability rates may be related to monopolistic or oligopolistic positions, in which case incidence tends to fall on monopoly rents rather than on normal returns to capital (see Section 4.5.3), which may induce smaller behavioural responses in investment decisions (Kopp et al., 2019^[40]). Moreover, these monopolistic positions may have been acquired thanks to significant past investments (e.g. through the grant of patents, or under winner-takes-all or winner-takes-most dynamics), in which case MNE groups might be reluctant to reduce future investment as this would threaten their dominant position in the market. Finally, more profitable groups may have greater opportunities and incentives to engage in tax planning.²² For example, as these firms will often rely more on intangible assets, they have a greater opportunity to engage in tax planning activities through the strategic location of intangible assets. In addition, the fixed costs of tax planning may reduce the incentives for less profitable groups to engage in some profit shifting strategies.

339. For instance, recent evidence on US firms’ reactions to the Tax Cuts and Jobs Act suggests that superstar firms, which are generally characterised by very high mark-ups and profitability rates, are indeed likely to react differently from other firms to changes in corporate taxation (Kopp et al., 2019^[40]). Since these firms are also more likely than the average firm to be impacted by the international tax reforms currently under discussion, the variation in tax sensitivity between these firms and others could have substantial implications on the overall investment effects of the reform.

Figure 4.3. Tax Sensitivity of Investment by Profitability at the MNE Group Level

Change in the investment rate (ratio of investment to lagged capital stock), in percentage point, after a 1-percentage point increase in the EMTR; Profitability at the MNE group level measured by profit before tax over turnover



Note: Estimates based primarily on firm-level data from the ORBIS database, as well as ZEW ETR data. The estimated effects for profitability groups marked with a star (*) are statistically significantly different from zero at the 10% level, whereas the effects for other profitability groups are not.

Source: See Millot et al. (2020_[44]).

340. Under Pillar One, new tax liabilities would arise only above a certain defined profitability threshold, e.g., in relation to profit before tax over turnover. More profitable MNEs are also more likely to have shifted profits to low-tax jurisdictions; this implies, all else equal, that they will also likely be more affected by minimum effective taxation under Pillar Two. To study the potential impacts of the reform, additional empirical analysis has been conducted. In Millot et al. (2020_[44]), further insights on the effect of corporate taxes on MNE investment at the entity level have been produced, focussing on the variation in the tax sensitivity of investment across MNE groups, in particular, depending on the profitability rate of the group.

341. Relying on a firm-level econometric framework estimated on a panel of about 26,000 MNE entities located in 17 predominantly European countries over the period 2007-2016, the analysis confirms the earlier findings in the literature that MNE investment in a given jurisdiction responds negatively to increases in the jurisdiction level EMTR.²³

342. Going one step further, the results of the analysis suggest that the short-term²⁴ tax sensitivity of MNE investment is lower among entities belonging to groups that have a relatively high profitability. As shown in Figure 4.3, the tax sensitivity of entities in an MNE group with profitability above 15%, computed as profit-before-tax to turnover, would be considerably lower than that of an entity in a group with profitability between 0% and 10%. Specifically, it is estimated that entities in MNE groups with a profitability rate between 0% and 10% would on average reduce their domestic investment rate by around 0.15 percentage points following a one percentage point increase in the jurisdiction's EMTR. However, this effect is almost half as large for entities in MNE groups with profitability ratios above 10% and more than

three times smaller for entities in MNE groups with profitability rates above 15%. The difference between the estimated sensitivities for the different profitability groups is moreover statistically significant when controlling for all potential sources of unobserved heterogeneity through fixed effects at the firm and country-year level. Additional regression results suggest that this lower tax sensitivity among entities from high-profitability MNE groups can be related to the lower liquidity constraints likely faced by these groups.

343. Overall, these results suggest that entities in MNE groups that are more likely to be impacted by the new tax rules proposed under Pillars One and Two may be less sensitive to taxes in their investment behaviour than entities in an average MNE.

4.7. Indirect effects on MNE investment and economic output

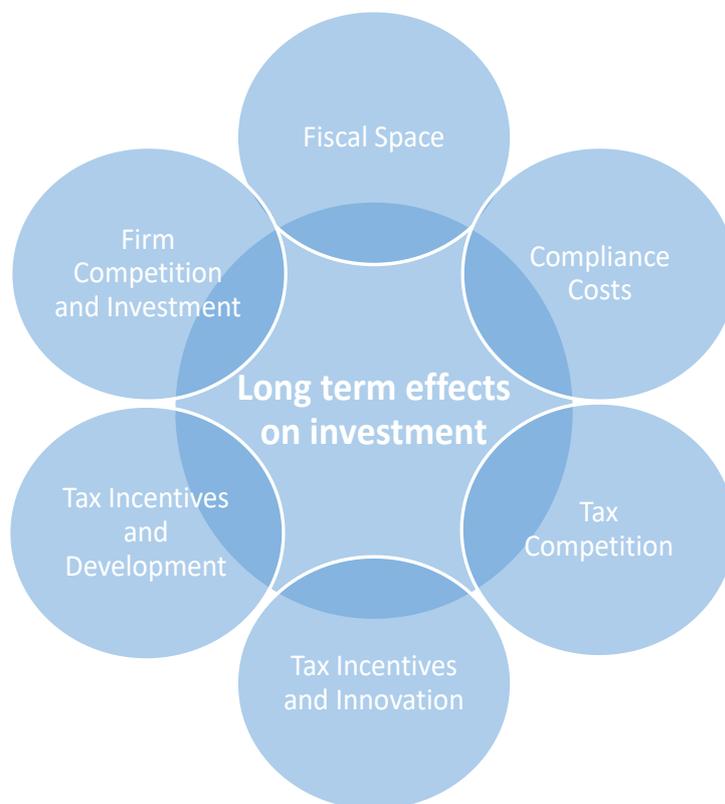
344. As discussed in the Sections 4.4 and 4.5, the new tax rules affect real investment directly through their impact on investment costs. However, the proposals include several novel elements that are likely to elicit behavioural responses by MNEs and governments. Amount A of Pillar One involves the creation of a new nexus and the reallocation to market jurisdictions²⁵ of a share of residual profit determined at the MNE group or segment level, based on a formulaic approach. Pillar Two seeks to address remaining BEPS challenges and ensure that large internationally operating businesses pay a minimum level of tax regardless of where they are headquartered or the jurisdictions they operate in. Without prejudging the final design and parameter choices, it is clear that the structural changes embedded in these new rules could have additional indirect effects on investment and economic output through various channels. To bring these indirect effects into the analysis this section builds on the economic literature, discussing relevant empirical and theoretical insights with a view towards the overall assessment presented in the Section 4.8.

345. Figure 4.4 illustrates the most relevant indirect effects. To start with, additional fiscal space generated by the tax revenues from Pillar One and Pillar Two could have positive indirect effects on investment. Since the analysis of investment costs in Section 4.5 focusses only on tax-induced cost increases, any other additional cost changes faced by taxpayers and governments also need to be accounted for in the overall assessment, notably compliance and administrative costs. On the business side, compliance costs are discussed in a separate subsection; on the government side, administrative costs are included in the broader discussion on fiscal space.

346. Adding to these effects, the introduction of novel elements is also expected to change the incentive structure underlying the international tax system, potentially affecting capital allocation across projects or locations and thus overall economic output. For example, strategic interactions in tax policy design can give rise to fiscal externalities when the government's tax policy choices in one jurisdiction affect the optimal response of other governments in terms of their tax policies. Introducing novel elements into the international tax system could alter the structure of these fiscal externalities, thus changing governments' optimal tax policy choices as well as firms' responses to a changing tax policy landscape. Indirect effects operating through such fiscal externalities are discussed in the subsection on international tax competition.

Figure 4.4. Overview: Indirect Effects on Investment and Economic Output

This figure illustrates the quantitatively most relevant indirect channels through which global investment could be affected by the new tax rules.



Source: OECD Secretariat.

347. In some policy areas the existence of market failures or positive externalities provides a policy rationale to support specific investment projects. Since public support is often delivered through the corporate tax system, the new rules, in particular minimum effective taxation under Pillar Two, could reduce the policy options available to governments possibly leading to under-investments in projects that would otherwise have received more public support. The two main policy areas where tax incentives are often rationalised based on this argument are innovation and economic development; both of these policy areas are discussed in separate subsections.

348. Finally, an increase in market power, e.g. measured as firm concentration within a given market or industry, can under some circumstances decrease the firms' incentives to innovate and invest. If the new rules contribute to a more level playing field between firms, a potential reduction in market power could have positive indirect effects on innovation and investment – an argument that is examined in a separate subsection.

4.7.1. Fiscal space

349. Having already accounted for the corresponding direct effects on investment in the Section 4.5, the overall assessment of the new rules also has to account for the expected increases in fiscal space. As discussed in the revenue analyses, the new tax rules are expected to directly increase tax revenues for most governments (see Chapter 2 and Chapter 3). While the optimal use of additional fiscal space depends on the country-specific context, an increase in tax revenues, having already accounted for the change in

investment costs, is likely to have positive effects on the economy, as it can be used, e.g., to support public or private investment or to reduce public debt levels.

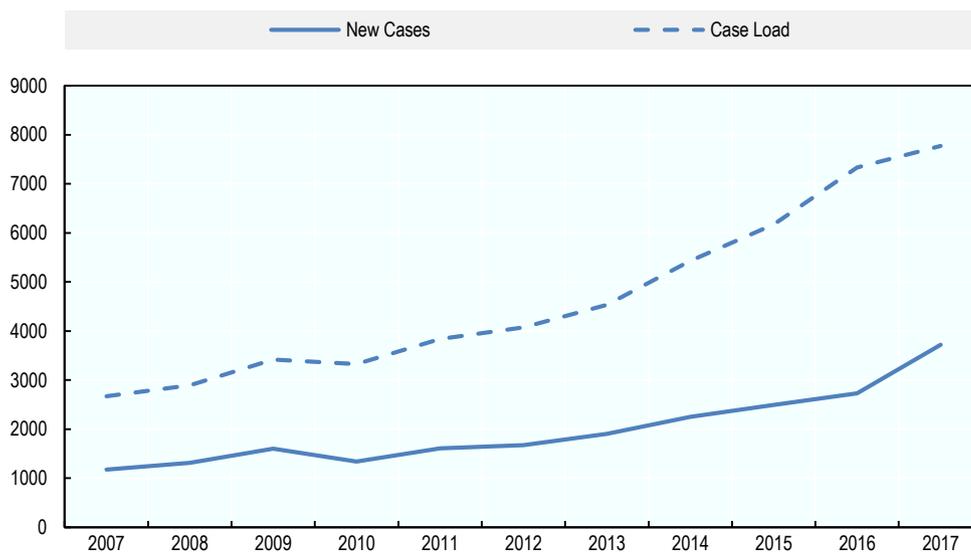
350. Furthermore, the reduction in ETR differentials noted in the Section 4.5 affects not only real investment, but it also reduces the potential gains from profit shifting. As a result, MNEs would be expected to engage in less tax evasion and corporate tax bases may become less elastic on average, e.g., if the sensitivity of profits to tax is increasing non-linearly with tax rate differentials. A given tax rate increase would, therefore, be associated with lower costs in terms of tax base lost due to relocation and governments may thus be able to raise funds more efficiently; e.g., tax administrations could raise the same revenue with lower tax enforcement levels. Through this channel, the new tax rules would thus reduce the marginal cost of public funds (Slemrod and Wilson, 2009^[45]), thereby further strengthening fiscal space across all jurisdictions.

351. The positive impacts of increased fiscal space are likely to be particularly important for developing countries. The marginal cost of public funds may be higher in developing countries due to capacity constraints in terms of tax enforcement and administration (Dabla-Norris et al., 2019^[46]; Keen et al., 2015^[47]). Insofar as compliance and administration functions related to Pillar One and Pillar Two are carried out by entities in ultimate parent jurisdictions, additional tax revenues could be raised at a lower cost per unit of public funds. Moreover, the need for domestic resource mobilisation to support public investments tends to be greater in developing countries, suggesting that public investments could yield stronger positive effects in those countries compared to developed countries where the return on additional public investment is likely to be lower (Besley and Persson, 2014^[48]).

4.7.2. Compliance and administration costs

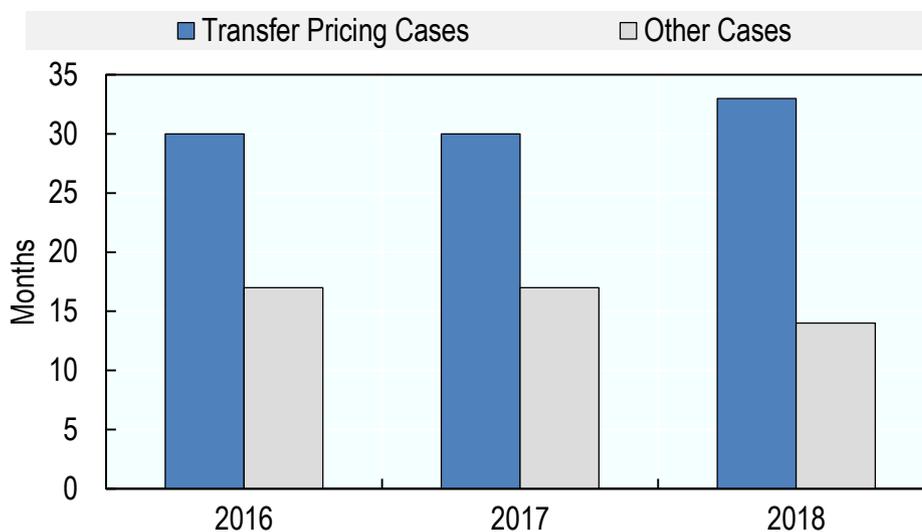
352. Introducing new tax provisions to implement Pillars One and Two will increase filing requirements, and compliance costs, for those MNEs that are within scope. As discussed in Chapter 2 and Chapter 3, the policy design includes several scope restrictions implying that only large and relatively profitable MNEs will be in scope. This means that increases in compliance costs will be borne mostly by those firms that currently have the lowest compliance costs measured as a proportion of turnover (see Box 4.2). In addition to this, some tax administrations may experience increases in administration costs as a result of implementing the new rules. Simplified administrative processes currently under discussion for various components of both Pillars would help to limit these costs.

Figure 4.5. Trends in Multilateral Agreement Procedure (MAP) cases for OECD Countries



Source: OECD calculations based on MAP Statistics at: <https://www.oecd.org/ctp/dispute/>
 To ensure a balanced panel, data are provided only for the following countries: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

Figure 4.6. Time to closure of cases under Multilateral Agreement Procedure



Source: OECD calculations based on MAP Statistics at: <https://www.oecd.org/ctp/dispute/>

353. Several indirect effects on firm behaviour could, at least partially, attenuate the expected increase in compliance costs. First, tax planning represents a larger proportion of the administrative costs of large MNEs relative to smaller firms (see Box 4.2). It is expected that the new rules will reduce the incentives for MNEs to engage in profit shifting. To the extent that firms reduce or abandon the use of complex tax

planning structures, in the medium term this could reduce compliance costs for firms and administration costs for tax authorities.

354. Second, there has been an expansion of Mutual Agreement Procedure (MAP) cases and an increasing volume of outstanding MAP cases in the international tax system (Figure 4.5). These cases are already creating significant compliance costs for MNEs. It is noteworthy that a large share of these MAP cases (51% in 2018) are transfer-pricing cases, which typically take much longer to close (Figure 4.6). While time-to-closure remains high for transfer pricing cases, it has recently been reduced for other, non transfer-pricing-related cases. Some of the transfer pricing cases refer to related party distributors, especially limited-risk distributors. By standardising the remuneration of related party distributors, Amount B of Pillar One would reduce the likelihood of these cases ending up in MAP.²⁶

355. Third, the reforms considered under Pillars One and Two are expected to include an expansion and improvement of dispute prevention procedures, suggesting that the additional compliance burden of implementing the proposals may be somewhat reduced. MNEs would need to allocate fewer resources to appeals, litigation and audits than would be the case in the absence of these additional procedures. These aspects, coupled with a potential reduction in MAP disputes due to simplifications under Amount B of Pillar One, may attenuate any increases in compliance costs for MNEs that result from the implementation of the new rules.

356. As the implementation of the proposals creates additional compliance costs for MNEs that are within scope, they may also lead to additional administration costs for tax authorities. As is the case for MNEs, a reduction in disputes due to expanded dispute prevention and resolution procedures may reduce administration costs. Simplification measures (such as Amount B) may also obviate transfer pricing disputes in certain areas. However, the overall level of administration costs may nonetheless rise as a result of the implementation of the proposals. Additional administration costs may be larger for those administrations that act as the lead tax administration as part of the proposed centralised and simplified administration system, and so may not be equal across jurisdictions.

Box 4.2. Compliance costs

Measuring compliance costs is challenging and subject to significant uncertainty. Most studies examining compliance costs rely on survey data with relatively small samples (Eichfelder and Vaillancourt, 2014^[49]). It is also difficult to generalise findings that relate to the subcomponents of compliance costs, which impact different firms in different ways and to different degrees. Much of the existing literature on compliance costs focuses on small and medium sized enterprises, with fewer studies (e.g. Slemrod and Venkatesh (2002^[50]) and Erard (1997^[51])) focusing on larger firms. There is evidence that compliance costs can vary significantly across firms, including by age, firm size, the number of members in a group, and firms' legal form (see Stamatopoulos, Hadjidema and Eleftheriou (2017^[52]) and Eichfelder and Vaillancourt (2014^[49]) for reviews).

In spite of these uncertainties, the literature suggests that compliance with taxes forms a substantial part of the overall compliance burden. Large companies are generally found to have greater total compliance costs than small firms in absolute terms. However, as a proportion of turnover, the literature suggests that compliance costs are greater for smaller firms than for larger firms (Eichfelder and Vaillancourt, 2014^[49]; Slemrod and Venkatesh, 2002^[50]; Ariff, Cheung and Chan, 1999^[53]). Higher proportionate burdens for small businesses are in part due to the fixed costs of compliance. Compliance costs are thus regressive due to these diseconomies of scale.

The overall tax compliance burden is also disaggregated in the literature. Studies suggest that major components of compliance costs are the costs of filing tax returns and the costs of record keeping (Lignier and Evans, 2012^[54]; Colmar Brunton, 2005^[55]). For many firms, a key burden in their overall financial compliance is the preparation of financial accounting information (Asatryan and Peichl, 2018^[56]; Eichfelder and Vaillancourt, 2014^[49]).

Tax planning itself is a key component of the compliance costs of large firms. The literature suggests that tax planning is a larger cost component of the compliance cost of large businesses relative to small businesses (Slemrod and Venkatesh, 2002^[50]), which may be a result of the fact that tax planning is more cost effective for large businesses.

Tax audits and tax appeals are also key drivers of compliance costs and tax complexity (Hoppe et al., 2019^[57]), which in turn can reduce investment (Hoppe et al., 2020^[58]). Concerns over the inconsistent approaches of different tax authorities towards the application of international tax standards have been expressed by businesses as key drivers of tax uncertainty (IMF-OECD, 2017^[59]).

The economic literature suggests that the costs of engaging in audit, appeal and litigation increase as a share of the total compliance burden with business size (Eichfelder and Vaillancourt, 2014^[49]). Slemrod and Blumenthal (1996^[60]) suggest that about one quarter of total compliance costs for large businesses can be allocated to appeals, litigation and audits – excluding any potential reputational costs. This could be driven by economies of scale in the compliance process, a higher probability of audit for large firms, and a higher willingness of large firms to take on legal disputes. Audits may be linked to increased tax planning by large multinational firms and the ability of governments to gain large amounts of tax revenue from these audits.

In addition to costs associated with business compliance, it is also important to consider cost increases from the perspective of tax administrations. While compliance can be a significant burden on businesses, complex taxes can also be more difficult and costly to administer for tax administrations. There is evidence that corporate taxes are among the most complex taxes for tax administrations to administer, and that audits and investigations are a significant burden on tax administrations (Díaz de Sarralde Miguez, 2018^[61]). Developing countries may suffer more from the burden of administering complex taxes (Dabla-Norris et al., 2019^[46]; Keen et al., 2015^[47]), and are less able to bear the costs of complex tax enforcement. Nonetheless, investments in tax administrations often yield benefits well in excess of their costs (Chatib Basri et al., 2019^[62]), especially in low-capacity contexts. Implementation of simplified tax regimes may reduce costs for tax administrations.

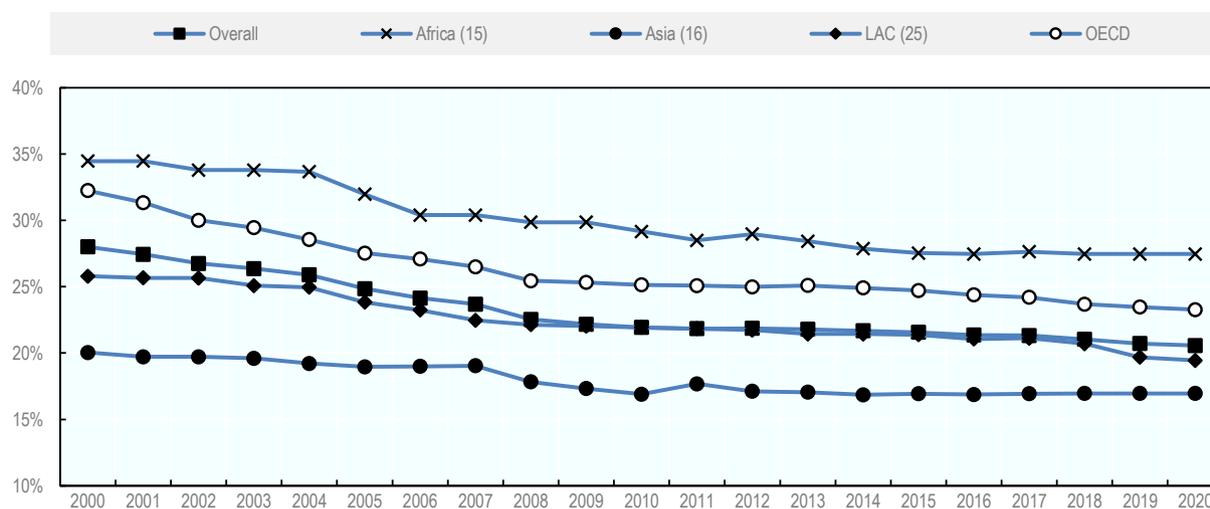
4.7.3. International tax competition

357. Empirical evidence generally supports the view that jurisdictions use their CIT system, including statutory rates as well as the definition of corporate tax bases, to compete for MNE investment and the tax revenue it generates over time (see Box 4.3). First, statutory CIT rates have been declining since the mid-1980s, not only in OECD countries but also in many developing and emerging economies (Devereux et al., 2002^[63]) (Klemm and Van Parys, 2012^[64]). In particular, the unweighted average statutory CIT rate in OECD countries has declined from above 32% in 2000 to around 23% in 2020, and from around 28% to just below 21% in a sample covering more than 90 developing and developed countries over the same time horizon (see Figure 4.7 based on OECD Corporate Tax Statistics (2020^[19])). Second, available data on forward-looking effective average tax rates²⁷ (EATRs), capturing not only the statutory rates but also standard components of the corporate tax base, show a decline in the unweighted effective average tax rate from 29% to around 23% in a balanced panel of OECD and G20 countries over the period 1999 to 2017. An alternative data source covering mostly European countries shows a similar decline in the unweighted EATR from 24% to 20% over the years 2005 to 2018 (Figure 4.8).

358. In addition, empirical research has also identified strategic interactions in tax policy design across jurisdictions, implying that the policy choices of governments regarding tax rates and bases are affected by other governments' tax policy choices (see Annex 4.A). Interactions can arise in many different areas, going beyond statutory CIT rates and bases; for example, policy decisions on preferential regimes, CFC rules or double tax agreements can have implications for policy design in other jurisdictions. Ultimately, these strategic responses to tax competition produce negative fiscal externalities (or spillovers) that could drive corporate effective tax rates below their optimal level and lead to inefficiently high taxation of less mobile tax bases such as labour or consumption. In this case, unilateral (or uncoordinated) policy design is likely to produce a globally inefficient outcome, i.e., a reduction in global economic output compared to the case with multilateral (or coordinated) policy design (Gupta et al., 2014^[65]).

359. However, the theoretical literature reviewed in Annex 4.A also provides some arguments for the potentially efficiency-enhancing effects of tax competition. For example, competitive pressure could have positive efficiency effects if capital becomes partially immobile once the location decision has been taken and governments cannot credibly commit to keeping effective tax rates stable in the absence of tax competition. Alternatively, positive efficiency effects could also materialise if competitive pressure limits public sector growth that is driven by rent-seeking or self-interested behaviour by political leaders and government officials.

Figure 4.7. Combined statutory CIT rates 2000 to 2020, by Region (unweighted)



Note: The data series represent unweighted average combined CIT rates across all countries covered in the second edition of OECD Corporate Tax Statistics; zero-tax jurisdictions are included; in the case of progressive tax systems the highest applicable rate is used.

Source: OECD Corporate Tax Statistics (2020^[19]).

360. The new tax rules introduced under Pillar One and Pillar Two will affect the strategic interactions in tax policy design across jurisdictions, potentially reducing the extent to which governments engage in tax competition. Under Pillar One, the share of the corporate tax base within the scope of Amount A is determined by reference to profitability at the MNE group level; a fraction of this share is then allocated to market jurisdictions²⁸ and taxed there at prevailing rates. This approach is likely to reduce competitive pressure on governments through two different channels. First, consumers and users can generally be considered as relatively immobile; the allocation of a share of the corporate tax base to market jurisdictions thus directly reduces the tax base that can be attracted through lower effective taxation. Second, assessing corporate tax bases at the MNE group level, rather than on a separate basis for each of the entities of the

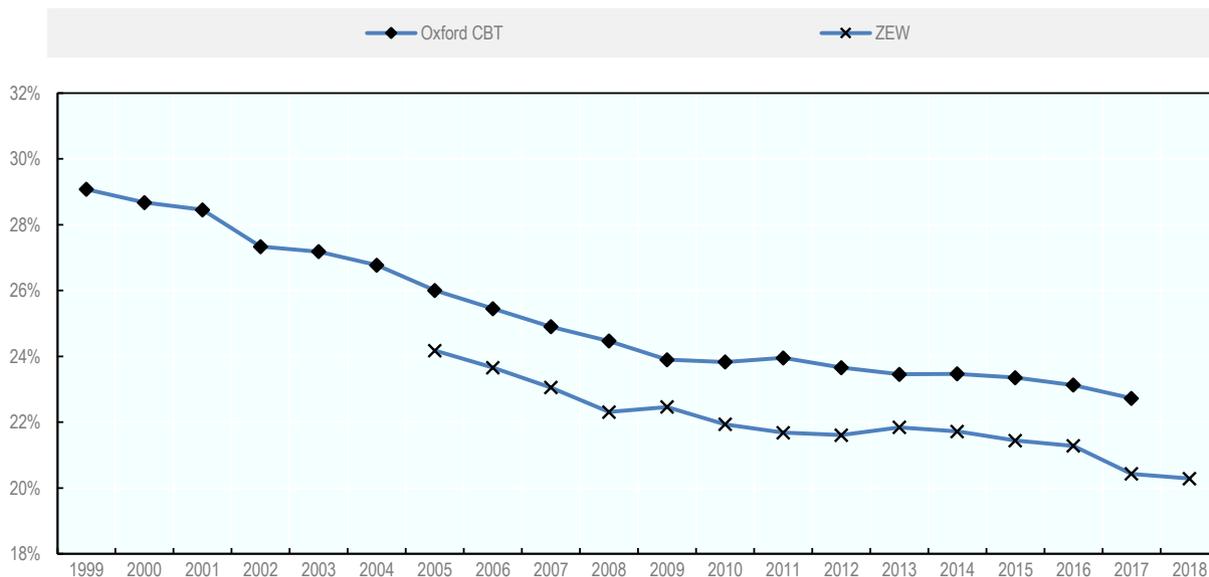
MNE group, is likely to reduce the sensitivity of MNE investment with respect to tax rates in specific locations. As the amount of investment that can be attracted through a given reduction in the effective tax rate will be lower, governments will have some scope to retain higher levels (or resist pressure to implement lower levels) of effective taxation compared to the case without an MNE group-level assessment.

361. Under Pillar Two, minimum taxation is implemented by introducing four new rules (see Chapter 1), leading to significant implications for governments' optimal tax policy choices. The objective of the new provisions is to ensure that the effective tax rate on MNE profit that would otherwise be taxed below an agreed minimum rate is brought up to this minimum rate, which has to be decided by the Inclusive Framework. The income inclusion rule (IIR) will allow jurisdictions where ultimate parent entities are located to top-up taxes on low-taxed profits earned by subsidiaries in other jurisdictions such that effective tax rates are brought up to a given minimum rate. In the absence of complementary rules, MNEs could have incentives to invert, i.e., to change their residence for tax purposes, in order to avoid minimum taxation if some jurisdictions do not adopt the IIR (see Annex 4.C). To avoid creating such an incentive, the undertaxed payments rule (UTPR) would allocate top-up tax proportionately among entities applying UTPR in a co-ordinated way first to those entities making direct payments to the low-tax MNE entity and then amongst all entities in the group that have net intra-group expenditure (Englisch and Becker, 2019^[20]). Furthermore, two additional components, the switch-over rule and the subject to tax rule, complement these rules, contributing to the objective of ensuring minimum effective taxation.

362. Pillar Two introduces a lower bound on the effective tax rates that governments can offer in order to attract foreign investment, thereby limiting the extent to which competition can take place through the corporate tax system. However, it is possible that competitive pressure persists and some governments respond by providing other forms of public support. In some cases (e.g., grants or subsidies), this support will be more transparent than if it was delivered through the tax system. In addition, the existence of a lower bound does not necessarily imply that effective tax rates will remain stable (or even increase) across all participating jurisdictions. As reviewed in Annex 4.A, some theoretical models²⁹ suggest that a reduction in the effective tax rate in jurisdictions with relatively high rates could, under certain assumptions, become more attractive with minimum effective taxation because it is common knowledge that low-tax jurisdictions cannot lower their rates below a certain minimum. However, it is unclear whether this theoretical result is empirically relevant, given that recent evidence at the German subnational level points in the opposite direction (Schwerin and Buettner, 2016^[66]).

Figure 4.8. Effective Average Tax Rates (EATRs), by Data Source (unweighted)

Time series data on EATRs is currently available from two different sources, the Oxford Centre for Business Taxation (CBT) and the Leibniz Centre for European Economic Research (ZEW); the unweighted averages shown in this graph are computed for balanced panels covering 38 and 35 countries respectively.



Note: The ZEW time series covers 35 mostly European countries over 2005 to 2018: Austria, Belgium, Bulgaria, Canada, Switzerland, Cyprus³⁰, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, UK, Greece, Croatia, Hungary, Ireland, Italy, Japan, Lithuania, Luxembourg, Latvia, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovak Republic, Turkey and the USA. The time series from the Oxford University Centre for Business Taxation covers 38 countries over 1999 to 2017: Argentina, Austria, Brazil, Belgium, Bulgaria, Canada, Switzerland, Chile, Germany, Denmark, Estonia, Spain, Finland, France, UK, Greece, Hungary, Indonesia, Ireland, Israel, India, Iceland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, Netherlands, Norway, New Zealand, Poland, Portugal, Russia, Sweden, Slovenia, Turkey, USA and South Africa.

Source: [ZEW](#) rates are based on the European Union (EU) Commission project TAXUD/2018/DE/307; [Oxford CBT](#) rates have been sourced from the website.

363. A different strand of the theoretical literature investigates the role of zero-tax jurisdictions specialised in attracting accounting profits that are shifted outwards from other jurisdictions. On the one hand, the existence of such jurisdictions increases the marginal cost of public funds faced by other jurisdictions, thus implying a net loss in global economic output (Slemrod and Wilson, 2009^[45]). On the other hand, it has also been argued that allowing for a certain amount of profits to be shifted outwards could be an efficient strategy in a context where governments compete for mobile and immobile tax bases but tax policy cannot discriminate between the two (Dharmapala, 2020^[67]).

364. Taken together, these theoretical and empirical insights suggest that the new rules will not put an end to tax competition, but they are likely to dampen the downward pressure on effective tax rates across many jurisdictions, mostly due to the reduction in ETR differentials. While the provisions envisaged under Pillar One clearly reduce negative fiscal externalities, scope restrictions will limit the overall impacts of these changes in the incentive structure at the global level. Minimum effective taxation under Pillar Two introduces a lower bound to tax competition; however, the resulting changes in the incentive structure are complex and optimal policy responses will depend on a range of other factors such as the size and structure of the economy, regional interactions or the general tax structure.

Box 4.3. Empirical evidence on tax competition

The secular downward trend in statutory CIT rates provides initial empirical evidence of international tax competition, understood as the interdependent setting of corporate income tax rates and tax bases by national governments (Devereux and Loretz, 2013^[68]). Early theoretical contributions, notably Zodrow and Mieskowski (1986^[69]) and Wilson (1986^[70]), suggest that statutory CIT rates are, under certain conditions, strategic complements in the sense that a decrease in one country induces decreases in other countries (and vice versa), potentially leading to inefficiently low CIT rates and an under-provision of public goods due to a lack of fiscal space.

Empirical research has often started from the assumption that economic integration increases over time, raising competitive pressures on CIT rates (see Devereux and Loretz (2013^[68]) for a review of various empirical strategies). Recent empirical contributions typically aim at identifying the slope of the government reaction function directly, following Devereux, Lockwood and Redoano (2008^[71]). Although Chirinko and Wilson (2017^[72]) suggest that reaction functions of US state governments may be downward sloping, the vast majority of empirical studies confirm that government reaction functions are positively sloped, i.e., that there is strategic complementarity between CIT rates across countries (Leibrecht and Hochgatterer (2012^[73]); Davies and Voget (2011^[74]); Costa-Font, De-Albuquerque and Doucouliagos (2014^[75]); Redoano (2014^[76])). The most recent study, Lee (2020^[77]), investigates tax competition on CIT rates in 67 countries between 1981 and 2015, again confirming upward sloping reaction functions.

While most of the empirical literature on tax competition assumes that governments respond simultaneously to other governments' rate setting choices, it has been recognised that tax competition could also be sequential (Gordon (1992^[78]); Keen and Konrad (2013^[79])). In particular, larger countries, such as the United States, could lead by first setting their own rate, while other countries follow by choosing their rate depending on the leader's choice. In such a model (i.e., applying the Stackelberg equilibrium concept), countries would choose higher tax rates than in the standard model with simultaneous choices (i.e., applying the Nash equilibrium concept). Altshuler and Goodspeed (2015^[80]) are the first to provide an empirical test for the sequential model, providing evidence for positive reaction functions and finding that the United States has acted as a leader in CIT rate setting using data from 1968 to 2008; the results reject leadership roles for Germany or the United Kingdom over the same time horizon.

While the sequential model allows for the possibility that a minimum tax could induce leader and follower countries to choose lower CIT rates (Konrad (2009^[81]); Kiss (2012^[82])), empirical evidence at the German subnational level seems to contradict this finding (Schwerin and Buettner, 2016^[66]). Specifically, Schwerin and Buettner (2016^[66]) exploit a recent business tax reform in the German Federation that introduced a minimum tax with the aim of reducing tax competition among subnational governments; quasi-experimental evidence suggests that subnational municipalities competing with lower-tax subnational regions responded to the reform by increasing their business tax rates.

4.7.4. Tax incentives to support innovation

365. Innovation is a key driver of productivity, investment and growth at the firm level as well as for entire economies. However, due to the intrinsic nature of innovation, there are reasons to believe that individual entrepreneurs and businesses are likely to generate less innovation than would be socially optimal, in the absence of government intervention (see Box 4.4).

366. To support innovation and innovation activities³¹ such as research and development (R&D), governments have a wide array of policies at their disposal. Targeted policies can take the form of direct support via grants or public procurement of R&D services, or indirect support via the tax system, i.e., R&D tax incentives. While governments often opt for a mix of direct and indirect measures, the use of indirect

support instruments has generally increased across the OECD in recent years. In some cases, governments combine tax incentives that provide preferential treatment to the inputs to innovation, e.g., R&D expenditure such as the wage of researchers; with tax incentives providing preferential treatment to the output of innovation, e.g., the income from a patent (Appelt, Galindo-Rueda and González Cabral, 2019^[83]) (see Box 4.4). However, despite the increased use of tax incentives in policy, evidence on their effectiveness is mixed, appearing more positive for input-based incentives than for output-based incentives (see Annex 4.Bs).³² Moreover, providing preferential treatment to the income from a highly mobile asset has been found to lead to the strategic location of IP assets, a key profit shifting channel identified in the literature (Beer, de Mooij and Liu, 2020^[18]).

Box 4.4. Government support for business R&D and innovation

Several reasons are often referred to in the literature to support the proposition that, in the absence of government intervention, markets will generate less innovation than would be optimal. First, knowledge is in principle non-rival. Innovation activities generate unpriced spillovers to other agents in the economy, preventing the full appropriability of the returns to innovation (Romer, 1990^[84]; Aghion and Howitt, 1992^[85]). Second, the risky and uncertain nature of innovation that cannot be fully insured against or diversified away may also lead to an under-allocation of resources to innovative activities (Arrow, 1962^[86]). Third, as a result of the latter, the cost of financing of these investments will be higher compared to alternative investment opportunities that do not pose the same level of risk and uncertainty, which particularly affects financially constrained firms. This issue is of particular concern for young firms and SMEs that lack both the collateral and the track record to obtain external funding (Hall and Lerner, 2010^[87]). Fourth, underinvestment might be frequent in research areas of public interest that are non-rival and non-excludable, e.g., public goods such as climate change or health (Hall, 2019^[88]).

Governments can offer direct support for business R&D and innovation via grants or public procurement of R&D services; or indirect support via the tax system in the form of tax incentives. These two instruments are, however, different in nature. Direct funding is discretionary, and allows governments to fund specific areas of research with high spillovers. It is often targeted towards basic research, encouraging radical rather than incremental innovation (Akcigit, Hanley and Serrano-Velarde, 2013^[89]).

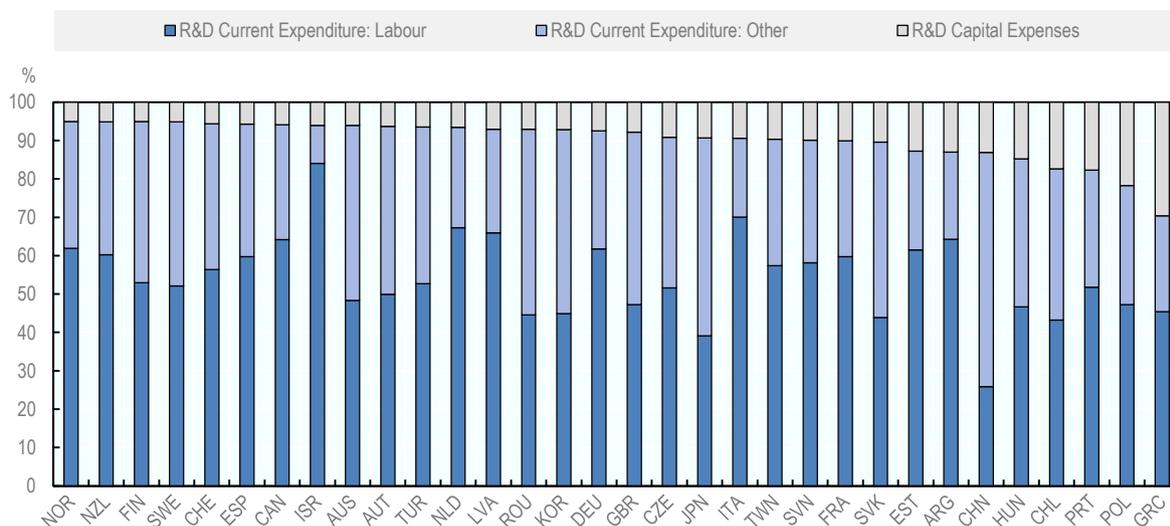
Tax incentives are typically a non-discretionary, market-based, policy instrument; they do not discriminate across firms or activities, all firms that qualify for the incentive will be able to benefit from the tax break, making such support easier to administer than direct support measures. Therefore, tax incentives are well suited to promote R&D and innovation across industries and firm types. However, they may not be as well-suited as a targeted measure to stimulate areas of potential underinvestment where higher social returns could be expected. In addition, concerns are sometimes raised over the ability of tax administrations to distinguish claims that pertain to R&D vs. non-R&D related activities, i.e., relabelling of non-R&D activities as R&D.

R&D tax incentives may provide enhanced relief to the inputs to innovation, i.e., to R&D expenditure such as the wage of R&D researchers, and/or to the output, i.e., to the income from R&D and other innovation activities such as income from a patent. Input-based R&D tax incentives have a more direct impact on the decision of the firm to engage and perform innovation activities, as relief is granted to the expenditure that is within the firm's control. Output-based tax incentives, as a relief on the outcome, are only granted in cases where the innovation has been successful, which depends on factors that may be beyond the firm's control. The latter might induce firms to seek patent protection for innovations that would not have been patented in the absence of the policy, i.e., so-called zombie patents; or to other unintended behaviours such as patent trolling (Appelt et al., 2016^[90]; Klemens, 2016^[91]; Gaessler, Hall and Harhoff, 2018^[92]).

367. Notwithstanding the impact that the broader tax environment has on innovation, a key change that the new rules under Pillars One and Two introduce is the potential limitation of the use of targeted measures such as expenditure- or income-based tax incentives to foster innovation. In particular, minimum effective taxation, as proposed under Pillar Two, will limit the potential tax benefits that governments can provide through these instruments. The extent of the tax benefits offered will depend both on the design of the incentive and the general characteristics of the tax system (see Annex 4.B). Therefore, this potential reduction in generosity will only come to bear in situations where tax incentives drive effective taxation at the jurisdiction³³ level, i.e., taking into account taxation on other non-qualifying income, below the minimum threshold. In cases where the minimum threshold limits the benefits of tax incentives under Pillar Two, only a subset of large MNEs would be affected while domestic and potentially also smaller multinational firms would still be able to benefit from tax incentives as before. As the final design parameters under Pillar Two are still under discussion, the introduction of carve-outs would also reduce the number of firms affected and limit the reduction in tax benefits from Pillar Two to an even smaller number of cases.

368. The provisions envisaged under Pillar One will have much less direct effect on the use of tax incentives to support innovation. Both types of tax incentives, expenditure- and income-based, decrease the effective taxation of innovative projects, thus increasing their profitability. To the extent that the reallocation of a percentage of residual profits under Pillar One leads to an increase in the tax rates applicable to the income derived from innovative projects, the new rules could lessen the reduction in effective taxation intended by tax incentives. This effect would be more likely in the case of income-based incentives.³⁴ However, given the size of the reallocation percentage currently under discussion, the generosity and effectiveness of expenditure- and income-based tax incentives are unlikely to be significantly altered by this potential interaction with a reallocation of tax bases under Pillar One. Overall, only a relatively narrow subset of large and highly profitable MNE groups will be subject to these effects as determined by the scope of Pillar One.

Figure 4.9. Business R&D expenditures, by type of expenditure

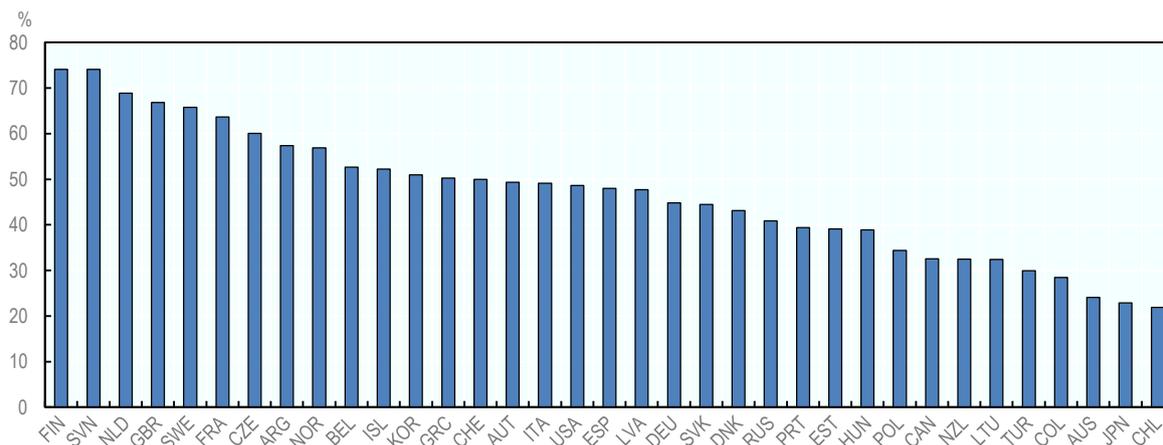


Note: The definitions used in the graph are based on the Frascati Manual. Current expenditures are composed of labour costs of R&D personnel and other current costs used in R&D. Other current expenditures are defined in the Frascati Manual 4.23 as those non-capital purchases of materials, supplies, equipment and services to support R&D, including external R&D personnel. Country coverage for this indicator is limited to those available in the OECD R&D Statistics. The underlying data refers to the latest year available, mostly to the year 2017. The data in the graph refers to 2018 for Chinese Taipei, Japan and Korea, 2016 for Argentina, Chile, Estonia, Latvia, Poland and United Kingdom; to 2013 France and New Zealand; to 2011 for China; and to 2009 for the Netherlands.

Source: OECD, R&D Statistics, September 2020.

369. The set of available innovation policies is broad enough to enable governments to respond flexibly and adapt their policy mix to these structural changes in the international tax environment if there is a concern about the level of innovation in their economies.³⁵ After all, incentives through the tax system are only one instrument in the policy toolbox of governments. For example, direct support measures could still be employed.³⁶ However, even within the tax system, tax incentives delivered through the CIT are not the only instruments available to governments to support innovation. First, expenditure-based tax incentives that provide relief to payroll taxes or social security contributions will, in principle, be unaffected, as they do not depend on corporate income taxes. These types of incentives provide an immediate subsidy to labour costs, a key component for R&D making up around 60% in R&D statistics, as shown in Figure 4.9.

Figure 4.10. R&D active innovative firms as a percentage of innovation-active firms, 2016



Note: The indicator refers to product or process innovative firms. Data covers OECD and partner economies. Data on Israel, Mexico, Ireland and Luxembourg are not available. The statistics for Colombia and Argentina refer to the manufacturing sector.

Source: OECD, based on the 2019 OECD survey of national innovation statistics and the Eurostat's Community Innovation Survey (CIS-2016), <http://oe.cd/inno-stats>, January 2020. Data and notes available here: <https://www.oecd.org/sti/inno/innovation-indicators-2019.zip>

370. Second, there are other tax instruments beyond targeted R&D tax incentives that can be used to promote innovation activities. In fact, the type of innovation activities firms conduct varies by country, across industries and firm types (Castellacci, 2008^[93]; Galindo-Rueda and Verger, 2016^[94]; Galindo-Rueda, Verger and Ouellet, 2020^[95]), and thus the optimal policy mix. Among innovation-active firms, the share engaging in R&D averages 47% for OECD countries for which data is available, with great variability across jurisdictions, see Figure 4.10.³⁷ This only highlights the role of innovation activities beyond R&D. The acquisition of capital assets and knowledge typically represent a significant share of total innovation expenditures, reaching around 50% of innovation expenditures among EU jurisdictions for which this breakdown is available, with significant variation across jurisdictions (Eurostat, 2020^[96]). Accelerated depreciation schemes that seek to reduce the cost of acquiring new equipment, such as hardware or software, and that appear to be effective tools in promoting investment (Ohrn, 2019^[97]; Zwick and Mahon, 2017^[39]) could be considered as part of the policy-mix.³⁸

371. Taxation is ultimately one among many factors affecting innovation decisions. Well-functioning product, labour and capital markets, with regulations that do not overly penalise failure may all act to increase the returns to innovation (Andrews, Criscuolo and Menon, 2014^[98]). A skilled workforce, an intensive innovative environment, stable macroeconomic and regulatory conditions, competition and openness to trade and policies that help surmount innovation barriers (e.g., regulatory barriers to competition or insufficient human capital) are all key elements in the development of a sound innovation

environment (Bloom, Van Reenen and Williams, 2019^[99]; OECD, 2015^[100]; OECD, 2010^[101]). Notwithstanding the limitations that the Pillar One and Pillar Two reforms will impose upon the use of CIT-related tax incentives, governments will continue to be able to draw upon a wider range of instruments to rebalance the innovation policy-mix to mitigate any impact on the support that firms affected by the new rules are receiving, if deemed necessary.

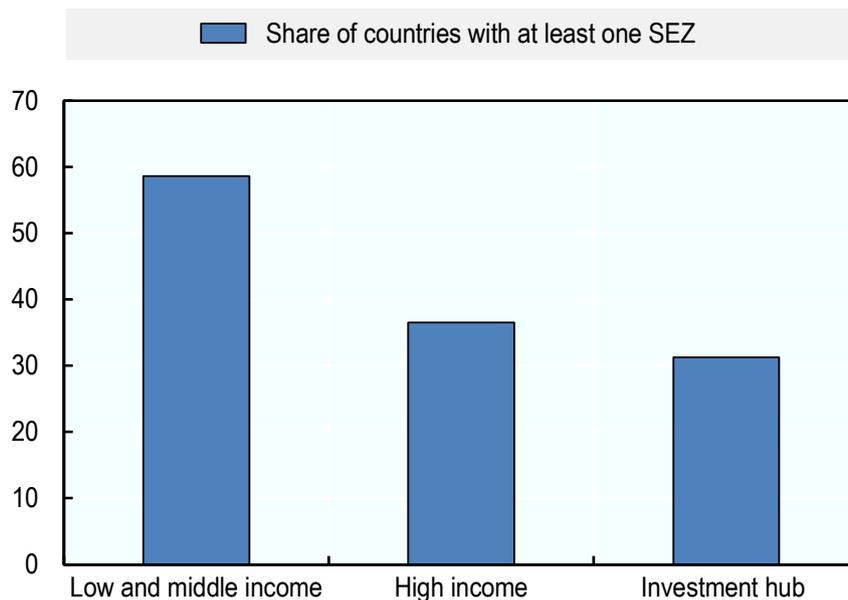
372. Although the new rules, especially minimum effective taxation under Pillar Two, could limit the generosity of some tax incentives for R&D and innovation under specific conditions, they will also curtail the potential tax gains from profit shifting through the strategic location of IP assets. This will dampen the incentives for governments to engage in tax competition over mobile tax bases. To the extent to which the location of R&D and innovation-related activities was previously driven by tax considerations, rather than other commercial considerations, the new rules would, therefore, be expected to support an efficiency-increasing relocation of these activities. This effect further strengthens and reinforces the impacts of the reduction in ETR differentials on the efficiency of the international allocation of capital, as discussed in Section 4.4. Taken together, these changes in the incentive structure faced by MNEs and governments are thus likely to lead to a more efficient location of innovation activities, and investments more generally, which would be more strongly affected by non-tax considerations related to wider business and economic conditions.

4.7.5. Tax incentives to support economic development

373. Foreign Direct Investment (FDI) can play an important role in promoting economic development due to its potential to generate positive external effects in the local economy, e.g., through a spillover in knowledge and expertise to local workers and businesses. Governments use investment tax incentives to influence the size as well as the sectoral or regional location of FDI, with the aim³⁹ of, e.g., creating jobs and boosting exports in their jurisdiction (see Box 4.5).⁴⁰

374. Jurisdictions differ with respect to their general tax structures and the type of incentives used. Low income jurisdictions (or developing countries), in particular, collect much less tax revenue as a share of GDP compared to higher income jurisdictions, an empirical finding that is often related to a lack of administrative capacity (Besley and Persson, 2014^[48]). Given prevailing differences in public infrastructure, human capital and the general business environment, their comparative advantage are typically cost-related, e.g., larger labour cost differentials or lower corporate taxation (Vukšić, 2013^[102]). Against this background, high income jurisdictions tend to rely more on R&D-related tax incentives, which are typically narrower in scope and more reliant on administrative capacity, while low income jurisdictions often resort to more generous tax incentives such as, e.g., tax holidays or exemptions, which are broader in scope but require less capacity to administer (IMF-OECD-UN-World Bank, 2015^[103]). In some cases, tax incentives are combined with other measures, e.g., policies aimed at creating a favourable business and legal environment, in a Special Economic Zone (SEZ), an approach that is also more prevalent in low- and middle-income jurisdictions (Figure 4.11).

Figure 4.11. Special economic zones (SEZs) by income group



Source: UNCTAD (2019).

Note: Special economic zones does not include logistic hubs.

375. Under certain conditions the new tax rules proposed could serve to limit the ability of government to provide generous tax incentives, including investment tax incentives. In particular, tax provisions under Pillar Two are aimed at ensuring a minimum level of effective taxation. This implies that the maximum level of tax benefits that governments can provide to foreign investors will be limited because other jurisdictions (e.g., in the case of the application of the IIR, the ultimate parent jurisdiction) will be able to apply a top-up tax to the low-taxed profits in order to bring effective tax rates at the jurisdictional level up to the minimum rate. While the minimum tax rate could also become binding in the case of very generous credits and allowances, this effect will be most significant for the most generous tax incentives, such as corporate tax holidays and exemptions, which often reduce CIT liabilities to zero, either indefinitely or for a defined period. Tax provisions introduced under Pillar One are less likely to limit the tax benefits obtained through investment tax incentives since a potential reallocation of tax bases will be determined at the MNE group or segment level and entail the reallocation of only a share of residual profit. However, even after the implementation of Pillar One and Pillar Two, governments will still be able to use tax incentives as before to attract FDI as long as effective tax rates do not fall below the minimum rate at the jurisdictional level.

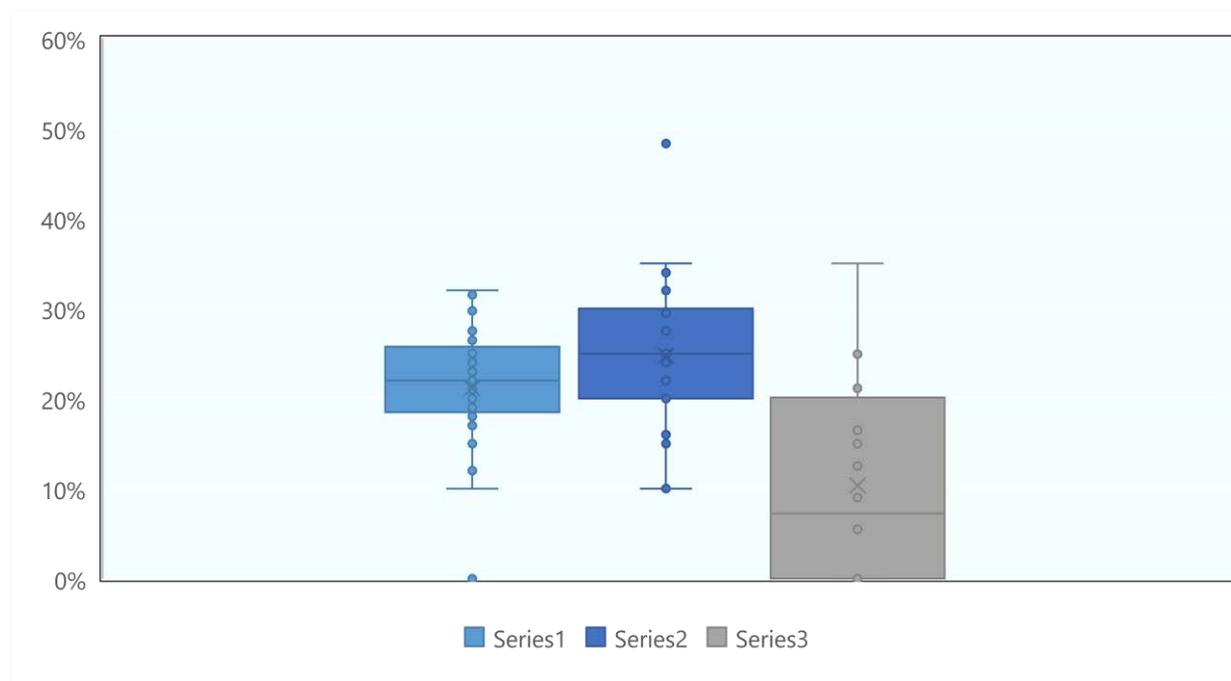
376. Although the potential limitation in the generosity of tax incentives could reduce the scope of policy instruments available to governments to attract foreign investment, it is unlikely to produce efficiency losses at the jurisdiction or global level. First, the effect of tax incentives on cost differentials across jurisdictions could be smaller than anticipated if tax competition induces an increasing number of jurisdictions to offer incentives, leading to a level effect without creating a comparative advantage for any particular jurisdiction. Second, tax incentives may induce distortions across different investments and may result in windfall gains for projects that would already have taken place in absence of the incentives. Third, competitive pressure is likely to be stronger in developing countries due to the resource requirements associated with the administration, auditing and evaluation of targeted regimes based on a narrower scope, thus further limiting potential resource mobilisation. Fourth, reductions in domestic resources available to governments in developing countries are unlikely to be compensated by increases at the global level if investment is merely

relocated to other jurisdictions with similar economic characteristics. There is therefore a risk that tax incentives fail to achieve the stated policy objectives at the jurisdictional level while at the same time leading to a globally inefficient allocation of capital.

377. In line with these arguments, the literature finds only limited evidence of the effectiveness of tax incentives in terms of attracting additional FDI. On the one hand, the existing literature typically does not investigate whether investment tax incentives obtained in a specific jurisdiction lead to an increase in global investment of a given MNE group, e.g., driven by a reduction in the effective tax rate at the group level. On the other hand, even at the jurisdiction level, there is only mixed evidence of their effectiveness in attracting foreign investment (Box 4.5 and Hajkova et al. (2006^[4])).

378. However, even if they succeed in attracting investment, tax incentives are not necessarily the most cost-efficient use of public funds dedicated to investment promotion. The net benefits of investment tax incentives, taking into account forgone tax revenue, are often not well understood, due to capacity constraints and/or lack of thorough evaluation. These constraints are of particular relevance for developing countries, where reliable information on revenue forgone is often not available. As tax revenues are a key source of finance to deliver often lacking public goods and services in developing countries, such as education and skills development, health and infrastructure, it is possible that alternative policies⁴¹ would deliver superior results in terms of investment, growth and sustainable development.

Figure 4.12. Distribution of statutory CIT rates by income group



Note: For each of the income groups, the boxplot shows the 25th percentile (lower edge of the box), the median (straight line in the box) and the 75th percentile (upper edge of the box); the mean is indicated by a cross and each circle corresponds to an observation.
Source: OECD Corporate Tax Statistics.

379. Irrespective of the cost-efficiency and effectiveness of tax incentives in general, developing countries will have substantial policy space to support foreign investment through their corporate tax systems, even after the introduction of the proposed rules. Figure 4.12 shows that, based on the most recent available data, statutory CIT rates are highest, on average, in lower and lower middle income countries; forward-looking effective average tax rates, taking into account standard components of corporate tax bases, also tend to be higher in developing countries (OECD, 2020^[15]). On average, in developing countries both types of rates are generally well above the minimum effective tax thresholds that are currently being debated (Figure 4.12). Developing countries therefore retain considerable policy

space for the use of tax incentives, even after the implementation of Pillar One and Two, especially compared to emerging or advanced economies. As with R&D tax incentives discussed above, governments will continue to be able to rely upon investment tax incentives to incentivise the location of FDI in their jurisdiction as long as the resulting effective tax rates do not fall below the minimum threshold. Given that in a number of developing countries current incentive regimes are very generous, e.g. relying mainly on tax holidays and exemptions, an adaptation of investment promotion strategies towards a cost-efficient use of tax incentives could thus be a key priority for developing countries aiming to promote economic development in the context of the evolving international tax system.

380. Taken together, the available evidence suggests that, in the absence of otherwise attractive economic conditions, the cost-efficiency and effectiveness of tax incentives is limited. Moreover, tax incentives could increase tax competition and undermine domestic revenue mobilisation efforts, especially in developing countries. Against this background, the introduction of the new tax rules under Pillar One and Pillar Two could strengthen the bargaining position of developing countries wanting to move away from certain, particularly costly, policy choices that deliver unclear net benefits. A reduced reliance on tax incentives would imply, in turn, that MNE location decisions are more affected by commercial considerations, instead of tax considerations, thereby potentially reinforcing positive effects on the efficiency of international capital allocation, as discussed in the context of R&D tax incentives and, more generally, in the Section 4.4.

Box 4.5. Investment tax incentives and sustainable development

Foreign direct investment (FDI) can play an important role in promoting development. FDI can serve as a conduit for the diffusion of technology and skills that can raise productivity, create jobs, boost exports, trigger innovation and, more generally, advance progress towards sustainable development (Javorcik, 2004^[104]; Farole and Winkler, 2014^[105]; OECD, 2019^[106]).

Tax incentives are widely used policy tools – in developed and developing countries – to attract investment and influence its size, location or industry. Low and middle-income countries – with on average, higher statutory CIT rates (Figure 4.12) – tend to offer higher tax reductions to attract investment (IMF-OECD-UN-World Bank, 2015^[103]). Competition among developing countries to attract investment has resulted in increasingly generous special tax regimes, as jurisdictions move to match or surpass tax incentives offered by other jurisdictions and bring ETRs faced by some firms to very low levels (Abbas and Klemm, 2013^[107]; World Bank, 2017^[108]; Wiedemann and Finke, 2015^[109]; World Bank, 2017^[108]).

However, developing and developed economies' tax incentives regimes typically differ in design, with the former relying more on tax holidays, exemptions and reduced rates, and the latter offering less generous allowances and credits often linked to specific R&D-related activities (James, 2013^[110]). These design differences have been found to play a significant role in determining the effectiveness of tax incentives in terms of achieving their intended policy objectives (IMF-OECD-UN-World Bank, 2015^[103]; OECD, 2015^[111]; Wells et al., 2001^[112]).

Empirical findings on the effectiveness of tax incentives in attracting FDI in developing countries is mixed, which, in part, may be due to the difficulty in disentangling the relevance of taxation within the broader policy mix and accurately capturing their net cost-benefit (Feld and Heckemeyer, 2011^[6]) (Redonda and Neubig, 2018^[113]). According to one study, lower statutory CIT rates and longer tax holidays are associated with additional FDI in Latin America and the Caribbean (LAC) countries, but not among African ones, indicating that additional factors may interact with how effective incentives are (Klemm and Van Parys, 2012^[64]). Although a positive correlation has also been found in studies, the boost to investment provided by tax incentives appears to occur at a low rate (Abbas and Klemm, 2013^[107]). FDI motivation may play a role in explaining the variation in findings across studies. For example, export-platform FDI of US MNEs was found to be more sensitive to host country taxation, particularly in developing countries (Mutti and Grubert, 2004^[114]; Azémar and Desbordes, 2010^[115]).

Competition may lead to only a limited relative change in the tax rate differential across jurisdictions, i.e., their competitive advantage in terms of investment costs. In Asia-Pacific, for example, special tax regime ETRs were found to result in a reduction of a similar magnitude across jurisdictions compared to their statutory rates - a parallel downward shift (Wiedemann and Finke, 2015^[109]). Li (2016^[116]) confirms this idea, finding evidence of a parallel downward shift of sub-central tax rates within countries due to regional competition.

International investors typically do not cite tax incentives among the most important factors to determine investment location decisions, relative to the infrastructure they offer, as well as the simplified regulatory framework that facilitates creating and running businesses (UNIDO, 2013^[117]; IMF-OECD, 2017^[118]; Canh et al., 2013^[119]). Soft and hard infrastructure were found to be highly correlated with the presence of a foreign investor, in particular export-oriented ones based on firm-level data from 77 developing countries (Kinda, 2010^[120]). Countries are likely to benefit most from tax incentives when combined with a strong investment climate, macroeconomic stability, market access and clear intellectual property rights (Thomsen, 2004^[121]).

Special economic zones (SEZs) – more common in low and middle-income countries (Figure 4.11) – often provide the most generous special tax regime within a country. SEZs offer a package of benefits to investors including tax incentives (98% of SEZs), special customs regimes (94%) and others (UNCTAD, 2019^[122]). SEZs can act as hubs to attract FDI and when linkages develop with the rest of economy, generate economic growth and positive spillovers on the broader economy (Wang, 2013^[123]; Chaurey, 2017^[124]). Despite their prevalence, econometric studies find limited evidence of tax incentives as the main determinant for investing in the zone (Hsu et al., 2019^[125]; Lin and Wang, 2014^[126]) or of their positive spillovers on the rest of the economy.

4.7.6. Firm competition and investment

381. Recent research suggests that structural economic changes related to digitalisation and globalisation have important effects on firm concentration and price-cost mark-ups at market and industry level. While the debate on these effects is not settled, evidence from the last several decades suggests that, in certain countries and industries, fewer firms account for a higher share of revenues, output and/or employment (see Box 4.6). In particular, several empirical studies suggest that these developments are mostly driven by the highly digitalised sectors of the economy, as network effects give rise to winner-takes-all (or winner-takes-most) dynamics allowing some firms to gain competitive advantages (Bauer and Latzer, 2016^[127]) (OECD, 2018^[128]) (OECD, 2019^[129]). To the extent that these findings are associated with a decrease in the intensity of competition among firms,⁴² they could imply a reduction in consumer welfare, as well as business investment, innovation and productivity growth (Gutiérrez and Philippon, 2017^[130]).

382. The Pillar One and Pillar Two proposals are not targeted to influence competition dynamics among firms, as this is primarily the focus of competition and regulatory policies rather than tax policy. Nevertheless, from a tax perspective, Pillar One and Pillar Two would contribute to a more even playing field among MNEs, and between MNEs and non-MNE firms. In turn, this could contribute to reducing, or at least slowing down the trend towards greater concentration and other potentially adverse effects associated with such concentration.

383. The impact of the proposals differs across firms due to the thresholds and scope restrictions embedded in the new provisions. The design of Pillar One is targeted towards MNEs based on their size, through the global revenue threshold, and their profitability, through the profitability threshold (see Pillar One Blueprint report (OECD, 2020^[131])) in addition, its application is potentially limited to businesses providing automated digitalised services (ADS) and consumer facing businesses (CFB). The new provisions under Pillar One, therefore, target the largest and most profitable MNEs - these are the firms that have been most strongly associated with the secular trends towards firm concentration and price-cost

mark-ups (Calligaris, Criscuolo and Marcolin (2018^[2]); Bailin Rivares et al. (2019^[131])). Under Pillar Two, no sector-specific scope restrictions are considered. However, the new provisions introduced to ensure minimum effective taxation will imply that those MNEs engaging in profit shifting to low-tax jurisdictions will experience larger increases in their tax liabilities under Pillar Two, in line with the policy intention to address remaining concerns about base erosion and profit shifting (BEPS). Since larger MNEs tend to engage more in tax planning and related tax savings could be used to crowd out other firms (Sorbe and Johansson, 2017^[132]), the expected reduction in profit shifting due to the new tax rules, and Pillar Two in particular, could further counteract the observed trends in concentration.

384. The impacts of Pillars One and Two reinforce each other, possibly contributing to a dampening of the trend towards greater concentration at market and industry level. As large and profitable MNEs, especially those who are engaging in profit shifting, will be affected the most, the new rules are expected to produce a more level playing field among MNEs, and vis-à-vis their smaller and domestic competitors, as well as those firms not engaging in profit shifting. If less concentrated markets and industries are indeed associated with more business investment and innovation, the reform could have additional positive effects on growth through this channel. However, tax policy is only one among many factors affecting concentration dynamics; its quantitative impact also depends on the wider competition and regulatory policy context.

Box 4.6. Firm competition and investment

An avenue through which the proposals could affect investment and growth is through their impacts on competition intensity and market power and, as a consequence, on investment. The proposals are likely to impact firms that are able to impose mark-ups by virtue of their strong market positions, and firms that have more opportunities to engage in tax planning. To the extent that the proposals reduce incentives and opportunities to engage in profit shifting, and raise effective tax rates on those firms earning higher mark-ups, they may level the playing field between different kinds of firms. As firms may have lower incentives to invest and innovate where they have a dominant market position, this more level playing field may in turn raise investment levels (Gutiérrez and Philippon, 2019^[42]).

There is an expanding literature pointing to increasing market concentration and declining competition intensity, although this topic is still the subject of extensive academic debate (see Syverson (2019^[133]) for a review). Furman and Orszag (2015^[134]) and Autor et al. (2017^[43]) (2020^[135]) point to evidence of increased concentration and declining competition intensity in the United States in particular. Bajgar et al. (2019^[41]), find that increased concentration is also present outside the United States. De Loecker, Eeckhout and Unger (2020^[136]) point to increased market power by examining both mark-ups and profitability, and find a reallocation of market share from firms with low mark-ups to those with high mark-ups.

Several recent empirical papers suggest that increases in market power are more pronounced in highly digitalised sectors of the economy. Network effects in the digital sector may mean that some firms are able to gain competitive advantages over other firms and discourage entry by smaller firms (Bauer and Latzer, 2016^[127]) (OECD, 2018^[128]) (OECD, 2019^[129]). For example, Bailin Rivares et al. (2019^[131]) find high levels of concentration among online platforms. Calligaris, Criscuolo and Marcolin (2018^[2]) point to evidence of higher mark-ups in digital-intensive sectors as evidence of reduced competition. Some papers in the literature have also related higher mark-ups to tax planning. Sorbe and Johansson (2017^[132]) find that tax-planning multinationals have higher mark-up rates than other firms, even after controlling for other factors influencing mark-ups. They note that the direction of causality is difficult to establish, since a high mark-up can be a factor encouraging a firm to engage in tax planning.

This expanding evidence of increased industry concentration, market power and higher mark-ups has been related by some authors to investment. Gutiérrez and Philippon (2019^[137]; 2017^[130]) attribute low investment levels to a variety of factors, significant among which is expansion of market concentration and a weakening of the competitive environment. They find that firm concentration and governance issues account for 75% of the investment gap in their analysis, and that those industries with higher degrees of concentration are characterised by lower levels of investment, even after controlling for current market conditions and the intangible intensity of the industry. They also find that firms driving the investment gap return a disproportionate amount of free cash flow to shareholders. Increased concentration patterns have also been found in Europe. However, other papers suggest that market power may be a result of increased investment in intangibles by some firms, which may be efficiency enhancing (Crouzet and Eberly, 2019^[138]).

Pillar Two focuses on firms with lower ETRs, which are likely to be firms engaging in aggressive tax planning and profit shifting. This suggests that the implementation of the proposals could help level the playing field between firms with better access to tax planning opportunities, and more specifically, those engaging in profit shifting compared to other firms. For the reasons set out above regarding the potential linkages between market concentration and investment levels, this may in turn have a positive impact on investment.

4.8. Impacts on investment and output with and without a multilateral consensus

385. Sections 4.3 to 4.7 have been devoted to a detailed discussion of the investment effects of the proposals, based on new empirical research as well as insights drawn from the economic literature. This section brings together the main results from these analyses to form an overall assessment of these proposals if they were to become a consensus-based solution. This consensus scenario also assumes the withdrawal of existing DSTs as well as a commitment to refrain from introducing such measures in the future. To conduct a meaningful evaluation of the consensus scenario, however, this assessment needs to compare this outcome with a plausible counterfactual. It would be incorrect to assume that this counterfactual looks like the status quo; instead, the consensus scenario should be evaluated against a scenario reflecting the projected state of the global economy in the event that a consensus-based solution to address the tax challenges arising from digitalisation cannot be secured through the multilateral process of the Inclusive Framework. Equally important, both sets of scenarios should acknowledge the fact that the baseline scenario, reflecting the situation before potential implementation of the reforms, has changed due to the COVID-19 pandemic. While Box 4.1 discusses how the pandemic and its economic implications affect the evaluation, the following two subsections provide a qualitative discussion of the consensus and no-consensus scenarios before developing quantitative estimates for both sets of scenarios by drawing on a range of additional modelling tools as well as results from the related literature.

4.8.1. Global economic implications if consensus is reached

386. Taking stock of the findings presented in Sections 4.3 to 4.7, several main insights emerge in relation to the expected investment effects at the group and entity level, as summarised in Figure 4.13. To begin with, it is worth highlighting that the proposals operate at the MNE group level, determining tax bases based on the global performance of the MNE group as a whole rather than on a separate entity basis. Depending on the final policy design, the inclusion of a number of scope restrictions would imply that the effects of Pillar One and Pillar Two on investment costs would be limited to a subset of MNEs. It is currently proposed that the scope of Pillar One is limited to MNE groups that perform ADS and CFB activities, and by a profitability threshold that targets the impact of the rules to more profitable MNEs, and by a revenue threshold that targets larger MNE groups. Pillar Two, on the other hand, is focussed on large MNEs

achieving low effective tax rates at the jurisdictional level. Particularly, where a formulaic substance-based carve-out is provided, it is likely that these rules will mainly affect firms engaging in profit shifting.

MNE responses at entity level

387. Additional tax liabilities at the MNE group level lead to higher tax payments by some affiliated entities, thereby increasing investment costs at the entity level within the affected MNE groups.⁴³ In the case of Pillar Two, MNE entities that would otherwise have realised ETRs below the minimum threshold could face an increase in investment costs. In line with the literature on the tax sensitivity of foreign and domestic investment, the empirical estimates suggest that affected MNEs will respond to potential cost increases by reducing or relocating some of their investments. As a consequence, the proposals could lead to investment relocation away from low-tax jurisdictions, however, relocation across jurisdictions does not necessitate a reduction in global investment if it is linked to an investment increase in another location.⁴⁴ As discussed in Section 4.4, relocation can increase the efficiency of capital allocation across jurisdictions, in situations where investment decisions were previously driven by tax considerations. A more cost-efficient use of tax incentives could reinforce positive effects on capital allocation. In addition, entities in more profitable MNE groups may be less sensitive to tax increases, suggesting that relocation of investments may be lower for entities in MNE groups affected by the reforms compared to entities in an average MNE group – as discussed in Section 4.6.

Government responses and other indirect effects on investment

388. As the discussion in Section 4.7 shows, potential indirect effects on investment are typically context-specific. Furthermore, indirect effects could interact, positively or negatively, with each other, thus either reinforcing or offsetting overall effects on investment at the jurisdiction level; the overall direction of these effects at the jurisdiction level therefore depends mostly on government responses to the evolving international tax system. For example, increased fiscal space could be used to increase support for business innovation or to expand tax administrations with the aim of lowering compliance costs; a more level playing field for domestic and multinational firms could be combined with additional support for young, innovative firms; lower competitive pressure on effective tax rates could facilitate the development of a different investment promotion strategy. A successful adaptation of domestic policies to the changing incentive structure could, therefore, lead to additional positive effects on global investment and economic output.

389. In particular, the analysis highlights several policy areas where the response of individual governments to the changes in the international tax system could have important effects on investment at the jurisdiction and, ultimately, the global level. To start with, investment costs would increase in jurisdictions where firms were subject to ETRs below the minimum threshold prior to the reform, either due to minimum effective taxation under Pillar Two or because low-tax jurisdictions increase their domestic ETRs. As a result, ETR differentials across jurisdictions would decrease, implying lower tax gains from relocation and thus higher relevance of non-tax factors for location decisions. In addition, lower profit shifting incentives would reduce the cost of public funds to the extent that tax administrations need to spend less on enforcement activities. Responding to this structural change, low-tax jurisdictions could decide to adapt their broader policy strategies to improve their attractiveness for foreign investment, over and above pure cost considerations. As discussed in Section 4.7, a similar response could be adopted by countries, including developing countries, where they have previously chosen to grant generous, and often inefficient, tax incentives to attract FDI, but can strengthen domestic resource mobilisation and open up more fiscal space for public investments.

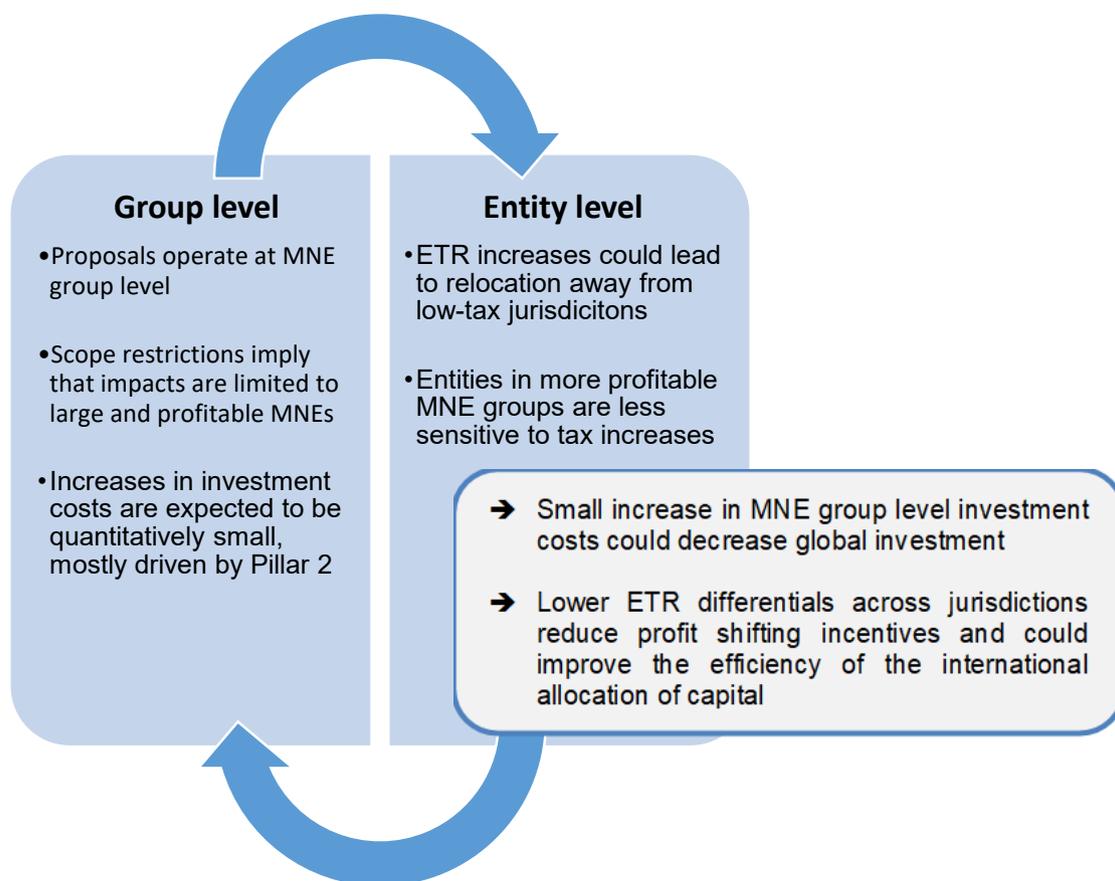
390. Moreover, specific consideration should be given to policy areas where investments yield positive externalities, as tax policies are often used to address concerns about underinvestment in such contexts. While spillover effects from FDI could also yield positive effects on local economies, the main policy area

where external effects are expected to be quantitatively relevant is innovation and, in particular, business R&D. Section 4.7 has presented in-depth discussions of various tax and non-tax policies aimed at supporting innovation and their effectiveness based on empirical evidence. This analysis suggests that, while policy strategies may need to be adapted in certain jurisdictions, e.g., to bring preferential regimes in line with recommendations of the OECD/G20 Base Erosion and Profit Shifting project or to shift public support from indirect to direct support measures, a wide array of policy instruments remain available to governments after the implementation of Pillar One and Pillar Two in order to achieve their intended policy objectives.

391. Although the changing incentive structure could thus induce behavioural reactions by MNEs and governments, leading to a more efficient allocation of capital across jurisdictions, and therefore, an increase in global economic output, as summarised in Table 4.2, it is beyond the scope of this overall assessment to quantify these effects. However, in the event that some positive efficiency effects are realised at the global level due to the implementation of Pillar One and Pillar Two, these effects could be expected to, at least partially, offset any negative effects associated with higher investment costs at the MNE group level.

Figure 4.13. Investment effects at MNE group and entity level

MNE responses at the group level and their impacts on global GDP

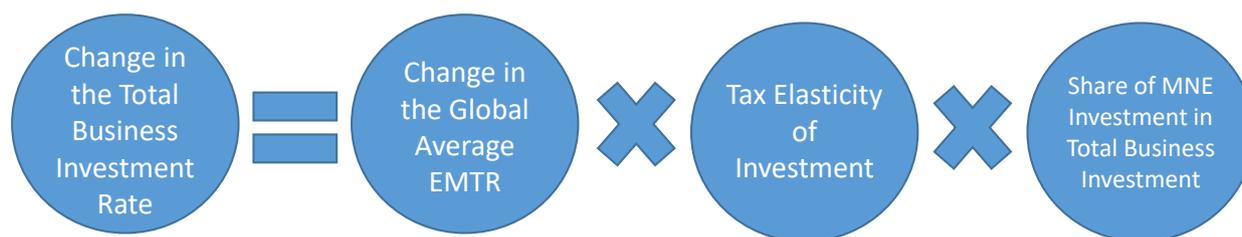


392. Turning to the analysis of investment costs at the MNE group level, the empirical results show that, on average, there are only small effects of Pillars One and Two on EATRs and EMTRs.⁴⁵ The global GDP-weighted average change in the EATRs is estimated to be just around 0.35 percentage points; the

corresponding change for the EMTR is around 1.40 percentage points, with Pillar Two driving most of this increase. Moreover, the effect on investment costs is larger for projects located in investment hubs, most of which have comparatively low effective tax rates. These results rely on the following illustrative assumptions on the design of Pillar One and Pillar Two. In Pillar One, only Amount A is modelled, assuming a 10% profitability threshold based on profit before tax over turnover, a 20% reallocation percentage to market jurisdictions and a scope restriction to ADS and CFB sectors. In modelling Pillar Two, a 12.5% rate with jurisdictional blending is assumed, including a 10% carve-out on depreciation expense (approximated using the value and location of tangible assets).

393. These results provide a starting point to explore the extent to which an eventual implementation of the Pillar One and Pillar Two proposal could lead to a reduction in the global level of MNE investment. In particular, a quantitative approximation of the overall impact on global output in the medium to long run (i.e. 10 years following implementation) can be derived by combining the empirical results from Sections 4.5 and 4.6 with additional assumptions and modelling techniques. To provide a quantitative approximation of the investment effects that is consistent with the OECD model for long-run projections,⁴⁶ an estimate of the change in the total business investment rate can be derived - this calculation is illustrated in Figure 4.14.

Figure 4.14. Estimating the change in the total business investment rate



Source: OECD illustration.

394. The calculations are based on the following aggregate figures.

- **Global average EMTR change.** Assuming a 10% profitability threshold based on profit before tax over turnover, a 20% reallocation percentage to market jurisdictions and a restriction to ADS and CFB for Amount A under Pillar One and a 12.5% rate with jurisdiction blending, including a 10% carve-out on depreciation expense (approximated using the value and location of tangible assets), for Pillar Two, the combined effect on the global GDP-weighted average EMTR,⁴⁷ measured at the MNE group level, is about 1.4 percentage points. The approximation uses the EMTR, rather than the EATR, to better align with the empirical literature on the tax sensitivity of investment.
- **Tax elasticity of investment.** The tax sensitivity of investment is based on the industry-level estimates developed by Sorbe and Johansson (2017^[7]), as their empirical approach is aligned with the estimates discussed in Section 4.6 while also allowing for a consistent approximation of the long-term effects on investment. Building on this approach, the short-term sensitivity, -0.05, is translated into a long-term sensitivity of -0.12, and adjusted downwards to -0.08 to account for the empirical finding that tax sensitivities are on average around 35% lower among MNE groups with profitability above 10%.⁴⁸
- **Share of MNE investment.** The empirical results from Sections 4.5 and 4.6 refer to investment costs and elasticities of MNEs; however, not all business investment comes from MNEs. Since the MNE share in global business investment is not directly observed in the data, it is approximated⁴⁹ based on the global average MNE share in gross value added (32%), including domestic and foreign MNEs, using data from the Analytical AMNE⁵⁰ database.

395. Bringing the aggregate figures together, as shown in Figure 4.14, suggests that increasing investment costs would lead to a decline in the total business investment rate of around 0.04 percentage points ($1.4 \cdot -0.08 \cdot 0.32 = -0.04$). Although this approximation accounts for lower tax sensitivities among the MNE groups targeted by the new rules, it corresponds to an upper bound, given that the tax sensitivity does not take into account that group level responses are likely to be smaller due to relocation of investment within the group. Further, this tentative approximation is subject to a number of caveats that have been highlighted in relation to the underlying empirical work discussed throughout this chapter (Millot et al. (2020_[44]), Hanappi and González Cabral (2020_[12])).

396. Once the change in the total business investment rate has been estimated, it can be used to approximate the GDP change, using a stylised framework consistent with the OECD model for long-run economic projections (see Box 4.7 for a brief description of the modelling approach). Based on this approach the change in the investment rate, -0.04, thus translates into a reduction in GDP of around 0.07% over a medium- to long-term horizon.

397. While the above calculation represents only a simple approximation of the likely effects on GDP, a sensitivity analysis can be conducted to understand how the quantitative result would change with respect to some of the underlying assumptions. Specifically, the same calculation can be done using the average tax sensitivity of investment, -0.12, without adjusting downwards to account for the lower tax sensitivity of highly profitable MNEs. In this case, the change in the investment rate is estimated to be -0.05 ($1.4 \cdot -0.12 \cdot 0.32 = -0.05$), leading to a slightly higher reduction in GDP, i.e., 0.11% over the same horizon. Alternatively, the change in the EATR can be used, instead of the EMTR, to approximate the impacts of the proposals on backward-looking ETRs. Using the change in the global GDP-weighted average EATR, 0.35 percentage points, as a basis for the approximation would result in a significantly less negative effect on GDP, i.e., -0.02% over the same horizon.

Box 4.7. Assumptions to model long-run economic impacts

The impacts of a reduction in the investment rate on GDP can be assessed based on the following framework that can be seen as a stylised and simplified version of the OECD model for long-run economic projections. Production in the economy is assumed to be a Cobb-Douglas function of capital K and labour L , with labour share, $1 - \alpha$.

$$Y_t = AK_t^\alpha L^{1-\alpha}$$

In this equation, A represents total factor productivity (TFP). Capital depreciates at a constant rate, δ , so that its evolution is determined by the accumulation equation.

$$K_{t+1} = (1 - \delta)K_t + I_{t+1}$$

I_{t+1} represents investment, which is assumed to be a constant share, γ , of GDP, $I_{t+1} = \gamma Y_t$. Given that in the steady state the investment rate is fixed to the level of the depreciation rate, $\frac{I}{K} = \delta$, the fall in investment is implemented as a permanent reduction in the investment-to-GDP ratio, γ . To align the parameters with the OECD long-term model, it is assumed that the capital-to-output ratio equals 1.5, $\frac{K}{Y} = 1.5$, implying that a shock of ϵ on the investment rate, $\frac{I}{K}$, as derived in the econometric estimations, can be translated as a permanent reduction in γ of $1.5 \cdot \epsilon$. The shock is implemented starting from a situation where the economy is in its steady state, with the initial parameters set at $\alpha = 0.24$, $\delta = 5\%$ (per year) and $\gamma = 7.5\%$ before the shock.

398. Taken together, the two main channels through which the proposals affect global investment and output are, first, an increase in investment costs at the MNE group level, reducing global investment levels and, second, a reduction in ETR differentials, reducing profit shifting and improving the global capital

allocation across jurisdictions. The first effect is negative and a tentative quantification suggests that it could lead to a reduction of global GDP by less than 0.1%. However, there could be a second, countervailing effect on global GDP if capital allocation across jurisdictions becomes more efficient; however, the extent to which this would be the case depends on individual governments' policy responses to the evolving international tax system as well as on MNE responses along other decision margins, e.g., with respect to their organisational structure. Since these effects are difficult to quantify, only the effect of the first channel has been modelled in this quantitative assessment.

Table 4.1. Consensus scenario: Summary

Direct Effects on Investment	Indirect Effects	Summary
Scope restrictions imply that many MNEs will be unaffected and increases in investment costs are targeted to highly-profitable MNE groups and those engaged in profit shifting	Fiscal space increases for most jurisdictions and lower profit shifting incentives could make it easier to raise additional public funds	Increases in investment costs could induce a small reduction in global investment
Increases in investment costs are expected to be quantitatively small, mostly driven by Pillar Two	Compliance and administration costs could increase, but this potential increase would likely be lower than in a situation without agreement	This could lead to a reduction in global GDP by less than 0.1%, which may be partly or fully offset by positive indirect effects
ETR increases at the entity level may lead to some relocation away from low-tax jurisdictions	Indirect effects are often context-specific and adaptation of policy mixes may be required in certain jurisdictions	Policy adaptations may be needed in certain jurisdictions in response to changes in the international tax system
Entities in more profitable MNE groups are less sensitive to tax increases	Many policy instruments remain available after implementation of Pillar One and Pillar Two to achieve intended policy objectives	
Reduction in ETR differentials across jurisdictions is likely to reduce the incentives for profit shifting and could improve the efficiency of the international allocation of capital	Economic efficiency could increase, e.g., if firm competition is strengthened	A consensus-based multilateral solution would lead to a more favourable environment for investment and growth than would likely be the case in the absence of an agreement

Source: OECD illustration.

4.8.2. Global economic implications if no consensus is reached

399. The tax challenges arising from digitalisation were described in detail in the BEPS Action 1 Report (OECD, 2015^[139]). Although the report considered several options to address these challenges, no agreement was reached at the time. Subsequently, the *Tax Challenges Arising from Digitalisation – Interim Report 2018* noted that changes to the international tax rules were required and that a coherent and concurrent review of two key aspects of the existing framework, the nexus and profit allocation rules, should be undertaken with the view towards a global consensus in 2020 (OECD, 2018^[128]).

400. As stated in the Interim Report, some jurisdictions adopted the position that, in the absence of a consensus-based global solution, interim measures to address concerns about the tax challenges arising from digitalisation would likely be implemented on a unilateral basis. Notwithstanding the fact that diverging positions existed on both the merits of and the need for interim measures such as transaction-specific digital services taxes (DSTs), an increasing number of jurisdictions have implemented or are considering the implementation of DSTs. In addition, a number of jurisdictions have introduced other unilateral measures including alternative applications of the permanent establishment (PE) threshold, withholding taxes or specific regimes targeting large MNEs, e.g., diverted profit taxes. While these additional unilateral measures are not included, Table 4.2 presents an overview of jurisdictions that have either legislated or are considering the implementation of a DST or similar measure.

Table 4.2. Digital services taxes and similar measures

Jurisdiction	Measure	Rate	Status
Austria	Digital Advertisement Tax	5.0%	Effective
France	Digital Services Tax	3.0%	Effective (collection postponed)
Hungary	Digital Advertisement Tax	7.5%	Effective (0% until Dec 2022)
India	Equalisation levy	2 and 6%	Effective
Indonesia	Electronic transaction tax	TBD	Legislated
Italy	Digital Services Tax	3.0%	Effective
Tunisia	Digital Services Tax	3.0%	Legislated
Turkey	Digital Services Tax	7.5%	Effective
United Kingdom	Digital Services Tax	2.0%	Legislated
Australia	Tax on digital services or similar measure in the event of no international solution	-	Under Consideration
Belgium	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration
Bulgaria	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Brazil	Digital Services Tax	1 to 5%	Under Consideration
Croatia	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Cyprus ⁵¹	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Czech Republic	DST or similar measure at EU or national level in the event of no international solution	7.0%	Under Consideration
Denmark	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Estonia	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Finland	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Germany	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Greece	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Ireland	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Israel	Tax on digital services or similar measure in the event of no international solution	3 or 5%	Under Consideration
Kenya	Digital Services Tax	1.5%	Under Consideration
Latvia	DST or similar measure at EU or national level in the event of no international solution	3.0%	Under Consideration
Lithuania	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Luxembourg	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Malta	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Netherlands	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
New Zealand	Tax on digital services or similar measure in the event of no international solution	3.0%	Under Consideration
Norway	Tax on digital services or similar measure in the event of no international solution	-	Under Consideration
Philippines	Digital Services Tax	-	Under Consideration
Poland	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration

Portugal	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Romania	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Russia	Tax on digital services or similar measure in the event of no international solution		Under Consideration
Slovakia	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Slovenia	DST or similar measure at EU or national level in the event of no international solution	3.0%	Under Consideration
Spain	DST or similar measure at EU or national level in the event of no international solution	3.0%	Under Consideration
Sweden	Tax on digital services or similar measure at EU level in the event of no international solution	-	Under Consideration (EU)
Zimbabwe	Tax on digital services or similar measure	-	Under Consideration

Note: The table lists jurisdictions where a digital services tax (DST) has been implemented and is effective, as well as those jurisdictions where a DST or similar measure is under consideration (or has been) by the government or legislature.

Source: OECD Secretariat.

Digital services taxes

401. Against the background of these developments, a failure to secure a consensus-based solution through the Inclusive Framework's multilateral process would significantly increase the domestic pressures on governments to address the tax challenges arising from digitalisation unilaterally, and would likely lead to the introduction of DSTs or similar measures in a growing number of jurisdictions. Given the uncoordinated nature of these unilateral policy responses, it is not possible to model the impacts of the various measures, including their interactions, on investment and economic output with the same amount of detail as has been done for the Pillar One and Pillar Two proposals. However, the evaluation of the consensus scenario requires a comparison with a counterfactual capturing the main implications for the global economy of the absence of a consensus-based solution to the tax challenges arising from digitalisation.

402. Most importantly, the number of jurisdictions considering the introduction of a DST or similar measure can be expected to increase significantly in the absence of a global solution, thus increasing tax-related distortions of MNE behaviour and reducing global economic output. Although design elements differ across jurisdictions, DSTs are, broadly speaking, taxes on revenue earned by certain highly-digitalised MNEs from transactions linked to online activities of users resident in the taxing jurisdiction. As taxable transactions are typically determined based on the user's location, e.g., the jurisdiction of the viewer of an advertisement or the recipient of an online service, DSTs tend to apply to resident and non-resident MNEs irrespective of the extent of their physical presence in the taxing jurisdiction (OECD, 2018[128]).

403. From an economic perspective, DSTs are subject to a number of deficiencies. In contrast to the corporate income tax (CIT), DSTs are a tax on revenues rather than a tax on corporate profits (i.e., total revenues minus total costs). Total revenues associated with specific types of digital transactions are within the scope of the tax, regardless of the costs incurred in providing the respective digital services, leading, for example, to positive tax liabilities imposed on loss-making firms. Economic double taxation could arise if DSTs are levied on residents and non-residents with no ability to credit the tax against CIT levied on the same income. Consequently, DSTs are more distortive than profit-based taxes, leading to higher prices, lower quantities and less investment in the affected sectors (Lowry, 2019^[140]). Since they are typically levied on intermediate services, e.g., online advertisement, the negative effects of economic double taxation could flow through to a much larger number of firms and sectors. As discussed in 4.5.3, the extent to which this effect is potentially passed through depends on a range of other factors such as the degree

of market power and the prevalence of economic rents, and is difficult to assess especially in the context of multisided markets.

404. Another major implication of a failure to secure a consensus-based solution through the multilateral process of the Inclusive Framework would be an increasing fragmentation of international taxation, driven by the proliferation of various unilateral measures, compounded by substantial increases in compliance costs for taxpayers and administrative costs for governments. Due to their selective targeting of specific digital services, a more widespread adoption of DSTs, in particular, would introduce additional distortions across projects and business models,⁵² contributing to further fragmentation. In addition, tax uncertainty would increase relative to the consensus scenario, as governments fail to coordinate their policy responses. Such negative fiscal spillovers could give rise to globally inefficient outcomes (see Section 4.7). Relatedly, ETR differentials across firms are likely to increase as a consequence of a growing number of transaction-specific DSTs, leading to potential inefficiencies in capital allocation across jurisdictions.

The risk of entering into trade-related disputes

405. Apart from immediate impacts on economic efficiency, a failure to secure a consensus-based solution through the multilateral process of the Inclusive Framework could have broader geopolitical implications feeding back into the economic evaluation of the counterfactual. In particular, a more widespread adoption of DSTs would likely give rise to an increase in trade disputes. The potential for such an escalation has been highlighted in the context of France's introduction of a DST. In that case, the United States responded to the introduction of the French DST, with the US Trade Representative (USTR) launching an investigation under Section 301 of the US Trade Act 1974.

406. Following its investigation launched in July 2019, the USTR published a report on the French DST in December 2019 (USTR, 2019[141]). The document highlighted what the USTR considered to be the “discriminatory, unreasonable and burdensome aspects of France’s DST”.⁵³ In its Notice of Determination and Request for Comments Concerning Action Pursuant to Section 301: France’s Digital Services Tax (USTR, 2019[142]), the USTR noted that section 301(c)(1)(B) of the Trade Act authorises the USTR to impose duties on the goods of the foreign country subject to the investigation and stated that, pursuant to sections 301(b) and (c), the USTR proposed to determine that action was appropriate in respect of the French DST. At the time, he provided that appropriate action could include the imposition of additional ad valorem duties of up to 100 percent on certain products of France and outlined a preliminary list of 63 tariff subheadings, with an estimated import trade value for calendar year 2018 of approximately USD 2.4 billion, corresponding to an amount approximately five times the total expected revenues from the first year of the French DST’s operation.⁵⁴ On 10 July 2020, the USTR referred to the investigation of the French DST and announced that his office would take action in the form of additional duties of 25 percent on French products, targeting 21 tariff subheadings, with an estimated trade value for calendar year 2019 of approximately USD 1.3 billion, corresponding to an amount approximately proportional to the revenues expected to be raised by the French DST in its first year from US MNEs (USTR, 2020[143]).

407. On several occasions, the European Commission responded to these developments by emphasising its commitment to a common EU-level response. In January 2020, the EU Trade Commissioner issued a statement stating that he views “the investigation as a European matter and, as in all trade-related matters, the EU will act and react as one” (EU Commission, 2020[144]). More recently, the EU Commissioner for the Economy announced that “the commission stands as one with EU countries facing the threat of US sanctions because they have moved forward with their own digital services taxes. If needed, we will react as one” (EU Commission, 2020[145]).

408. Following these developments, the United States has agreed to suspend the application of additional tariffs while France has postponed the collection of revenues from the DST, however, in the absence of an international agreement through the multilateral process of the Inclusive Framework, the number of countries involved in similar disputes could increase significantly. In parallel to these

developments, on 2 June 2020, the USTR announced that his office had initiated investigations under Section 301 of the 1974 Trade Act into DSTs or similar measures that have been adopted or are being considered by a number of US trading partners, namely with respect to Austria, Brazil, the Czech Republic, the European Union, India, Indonesia, Italy, Spain, Turkey, and the United Kingdom (USTR, 2020[146]). While these additional investigations have only just commenced, these recent developments suggest that a failure to secure a consensus-based solution on the tax challenges arising from digitalisation through the multilateral process of the Inclusive Framework would significantly heighten the risk of protracted trade disputes involving several major economies, including members of the G20.

Modelling the economic implications of tax and trade disputes

409. The counterfactual scenarios aim to consider the potential state of the global economy assuming the failure to secure an agreement on international taxation. As mentioned above, such an agreement is assumed to entail a consensus on the design of the proposals as well as a commitment to withdraw any existing DSTs and to refrain from implementing such measures in the future. In contrast, the counterfactual scenarios not only capture the economic impacts of unilateral measures on global investment and output, but also the potential trade-related ramifications of an increasing fragmentation of the international tax system and, in particular, their feedback effects on economic outcomes. To this end, the following analysis builds on a cooperation with the OECD's Trade and Agriculture Directorate using the OECD METRO Trade Model,⁵⁵ a computable general equilibrium (CGE) model, capable of simulating economic impacts of taxes as well as tariff retaliation in a consistent framework.

410. The OECD METRO Trade Model is routinely used to study changes in trade policy and other factors (see Annex 4.D and the model documentation (OECD, 2020_[147])). It covers 65 countries and regional aggregates and 65 commodities across the global economy, based on external and internal data sources such as the Trade in Value Added⁵⁶ (TIVA) database, to analyse how production and trade are linked in global value chains and how resources such as labour, capital and natural resources are allocated across economic activities. It allows for the simulation of the economic impacts of a wide range of trade policies, including border tariff rates, non-tariff measures, export restrictions, domestic taxes and support programs.

Box 4.8. Digital services taxes and retaliatory tariffs in the OECD METRO Trade Model

The DST is implemented as an ad valorem tax on intermediate sales from the business services sector to all buyers, assuming that the revenues from digitally delivered services, such as revenues from advertising on a digital platform, are located exclusively in that sector.⁵⁷

While the DST is not the focus of the analysis, its implementation by the respective country grouping in each scenario anchors the size of the tariff retaliation and the counter-retaliation. To calibrate the DST rate, the French case serves as a benchmark based on the observation that the 3% DST in France is expected to generate revenues of around EUR 450 million in its first year. With that information, and taking the value of intermediate sales of business services in France as the benchmark, a corresponding DST rate on the business services sector can be approximated for either a 3% or a 5%⁵⁸ rate for each country, however, it is not possible to model revenue or income thresholds, as the model does not distinguish individual firms.

Given this approach, the French DST rate of 3% translates into a 0.12% tax on the entire business services sector – i.e., the DST-equivalent sector-level tax rate. Hence, the implicit assumption is that roughly 1/30 of the intermediate sales of business services correspond to digitally delivered services under the scope of the DST. This DST-equivalent tax rate is applied to intermediate sales of business services in all countries that are simulated to implement a DST, yielding the targeted tax revenues as shown in Annex Table 4.D.1 and Annex 4.D.

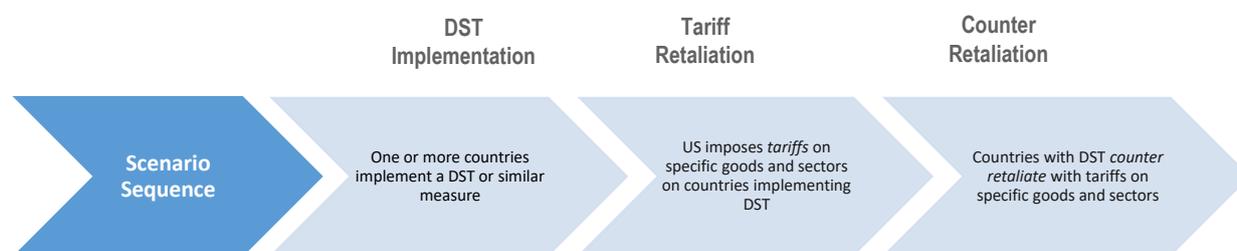
The retaliating region, i.e., the United States, implements retaliatory tariffs on targeted sectors to match the DST revenues in countries that implement a DST, times a retaliation factor of either one or five. The size of the (ad valorem) retaliatory tariff rate is thus a function of the DST revenues in the implementing country, the imports into the United States of the targeted sectors in the baseline data and the size of the retaliation factor. Tariffs are simulated on trade in non-service sectors that are known to be typically targeted for tariff action and are symmetrically applied to the same products, which makes the results comparable between countries.

Based on these assumptions, the retaliatory tariffs increase with the DST rate and the retaliation factor, leading to a set of calibrated tariff rates. Counter-retaliatory tariffs are assumed to match US retaliatory tariffs exactly in terms of revenues, without an additional counter-retaliatory mark up (see OECD (2018^[148]) and Annex 4.D). All counterfactual tax and tariff rates are assumed to be permanent and calculated on baseline data, i.e., without taking reactions and adjustments into account that will occur once a tax or tariff is put in place.

411. Although the DST is not included in the set of standard trade policy measures, it can be incorporated in a stylised way as an ad valorem tax on the share of digitally delivered intermediate sales from the business services sector to other sectors. As described in Box 4.8, its design is calibrated using French DST provisions and revenue estimates to produce an approximation of the DST base. In line with the variation in DSTs across jurisdictions, the DST rate is assumed to be either 3% or 5% (Table 4.2). Retaliatory tariffs are a standard feature of trade modelling that is captured within the existing framework. In the calibration used for this analysis, a range of plausible retaliation factors is considered. At the higher end, a worst-case scenario with a retaliation factor of five is considered, reflecting the broad magnitude of the tariff retaliation that was initially announced in the dispute between France and the United States. At the lower end, a proportional retaliation scenario is considered, broadly in line with the tariff response announced by the USTR on 10 July 2020 (see Annex 4.D for sensitivity analyses).

Figure 4.15. Trade retaliation: sequence of events

Simulation of the different cases follow a three-step sequence of events.



Source: In each of the cases, the number of countries implementing a DST or similar measure varies; the group of countries counter retaliating varies accordingly. The country groups are described in Table 4.3 and Table 4.4.

412. Figure 4.15 outlines the sequence of DST implementation, tariff retaliation and counter-retaliation underlying the counterfactual simulations presented in this section (see Annex 4.D for a description of additional simulation results). To capture a broad range of possible trade developments, as discussed above, two cases are distinguished, each corresponding to a different group of countries implementing a DST. In the case with narrow DST implementation, only those jurisdictions that have already legislated a DST or are subject to USTR Section 301 investigations are assumed to adopt such a policy in the event

that the multilateral process does not reach a consensus, i.e., groups 1, 2 and 3 in Table 4.3. In the case⁵⁹ with broad DST implementation, all jurisdictions in the model except for the United States, the People's Republic of China and Hong Kong (China) implement a DST or similar measure, i.e., groups 1, 2, 3 and 6 in Table 4.3.⁶⁰

Table 4.3. Country groupings

The following country groups are used to construct the policy simulations in Table 4.4.

Group	Label	Countries	Share in global GDP
1	DST legislated and/or effective	France	4%
2	Section 301 investigation underway - EU	Austria, Czech Republic, Hungary, Italy, Spain, Belgium, Bulgaria, Croatia, Cyprus ⁶¹ , Denmark, Estonia, Finland, Germany, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden	16%
3	Section 301 investigation underway – non-EU	Brazil, India, Indonesia, Turkey, United Kingdom	12%
4	Retaliating	United States	22%
5	No DST, no retaliation	China, Hong Kong (China)	14%
6	Other (no DST except in the case with broad implementation)	Rest of the World	33%

Note: In the case with narrow DST implementation, only those jurisdictions that have already legislated a DST or are subject to USTR Section 301 investigations are assumed to adopt such a policy in the event that the multilateral process does not reach a consensus, i.e., groups 1, 2 and 3. In the case with broad DST implementation, all jurisdictions in the model except for the United States, the People's Republic of China and Hong Kong (China) implement a DST or similar measure, i.e., groups 1, 2, 3 and 6. Group 6 includes the following countries: Australia, Canada, Israel, New Zealand, Norway, Philippines, Tunisia, Russia, Kenya, Japan, Korea, Brunei Darussalam, Cambodia, Philippines, Singapore, Viet Nam, Argentina, Chile, Colombia, Peru, Costa Rica, Switzerland, Kazakhstan, Saudi Arabia, Morocco, South Africa, Malaysia, Mexico, Thailand as well as an aggregate category covering the remainder of the global economy.

Source: OECD.

413. In each of the two cases, it is assumed that the unilateral implementation of DSTs or similar measures is followed by the United States imposing retaliatory tariffs on specific goods and sectors in the countries that have implemented DSTs. The targeted sectors are selected based on official announcements and experience from past trade disputes (see Box 4.8 and Annex 4.D). Finally, the countries that have implemented DSTs in the first step of the sequence are assumed to counter-retaliate against the United States in equal measure (OECD, 2018^[148]). This modelling assumption is also based on public statements made by French and European Union officials. Again, the targeted sectors are selected based on official announcements and past experience.

Table 4.4. Overview of the simulated cases

Different DST rates and retaliation factors are simulated for both cases. Group numbers refer to country groups in Table 4.3.

Case	DST rate	Tariff Retaliation Factor	Simulations
Narrow DST implementation	3%, 5%	1, 5	DST implemented: group 1,2,3 Tariff retaliation: group 4 Tariff counter-retaliation: group 1,2,3
Broad DST implementation	3%, 5%	1, 5	DST implemented: group 1,2,3,6 Tariff retaliation: group 4 Tariff counter-retaliation: group 1,2,3,6

Note: As sensitivity analysis, additional scenarios have been simulated and are described in Annex 4.D.

Source: OECD

Tax and trade disputes: impacts on global GDP

414. The results show that the simulated trade disputes could have substantial impacts on global GDP, measured in real terms. Depending on the combination of DST rates and retaliation factors, global GDP is simulated to be reduced by -0.09% to -0.24% in the case with narrow DST implementation (relative to a no-tax-and-trade-dispute scenario), and by to -0.44% to -1.21% in the case with broad DST implementation (Table 4.5).⁶² These results represent a potentially substantial negative effect on the level of global GDP, stemming from efficiency losses due to the tariffs compounded by reductions in wages and capital returns as well as a slow-down in investment driven by declining exports. Household income decreases at similar rates, indicating that households would bear most of the costs of the shrinking economy, as tariff increases affect households through two channels. First, their purchases become more expensive, as tariff-ridden import prices increase, and, second, factor income falls as the economy contracts. World trade, measured as real global import volumes, falls by about twice the rate of real GDP.

Table 4.5. Trade retaliation: simulation results (weighted percent changes)

Effects on macroeconomic indicators in percent for selected scenarios compared to a situation without DSTs and trade retaliation.

US tariff retaliation factor	Narrow DST Implementation				Broad DST Implementation			
	1		5		1		5	
	3%	5%	3%	5%	3%	5%	3%	5%
Global GDP (real)	-0.09	-0.15	-0.15	-0.24	-0.44	-0.72	-0.73	-1.21
Global Household income	-0.08	-0.14	-0.14	-0.23	-0.38	-0.64	-0.64	-1.07
Global Imports (real)	-0.17	-0.28	-0.34	-0.53	-0.68	-1.14	-1.25	-2.04

Note: As sensitivity analyses, additional results corresponding to retaliation factors of 0.5 and 4 are shown in Annex 4.D.

Source: METRO v3 database, OECD calculations.

415. Comparison of the two cases suggests that economic costs increase as DST implementation and subsequent tariff retaliation become more widespread. However, additional results presented in Annex 4.D reveal considerable heterogeneity across country groups. In particular, the countries engaging in unilateral actions are most negatively affected, while those that are not engaged in the dispute initially benefit from shifts of economic activity towards them. However, as the tax and trade dispute involves an increasing number of countries, the options for reallocation of trade and production between countries become fewer.

The shrinking size of the economies engaged in tariff retaliation generates progressively larger negative impacts. As their trade declines, income declines and demand for imports falls further. In line with these results, bilateral trade between the countries engaged in the dispute could shrink by double-digit numbers. While countries that are not engaged in the dispute would expand exports slightly, including trade amongst themselves, their trade into the countries that are affected by the tariff increases is only expanding marginally. As a consequence, trade diversion is limited, as import demand is falling in step with the overall economic contraction. Table 4.6 summarises direct and indirect effects on investment under the no-consensus scenario.

Table 4.6. No-consensus scenario: Summary

Direct Effects on Investment	Indirect Effects	Summary
Unilateral measures, such as digital services taxes and similar measures, increase investment costs for specific businesses	Additional fiscal space could have positive indirect effects on investment and economic output	Higher investment costs have a negative effect on global investment and output
Trade disputes could lead to a sequence of retaliatory tariffs, adding to investment cost increases	Profit shifting incentives remain high and could potentially increase due to increasing fragmentation and incoherence of international taxation	Trade disputes are likely to emerge, with the potential to significantly reduce global investment and output
Jurisdictions engaging in unilateral actions are most negatively affected, with bilateral trade potentially falling by double-digit numbers	Compliance and administrative costs are likely to increase more strongly due to an increasingly incoherent tax system	Economic impacts of trade disputes could entail a reduction in global GDP by around -0.1% to -0.2% if a smaller number of jurisdictions is involved, rising to -0.4% to -1.2% if more jurisdictions are involved
ETR differentials across firms are likely to increase due to fragmentation and incoherence of international taxation (e.g., transaction-specific DSTs)	Competition over mobile tax bases could intensify, potentially impacting economic efficiency	
DSTs could lead to double taxation, adding to increases in investment costs and distorting investment decisions	Turnover taxation, e.g., taxation of loss-making firms, reduces economic efficiency and global output, especially during periods of economic recession	Increasing uncertainty, fragmentation, incoherence of international taxation due to increasing reliance on turnover taxation

Source: OECD secretariat.

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Annex 4.A. Tax Competition: Theoretical Insights

416. This annex provides an overview of the recent developments in the theoretical tax competition literature. It complements Box 4.3 that focuses mostly on empirical studies.

417. Earlier contributions to the theoretical literature on tax competition, reviewed by Forslid (2005^[149]), Keen and Konrad (2013^[79]) or Devereux and Loretz (2013^[68]) among others, have produced insights and stimulus for empirical research. Huizinga and Nielsen (2008^[150]), for example, construct a model in which multinational production creates economic rents and firm ownership is diversified across domestic and foreign owners. Extending the standard framework in this way highlights that governments may have incentives to increase source-based CIT rates to tax some of the economic rent accruing to foreign owners; this effect, in turn, weakens competitive pressure on CIT rates. Baldwin and Krugman (2004^[151]) question the idea that economic integration necessarily increases competitive pressure on corporate tax rates. Their model allows for location-specific rents to arise from economic agglomeration, i.e., the emergence of highly-productive nodes within the world economy. Similar to Huizinga and Nielsen (2008^[150]), location-specific rents may induce governments to set higher CIT rates, thus dampening tax competition; as intensifying economic integration first increases and then decreases economic agglomeration, they find that the relation between economic integration and tax competition could be non-linear.

418. The theoretical literature has also investigated the role of certain zero-tax jurisdictions specialised in attracting accounting profits that are shifted outwards from other jurisdictions – in the context of these models. The existence of zero-tax jurisdictions and investment hubs can have an impact on tax competition for real investments occurring between other countries (see Dharmapala (2008^[152]) for a review). The distinguishing feature of this literature is that it introduces the possibility for MNEs to relocate accounting profits from one jurisdiction to another while keeping real production decisions unchanged; it views zero-tax jurisdictions and investment hubs typically as jurisdictions with a small (or negligible) real economy, specialised in attracting accounting profits from other countries in return for a small payment. Slemrod (2008^[153]) argues that this strategy corresponds to a commercialisation of a jurisdiction's sovereignty that comes at the cost of a significant loss in reputation; as a result, mostly countries with small population sizes adopt this strategy (Dharmapala and Hines, 2006^[154]).

419. Slemrod and Wilson (2009^[45]) formalise this idea in the context of a tax competition model; their results highlight that tax avoidance activities, e.g., tax consultants helping to shift profits to low-tax jurisdictions, represent a net social loss to the economy, and that higher shifting costs reduce the marginal cost of public funds. Other studies have challenged this view, arguing that the existence of low-tax jurisdictions allows other jurisdictions to offer lower effective marginal tax rates (at the MNE group level) when tax policy cannot discriminate between mobile and immobile tax bases. According to this argument, the existence of low-tax jurisdictions therefore has the potential to induce an increase in real investment that could outweigh other costs associated to them (Desai, Foley and Hines (2006^[155]); Hong and Smart (2010^[156])). Finally, Johannesen (2010^[157]) further explores the effects on tax competition, suggesting that the existence of zero-tax jurisdictions and investment hubs could force countries with lower effective taxation to choose whether to pursue a zero-tax strategy. As a result, the remaining jurisdictions would have incentives to coordinate towards a higher-tax strategy, implying lower levels of tax competition.

420. Keen (2001^[158]) argues that a differentiation of tax rates on mobile and immobile tax bases, through preferential regimes, can increase competition for mobile bases while decreasing it for immobile bases, possibly leading to an overall positive impact on revenues. Mongrain and Wilson (2017^[159]) build on this approach, introducing a model where tax policy makers cannot directly observe tax base mobility. As discrimination between tax bases becomes more costly within this framework, countries could decide

against the introduction of preferential regimes leading to, under certain conditions, higher overall tax revenues.

421. Another strand of the theoretical literature on tax competition has focussed on the political processes underlying national tax policy choices, i.e., dropping the assumption that government acts as a benevolent planner. Instead, this literature introduces the effects of electoral policies or self-interested policy-making by politicians into the modelling framework, studying how these assumptions affect tax competition (e.g., Brennan and Buchanan (1980[160]) or Edwards and Keen (1996[161])). Eggert and Soerensen (2008[162]), more recently, develop a model where vote-maximising politicians have an incentive to increase the size of the public sector to create economic rents for public sector employees; in this setting, tax competition is found to be potentially welfare-enhancing due to the fact that it restricts this type of self-interested behaviour.

Annex 4.B. Tax Incentives to Support Innovation

Evidence on the use and effectiveness of R&D tax incentives

422. The effectiveness of government support for R&D can be evaluated from an input perspective, in terms of its capacity to generate additional R&D investment, or from an output perspective, in terms of its capacity to generate innovation.

423. Expenditure-based R&D tax incentives have proven effective in generating both additional R&D investment by firms (i.e., input additionality), as well as an increase in innovation (i.e., output additionality), although evidence on the latter is more scarce. The most recent estimates find that a euro of R&D tax relief offered by governments translates into at least one euro extra of R&D investment by firms (Hall and Van Reenen, 2000[163]; Mairesse and Mohnen, 2010[164]; de Boer et al., 2019[165]; OECD, 2020[166]). In addition, the input additionality of expenditure-based R&D tax incentives is found to be larger for young and small- and medium-sized enterprises (SMEs) than for larger firms (Castellacci and Lie, 2015[167]; Dechezleprêtre et al., 2016[168]). These estimates would overstate the additionality of expenditure-based R&D tax incentives if there is relabelling of non-R&D expenditure as R&D expenditure to benefit from the tax relief or if these incentives incite the relocation of R&D activity rather than an increase in global R&D (Bloom, Van Reenen and Williams, 2019[99]). Output additionality is more difficult to measure due to the possible lag between R&D and innovation, the imperfect nature of innovation indicators and measurement difficulties related to potential spillover effects (Appelt et al., 2016[90]; Mairesse and Mohnen, 2010[164]). Several studies find positive evidence pointing to increased innovative sales, new products and patenting activity (Czarnitzki, Hanel and Rosa, 2011[169]; Ernst and Spengel, 2011[170]; Cappelen, Raknerud and Rybalka, 2012[171]) in response to the tax break.

424. While the evidence is more positive and conclusive on the effectiveness of expenditure-based R&D tax incentives, this is not the case for income-based R&D tax incentives. From the input-side, evidence on the ability of income-based incentives to induce additional business R&D spending is mixed (Mohnen, Vankan and Verspagen, 2017[172]; Gaessler, Hall and Harhoff, 2018[92]). From the output-side, the measurement of their impact on innovation poses methodological challenges due to the secular upward trend in patenting and the lack of sources of variation across countries and time, which may explain differences in results in prior literature (Gaessler, Hall and Harhoff, 2018[92]; Hall, 2019[88]). However, while income-based R&D tax incentives are designed to promote the output from R&D, recent evidence suggests that patented inventions do not show a statistically significant increase in countries offering intellectual property (IP) regimes compared to those that do not; on the contrary, some findings suggest a small negative impact on the numbers of patented inventions (Gaessler, Hall and Harhoff, 2018[92]). This apparent failure to achieve the stated policy goal, combined with limited evidence on their effectiveness, casts doubt over the rationale for this policy instrument (Gaessler, Hall and Harhoff, 2018[92]; Bloom, Van Reenen and Williams, 2019[99]).

425. The mobile nature of intangible assets makes it easier for multinational firms to strategically determine the location, and thus the income derived from them, in response to preferential income treatment in order to minimise their global tax liabilities (Griffith, Miller and O'Connell, 2014[173]). Evidence suggests that the location and transfer of patents is responsive to preferential tax rates, offered through IP regimes, if no domestic development conditions are required (Alstadsaeter et al., 2015[174]; Ciaramella, 2017[175]). As part of the Base Erosion and Profit Shifting (BEPS) project, government efforts have been directed towards a reduction in the use of these incentives for harmful purposes, which resulted in the nexus requirements introduced under BEPS Action 5 and other recommendations regarding controlled-

foreign company (CFC) rules under BEPS Action 3. The introduction of development conditions as a prerequisite to providing benefits from the income-based incentives has been found to mitigate the transfer of patents for purely tax purposes (Gaessler, Hall and Harhoff, 2018[92]).

426. Aside from indirect support through the tax system, direct government support via, for example, grants are found to have positive impacts on both R&D investment and innovation output output (Busom, 2000^[176]; Almus and Czarnitzki, 2003^[177]; Hall and Maffioli, 2008^[178]; OECD, 2020^[166]).

Design considerations: how much, to whom and why?

427. The design of R&D tax incentives plays a major role in determining how generous tax benefits are expected to be and to which firm types, and types of activity, the benefits are directed.

428. First, alongside the general characteristics of tax systems, the design of R&D tax incentives influences the generosity of these provisions. A comparison across countries yields a very heterogeneous landscape, with the implied R&D subsidy rate provided through expenditure-based R&D tax incentives ranging from somewhere close to 0 to 0.41 euros for an extra euro of R&D invested by large profitable firms (OECD, 2019^[179]). The generosity of these schemes has also been growing over time, with the average implied subsidy rising from 0.03 in 2000 to 0.14 in 2019 for large profitable firms. The trends are similar for firms of different types and levels of profitability (Appelt, Galindo-Rueda and González Cabral, 2019^[83]).

429. Second, although tax incentives are non-discretionary instruments, governments can design R&D tax incentives to target certain activities or firm types to address specific market failures. In some jurisdictions, preferential treatment is granted to young as well as small- and medium-sized enterprises through preferential rates; more generous provisions are sometimes applied in case of insufficient tax liabilities, e.g., refund provisions or more generous carry-over provisions, or to projects conducted in collaboration, e.g., with universities. In some countries, ceilings are used to limit the generosity of the provisions, particularly to large claimants, and to shelter public finances. In contrast to volume-based incentives that provide relief to the full R&D expenditure, incremental tax incentives provide enhanced relief to R&D above a certain base amount to avoid funding R&D that would have been undertaken in the absence of support, in an effort to protect public finances (Appelt et al., 2016^[90]).

430. Beyond the design of R&D tax incentives, it is crucial to analyse the use of these provisions to assess whether the intended policy goal is achieved. The distribution of tax support across firms and activities ultimately depends on the types of firm that are using the incentives as well as the interaction of their characteristics with the design of the incentive, e.g., the benefits for loss-making firms will depend on whether carry-over or refundability provisions are available (Appelt, Galindo-Rueda and González Cabral, 2019^[83]).

431. Recent literature has shed light on some of these questions, producing several important insights:

- **Innovation, R&D and government support are highly concentrated:** The top 2000 R&D performers account for almost two thirds of patents filed at the largest five IP offices worldwide (Dernis et al., 2019^[180]). In addition, large taxpayers also benefit from the majority of government support – both direct grants and tax support – despite constituting a smaller number of claims (OECD, 2019^[181]). Taken together, the evidence on the concentration of patents, especially high-revenue patents, among a small number of large MNEs suggests that the benefits from preferential regimes accrue mainly to multinational firms.

The rationale for channelling government support to large performers is attached to their ability to generate larger spillover effects and externalities, particularly if directed to basic research activities (Bloom, Schankerman and Reenen, 2013^[182]; Akcigit, Hanley and Serrano-Velarde, 2013^[89]).⁶³

- **The extent of government support to MNEs might be higher than intended:** The expansion of global value chains provides MNEs with the opportunity to locate their activity, including their R&D activities and intangible assets, in a tax efficient manner (Ernst and Spengel, 2011^[170]). This may boost the return to innovation that MNEs are able to secure relative to domestic performers, who could face comparative disadvantages due to these policies, an effect that might not have been intended when the policy was designed. With rising levels of the generosity of R&D tax incentives and with firms becoming increasingly more global, this concern is likely to become increasingly salient. In addition, the transfer of patents to other jurisdictions might also result in situations where the jurisdictions granting tax relief to R&D cannot secure the intended benefits, as spillovers materialise outside the domestic economy (OECD, 2015^[100]).
- **Young firms and SMEs play a key role in spurring innovation:** Looking at patenting activity as an imperfect measure for innovation, first-time patenting occurs typically within ten years of the existence of the firm (Squicciarini and Dernis, 2013^[183]) and young firms are more likely to introduce radical innovations (Andrews, Criscuolo and Menon, 2014^[98]). These findings highlight the importance of facilitating entry of young firms and SMEs into the market, both of whom tend to face greater difficulties in accessing finance (Hall and Lerner, 2010^[87]), as well as greater fixed costs of entry, as regulatory compliance costs are typically regressive in size.
- **Established performers may have an incentive to innovate to preserve their market position:** Although incumbents benefitting from monopoly rents may not have an incentive to innovate per se, the challenge posed by new entrants, who have incentives to capture the rents, may induce them to innovate to protect their dominant market position (Blundell, Griffiths and Van Reenen, 1999^[184]). This effect might be particularly relevant in highly digitalised and intangible-intensive sectors in which market concentration has been found to increase more strongly than in other sectors (De Loecker and Eeckhout, 2017^[185]; Autor et al., 2020^[135]; Calligaris, Criscuolo and Marcolin, 2018^[2]). Subsidising large incumbent firms might be counterproductive if it encourages the survival of firms with low innovative capacity preventing resources from being allocated to firms with high innovation capacity (Acemoglu et al., 2018^[186]).

Annex 4.C. Corporate Inversions

432. As discussed in the Section 4.7, the implementation of an income inclusion rule (IIR) acts as a top-up to low-taxed profits earned by subsidiaries. Taken in isolation, MNEs could have incentives to invert, i.e. to change their tax residence, in order to escape the tax liability. The under-taxed payment rule (UPR) acts to prevent such an incentive. This appendix provides a review of the literature on corporate inversions by MNEs in the context of recent policy developments.

433. The international operations of MNEs allow them to utilise a variety of strategies to change how and where their income is taxed. Corporate inversions are one of these strategies, by which an MNE engages in a transaction that changes the location of its ultimate parent entity and consequently, its tax residence, to a foreign jurisdiction. While corporate inversions can be motivated by many factors, some inversions are motivated by tax considerations. Companies inverting out of the United States between 1994 and 2014 are estimated to have reduced their worldwide tax expense to earnings ratio by an average of 9 percentage points, i.e. from an average of 29% prior to the inversion to 18% the year after the inversion (Congressional Budget Office, 2017[187]).⁶⁴

434. Several corporate inversions have been documented during the last decade; however, anecdotal evidence points towards a slowdown in recent years (Clausing, Miller and Mintz, 2014[188]; Voget, 2011[189]; Congressional Budget Office, 2017[187]; Congressional Research Service, 2019[190]).⁶⁵ Recent developments in international and domestic taxation and the increased use of anti-inversion regulations are likely to have driven this most recent trend. Overall, incentives for corporate inversions may vary across jurisdictions according to the structure and level of taxation as well as the stringency of regulations against base erosion and profit shifting (BEPS).

435. First, in worldwide tax systems, taxes on foreign active income can typically be deferred until repatriation. Such a system may lead MNEs to accumulate large amounts of unrepatriated profits in foreign jurisdictions, increasing the motivation for corporate inversions (Clausing, Miller and Mintz, 2014[188]; Desai and Hines, 2002[191]).⁶⁶ This effect becomes more salient, the higher the taxation is at the level of the headquarter jurisdiction. Evidence suggests that a 10 percentage points increase in repatriation taxes is estimated to increase the share of relocating MNEs by 2.2 percentage points (Voget, 2011[189]). However, in recent years there has been a clear shift towards territoriality with only four out of 37 OECD countries⁶⁷ retaining worldwide taxation. Under territorial tax systems, incentives for inversions are much weaker as active income from their foreign subsidiaries is exempt upon repatriation.

436. Second, the move towards territorial taxation has increased pressure on curbing base erosion and profit shifting. Under territorial taxation, the exemption of foreign active income creates incentives to shift income to low-tax jurisdictions. This has led to coordinated international efforts to introduce anti-BEPS rules that seek to protect corporate tax bases. As an example, controlled foreign company (CFC) rules allow the parent to bring low-taxed passive income into the domestic tax base, thus reducing the incentive to relocate profits (OECD, 2015[192]).⁶⁸ Indeed, CFC rules appear to induce MNEs to locate not only less profit but also fewer subsidiaries in jurisdictions below the CFC threshold, moving the income to higher-taxed environments (Clifford, 2019[193]). However, the presence of CFC rules appears to also increase the likelihood of headquarter relocations (Voget, 2011[189]).⁶⁹

437. Third, some jurisdictions have sought to reinforce domestic regulations in order to hinder the ability of corporations to invert with the purpose of obtaining a tax advantage. These include regulations that tighten restrictions over how companies are classified as foreign, e.g., including stricter criteria on control or economic substance; as well as regulations to close strategies that firms use to erode the tax base (Congressional Research Service, 2019[190]).⁷⁰ However, measures to deter corporate inversions are

dependent on the regulatory framework of the jurisdiction enacting them; e.g., in the European Union freedom of establishment is one of the fundamental freedoms of the European single market.

438. Although changes in organisational structures are pursued to obtain a tax advantage, corporate inversions are associated with considerable costs and uncertainties. Aside from the costs required to establish the organisational structure, the restructuring might trigger additional tax liabilities on other tax bases, e.g., transaction taxes or capital gains⁷¹ taxes, depending on the regulatory framework in the respective jurisdictions. Inversions have consequences beyond taxation stemming from: the change in control of the company whereby shareholders could lose their influence over the future of the company; the new regulatory environment of the country where the company inverts to; and the reputational costs that might be attached to inverted companies (Congressional Budget Office, 2017[187]). In many cases, these hidden costs associated with corporate inversions could outweigh the tax advantages from restructuring.

Annex 4.D. Trade Simulations

439. This annex provides some further results regarding the empirical calibration of the trade simulations discussed in the Section 4.8, exploring the effects of tariff retaliation on non-service trade against DSTs unilaterally imposed by a subset of countries. The numerical results are obtained using the OECD METRO model, which is a computable general equilibrium model (CGE) that traces complex international interdependencies in a theoretically and empirically consistent framework.⁷²

Model description

440. The METRO model is calibrated for this analysis to 6 regions (Table 4.3), 19 sectors, and 8 production factors (OECD, 2020[147]). The simulations represent short-to-medium term shocks where production factors are mobile across sectors, but the overall endowment of labour remains fixed while allowing for unemployment, and capital stocks respond to investment.

441. METRO, like many CGE models, relies on a comprehensive specification of all economic activity within and sometimes between countries (and therefore the different inter-linkages that tie these together). The model builds on the GLOBE model developed by McDonald and Thierfelder (2012[194]). The novelty and strength of METRO lies in the detailed trade structure and the differentiation of commodities by end use. Specifically, commodities and thus trade flows are distinguished by whether they are destined for intermediate use, for use by households, for government consumption, or as investment commodities.

442. The underlying framework of METRO consists of a series of individually specified economies interlinked through trade relationships. As is common in CGE models, the price system is linearly homogeneous, with a focus on relative, not absolute, price changes. Each region has its own numeraire, typically the consumer price index, and a nominal exchange rate (an exchange rate index of reference regions serves as model numeraire). Prices between regions change relative to the reference region.

443. The database of the model relies on the GTAP v10 database (Aguiar et al., 2019[195]) in combination with the OECD Inter-Country Input-Output Tables, which are the main source of the OECD Trade in Value Added Indicators and allows the model to distinguish trade for use in intermediate production or final demand. Policy information combines tariff and tax information from GTAP with OECD estimates of non-tariff measures on goods (Cadot et al., 2018[196]), services (Benz and Gonzales, 2019[197]) (Benz and Jaax, 2020[198]), trade facilitation (OECD, 2018[199]) and export restricting measures. The METRO database contains 65 countries and regional aggregates and 65 commodities.

444. The model is firmly rooted in microeconomic theory, with firms maximising profits and creating output from primary inputs (i.e., land, natural resources, labour and capital), which are combined using constant elasticity of substitution (CES) technology, and intermediate inputs in fixed shares (Leontief technology). Households are assumed to maximise utility subject to a Stone-Geary utility function, which allows for the inclusion of a subsistence level of consumption. All commodity and activity taxes are expressed as ad valorem tax rates, and taxes are the only income source to the government.

445. In the simulations for this analysis, the trade balance is fixed and the nominal exchange rate is flexible. Wages are assumed downwardly rigid, but remuneration rates of all other factors (i.e., land, capital, natural resources) are assumed to adjust. All tax and tariff rates are exogenous and fixed, government expenditures are fixed at base levels in value terms (i.e., there are no budgetary reallocations). Government surplus or deficit is flexible and adjusts with changes in tax and tariff revenues. The overall savings rate is fixed for each country group.

Calibration: digital service taxes and tariff retaliation

446. As described in Box 4.8, the DST is implemented as an ad valorem tax on intermediate sales from the business services sector to all buyers, using the French DST as benchmark. The DST-equivalent sector-level tax rates are applied permanently to all countries included in the simulations. Annex Table 4.D.2 shows the respective tax revenues generated in each of the country groups. Tariffs are simulated on trade in non-service sectors that are known to be typically targeted for tariff action and are symmetrically and permanently applied to the same products, which makes the results comparable between countries (Annex Table 4.D.1).⁷³

Annex Table 4.D.1. Sectors targeted for tariff retaliation or counter retaliation

Targeted sectors are subject to tariff retaliation or counter retaliation.

All Sectors	Targeted Sectors
Cereal grains	<i>Cereal grains</i>
Other agriculture and food	
Beverages and tobacco products	<i>Beverages and tobacco products</i>
Oil seeds	<i>Oil seeds</i>
Natural resources	
Meats	<i>Meats</i>
Mineral and metal products	
Motor vehicles and parts	<i>Motor vehicles and parts</i>
Transport equipment	<i>Transport equipment</i>
Electronic equipment	<i>Electronic equipment</i>
Machinery and equipment	<i>Machinery and equipment</i>
Other manufacturing	
Transportation services	
Communication services	
Financial services	
Insurance	
Business services	
Education services	
Public Administration and defence	

Source: METRO v3 simulations and database, OECD calculations.

Annex Table 4.D.2. DST revenues targeted for tariff retaliation

US retaliation factor	0.5		1		4		5	
	3%	5%	3%	5%	3%	5%	3%	5%
Model DST tax parameter	0.12%	0.20%	0.12%	0.20%	0.12%	0.20%	0.12%	0.20%
1 DST legislated	454	757	454	757	454	757	454	757
2 Section 301 EU Countries	2167	3612	2167	3612	2167	3612	2167	3612
3 Section 301 non-EU Countries	824	1373	824	1373	824	1373	824	1373
6 Other	2460	4101	2460	4101	2460	4101	2460	4101

Source: METRO v3 database, OECD calculations.

447. In the retaliating region, i.e., the United States, the size of the ad valorem tariff rate depends on the DST revenues in the implementing country, the imports into the United States of the targeted sectors in the baseline data and the size of the retaliation factor. The average retaliatory tariffs by country group

are shown in Annex Table 4.D.3. The calibrated tariff rates are generally close between country groups, except for country group 6 that contains a very mixed set of economies at different stages of development. As a result, the average level of servicification in this group is lower than in the other groups, and hence the revenues from a tax on digital services at a given tax rate are also lower compared to their weight in the global economy (see GDP shares in Table 4.3 and DST revenues in Annex Table 4.D.2). This results in a relatively lower level of retaliatory tariffs.

Annex Table 4.D.3. US Retaliatory tariffs on targeted sectors

The table shows the unweighted average tariff rate across all targeted sectors (Annex Table 4.D.1) corresponding to the respective DST revenue volume (Annex Table 4.D.2) and retaliation factor.

US retaliation factor	0.5		1		4		5	
	3%	5%	3%	5%	3%	5%	3%	5%
Model DST tax parameter	0.12%	0.20%	0.12%	0.20%	0.12%	0.20%	0.12%	0.20%
1 DST legislated	1.1%	1.8%	2.1%	3.6%	8.6%	14.3%	10.7%	17.9%
2 Section 301 EU Countries	0.9%	1.4%	1.7%	2.8%	6.8%	11.4%	8.5%	14.2%
3 Section 301 non-EU Countries	1.1%	1.8%	2.2%	3.7%	8.8%	14.7%	11.1%	18.4%
6 Other	0.3%	0.4%	0.5%	0.9%	2.1%	3.5%	2.6%	4.4%

Source: METRO v3 database, OECD calculations.

448. In scenarios with counter-retaliation, countries react to the retaliatory tariff imposed by the United States such that the counter-retaliation matches retaliation in terms of tariff revenues, without an additional mark up. The counter-retaliatory tariffs, shown in Annex Table 4.D.4, are close, but not equal, to the initial retaliatory tariffs imposed by the United States because the size of the import flow into the counter-retaliating countries does not generally match the size of their exports on which the initial US retaliatory tariff is based.

Annex Table 4.D.4. Counter-retaliatory tariffs on targeted sectors

The table shows the unweighted average tariff rate across all targeted sectors (Annex Table 4.D.1) corresponding to the respective DST revenue volume (Annex Table 4.D.2) and retaliation factor.

US retaliation factor	0.5		1		4		5	
	3%	5%	3%	5%	3%	5%	3%	5%
Model DST tax parameter	0.12%	0.20%	0.12%	0.20%	0.12%	0.20%	0.12%	0.20%
1 DST legislated	1.4%	2.3%	2.8%	4.6%	11.1%	18.4%	13.8%	23.0%
2 Section 301 EU Countries	1.7%	2.8%	3.3%	5.5%	13.3%	22.1%	16.6%	27.6%
3 Section 301 non-EU Countries	1.0%	1.7%	2.1%	3.4%	8.2%	13.7%	10.3%	17.2%
6 Other	0.3%	0.5%	0.6%	1.0%	2.4%	4.0%	3.0%	4.9%

Source: METRO v3 database, OECD calculations.

Additional results

449. The series of simulations for each parameter combination follows the sequence outlined in Annex Table 4.D.5. First, the implementation of the DST is simulated (S0); second, the new equilibrium after the DST implementation is taken as a starting point to simulate tariff retaliation (S1); third, starting again with the new equilibrium after tariff retaliation has taken place, counter-retaliation is simulated according to the case with narrow DST implementation (S2) and so on. Between each of the steps, the economy settles

into a new equilibrium, which reflects the adjustments in trade, production and prices that result from the respective policy development.

Annex Table 4.D.5. Overview of the simulated cases

Two different DST rates and retaliation factors are simulated for cases S1, S2 and S3. Group numbers refer to country groups in Table 4.3; the sequence of events is outlined in Figure 4.15.

Case	DST rate	Tariff Retaliation Factor	Simulations
First step in the sequence (S0)	3%, 5%	-	DST implemented, group 1
First and second step in the sequence (S1)	3%, 5%	0.5, 1, 4, 5	DST implemented, group 1 Tariff retaliation, group 4
Narrow DST implementation – full sequence (S2)	3%, 5%	0.5, 1, 4, 5	DST implemented: group 1,2,3 Tariff retaliation: group 4 Tariff counter-retaliation: group 1,2,3
Broad DST implementation – full sequence (S3)	3%, 5%	0.5, 1, 4, 5	DST implemented: group 1,2,3,6 Tariff retaliation: group 4 Tariff counter-retaliation: group 1,2,3,6

Note: The main text only refers to the cases with narrow and broad DST implementation; the additional cases are discussed only in this annex.
Source: OECD.

450. Aggregate results are discussed in the main text (Table 4.5) and Annex Table 4.D.6. However, there is considerable heterogeneity across country groups that is not visible from the global averages of GDP changes. That heterogeneity stems from various sources: the trade linkages with the United States; the trade linkages between and among country groups; the weight of the tariff-targeted sectors in the economy; and, importantly, the sequence of policy developments. Annex Figure 4.D.1 illustrates the distribution of GDP changes by scenario and across all parameter combinations.

451. The impact of the implementation of the DST in one country (S0) is very small and concentrated on the implementing country. Subsequent tariff retaliation (S1) spreads the negative effects more widely. Both countries engaged in this stage experience negative effects from the tariffs with the GDP of the DST implementing country (France) declining by between -0.1% to -0.3% and that of the retaliating country (US) by up to -0.08%. Other country groups would be either positively or negatively affected as trade is diverted away from the two countries engaged in the retaliation. For example, other EU countries would pick up some of the lost trade from the DST implementing country, while global value chain linkages would harm the trade from some EU and non-EU countries that flows through the DST implementing EU country and subsequently to the United States.

452. When the implementation of the DST, the tariff retaliation and the counter-retaliation becomes more widespread (S2) the economic cost increases and the variation across countries becomes more pronounced. The countries engaged in tariff retaliation are subject to larger negative effects, while those not engaged in the dispute could pick up some of the trade and economic activity. At this stage, two country groups would see a GDP increase, making up 0.38% or less for group 5 (China and Hong-Kong) and +0.32% or less for group 6 (including all other countries). In spite of this substantial reallocation, average global GDP would be lower, as shown in Table 4.5 in the main text and Annex Table 4.D.6.

453. As the implementation of a DST and tariff retaliation generalizes to even more countries (S3), the options for reallocation become fewer and global GDP would decline by up to -1.2% with very wide variations across country groups. The shrinking size of the economies engaged in tariff retaliation generates progressively negative effects. As their trade declines, incomes decline and demand for imports falls further. Country group 5, which is the only one not engaged in the dispute, picks up some of the economic activity (with GDP growth up to 1.3%) but obviously it cannot absorb all of the strain put on the global economy.

454. Standing by and not engaging in the tax and trade dispute generally appears to pay off. While some positive spillovers on countries not engaged in the trade dispute are always to be expected, the positive effects on country group 6 in the case where they are engaged in the dispute is not evident (Annex Figure 4.D.2). One reason for this finding is that they would benefit from reallocation of activities during the previous stages of the simulation (S0 through S2). The tariffs imposed when they enter in the last stage (S3) do not wipe out those previous gains, even if the incremental effects between S2 and S3 are negative for them. Another reason is that their tariff rates are comparatively lower than those imposed by other country groups (Annex Table 4.D.3 and Annex Table 4.D.4).

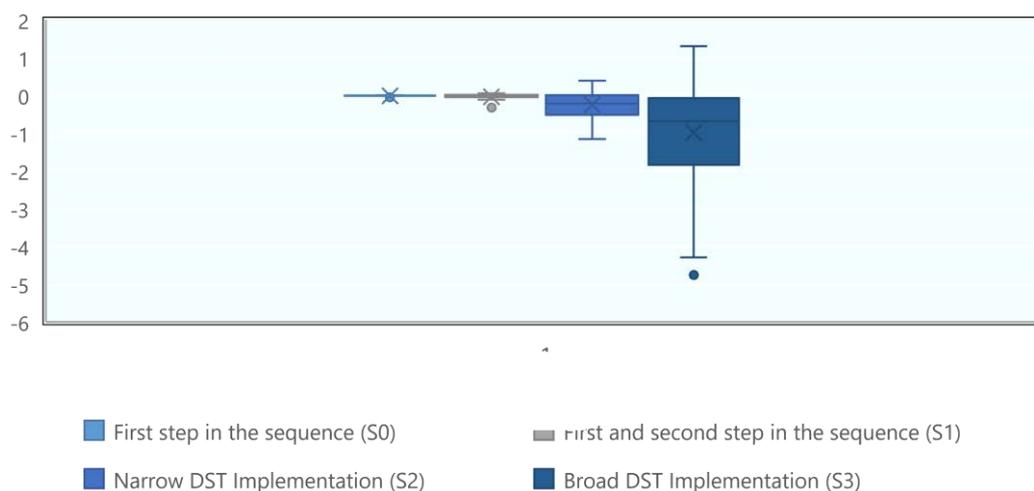
Annex Table 4.D.6. Simulation results (weighted percent changes)

Tariff ret. factor	Narrow DST implementation (S2)								Broad DST implementation (S3)							
	0.5		1		4		5		0.5		1		4		5	
DST rate	3%	5%	3%	5%	3%	5%	3%	5%	3%	5%	3%	5%	3%	5%	3%	5%
Real GDP	-0.08	-0.14	-0.09	-0.15	-0.13	-0.22	-0.15	-0.24	-0.40	-0.66	-0.44	-0.72	-0.66	-1.08	-0.73	-1.21
Real HH income	-0.08	-0.13	-0.08	-0.14	-0.13	-0.21	-0.14	-0.23	-0.35	-0.59	-0.38	-0.64	-0.57	-0.95	-0.64	-1.07
Real Imports	-0.14	-0.23	-0.17	-0.28	-0.30	-0.48	-0.34	-0.53	-0.61	-1.02	-0.68	-1.14	-1.11	-1.81	-1.25	-2.04

Source: METRO v3 simulations and database. OECD calculations.

Annex Figure 4.D.1. Distribution of GDP changes by scenario, relative to base data (%)

GDP changes by scenario across all parameter combinations.

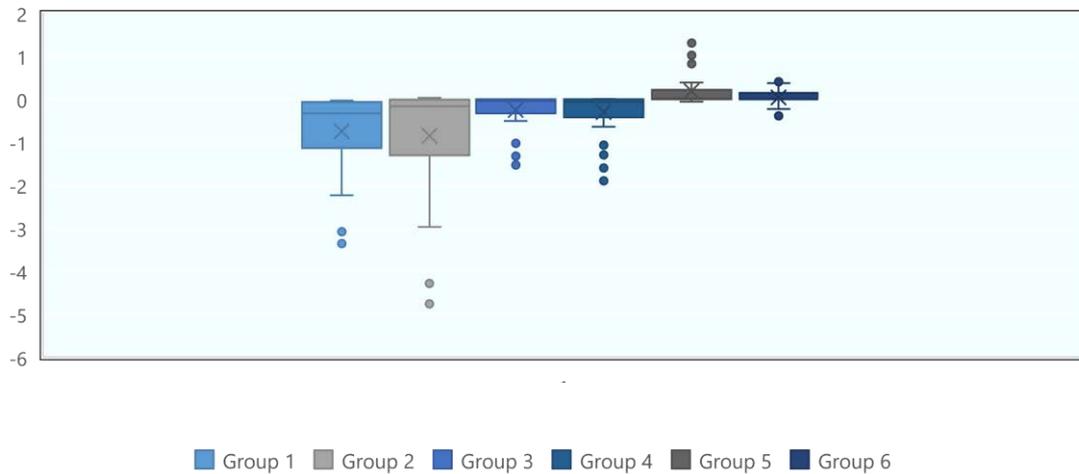


Note: The upper edge of the box corresponds to the 75th percentile; the lower end of the box corresponds to the 25th percentile; the middle line in the box is the median while the unweighted average is shown as a cross.

Source: METRO v3 simulations and database. OECD calculations.

Annex Figure 4.D.2. Distribution of GDP changes by jurisdiction group, relative to base data (%)

GDP changes by scenario across all parameter combinations.



Note: The upper edge of the box corresponds to the 75th percentile; the lower end of the box corresponds to the 25th percentile; the middle line in the box is the median while the unweighted average is shown as a cross.

Source: METRO v3 simulations and database. OECD calculations.

455. The broader the spread of tariffs and counter tariffs, the more widespread the slowdown in trade becomes (Annex Table 4.D.7). Bilateral trade in the case with narrow DST implementation (S2) between the countries imposing tariffs on each other could shrink by double-digit numbers. For example, the exports from EU countries to the United States could shrink by 10.8%, while the corresponding opposite trade flow could shrink by 11.5%. In this scenario, the countries not engaged in the dispute would expand exports slightly, including trade amongst themselves. Their trade into the countries that are affected by tariffs is only expanding marginally, however. Trade diversion is limited, because import demand is falling in step with the overall economic contraction.

456. Falling exports are not only the result of retaliatory tariffs imposed by trade partners, but are also a consequence of the export taxing effect of import tariffs (Lerner effect).

457. In the case with broad DST implementation (S3), when country group 6 also enters into the dispute, they would lose markets globally, except for the intra-group trade and trade with the countries not participating in the trade dispute; country group 5, (China and Hong Kong (China)). Their trade to other regions would collapse further as the global decline of economic activity aggravates.

Annex Table 4.D.7. Change in bilateral trade matrix (DST rate = 5%, Retaliation factor = 5), relative to base (%)

Narrow DST implementation						
to:	1 DST	2 Section 301 EU Countries	3 Section 301 non-EU Countries	4 Retaliating	5 No DST, no retaliation	6 Other
from:						
1 DST	0.0	-0.4	-0.4	-25.0	-2.0	-1.0
2 Section 301 EU Countries	-1.0	-0.7	-0.2	-10.8	-0.1	-0.1
3 Section 301 non-EU Countries	-0.7	-0.4	-0.1	-8.1	0.5	0.3
4 Retaliating	-14.8	-11.5	-9.0	0.0	1.1	0.9
5 No DST, no retaliation	-0.6	0.1	0.7	1.0	0.0	0.4
6 Other	-0.7	-0.3	0.0	1.3	0.7	0.5
Broad DST implementation						
to:	1 DST	2 Section 301 EU Countries	3 Section 301 non-EU Countries	4 Retaliating	5 No DST, no retaliation	6 Other
from:						
1 DST	0.0	-4.4	-2.7	-26.7	-3.3	-2.6
2 Section 301 EU Countries	-4.7	-5.7	-3.6	-13.7	-2.7	-3.0
3 Section 301 non-EU Countries	-2.1	-3.2	-1.1	-9.2	1.0	-0.1
4 Retaliating	-15.5	-13.3	-9.4	0.0	2.0	-4.2
5 No DST, no retaliation	-0.4	-1.0	1.4	3.1	0.0	1.7
6 Other	-1.2	-2.1	0.1	-2.5	2.4	1.6

Source: METRO v3 simulations and database. OECD calculations.

Notes

¹ This specification models only Amount A under Pillar One, assuming a 10% profitability threshold based on profit before tax over turnover, a 20% reallocation percentage to market jurisdictions and a restriction to ADS and CFB. In modelling Pillar Two, a 12.5% rate with jurisdiction blending is assumed, including a 10% carve-out on depreciation expenses (approximated using the value and location of tangible assets).

² For the purpose of this chapter, user/market jurisdictions (henceforth “market jurisdictions”) are jurisdictions where an MNE group sells its products or services or, in the case of highly digitalised businesses, provides services to users or solicits and collects data or content contributions from them.

³ The analysis of the revenue effects of the Pillar Two proposals in Chapter 3 covered certain scenarios including behavioural responses by governments and MNEs. On the government side, these responses covered only increases in effective tax rates in half of the jurisdictions where the average backward-looking effective tax rate on MNE profits is currently below the minimum rate but not zero and in none of the zero-tax jurisdictions - situations where the respective profits would otherwise be taxed at the minimum rate in another jurisdiction. On the business side, it included only changes in the intensity of profit shifting, e.g., when an MNE decides to shift fewer profits to lower-tax jurisdictions due to the introduction of the minimum tax. The revenue analysis presented so far has not taken into account impacts on real economic activities by MNEs, notably the impacts of the proposals on growth and investment.

⁴ If the relocation implies a decrease in production efficiency, global output could still decrease; however, the effects of changes in production efficiency are difficult to evaluate because the extent to which capital allocation is distorted before (and after) the relocation takes place is unknown.

⁵ Given that discussions on policy design and key parameters are still taking place through the Inclusive Framework, any modelling assumptions are made on a without prejudice basis.

⁶ The required data on depreciation expenses are not readily available across jurisdictions. In the ETR calculations the impact of a carve-out on depreciation expenses is therefore approximated using the value and location of tangible assets. The carve-out on payroll expenses cannot be adequately modelled in this framework. See Hanappi and González Cabral (2020_[12]) for more detail.

⁷ The required data from OECD Corporate Tax Statistics is available for 72 jurisdictions (excluding Estonia and Latvia).

⁸ The literature generally distinguishes effective average tax rates (EATRs) and effective marginal tax rates (EMTRs). EMTRs measure the extent to which taxation increases the pre-tax rate of return required by investors to break even. This indicator is used to analyse how taxes affect the incentive to expand existing investments given a fixed location (along the intensive margin). EATRs reflect the average tax contribution a firm makes on an investment project earning above-zero economic profits. This indicator is used to analyse discrete investment decisions between two or more alternative projects (along the extensive margin).

⁹ Throughout this analysis the MNE organisational structure is kept constant and empirical calibrations are based on the assumption that the investment is undertaken in the jurisdiction of the ultimate parent entity. However, the empirical calibration could be adjusted to analyse investments in the location of any given subsidiary, assuming that the ultimate parent entity is located in another jurisdiction; in theory, this approach would then need to consider all parent and subsidiary jurisdictions in the data to take into account the full set of combinations. While this approach may be conceptually appealing, data limitations imply that the results are likely to be less reliable than those based on the narrower but more accurate approach proposed here.

¹⁰ The ETRs in OECD Corporate Tax Statistics are based on information obtained directly from the respective delegate for each of the participating jurisdictions, including several rounds of feedback and quality assurance. However, data comparability at the jurisdiction level could be affected if asset classes are interpreted differently across jurisdictions.

¹¹ For the purposes of the ETR analysis, possible interaction effects between Pillar One and Pillar Two are not taken into account. Modelling the effects of both Pillars simultaneously would complicate the formal derivations significantly without necessarily providing further insights, over and above the empirical results described in the revenue analysis.

¹² As shown in Corporate Tax Statistics (OECD, 2020_[15]), certain jurisdictions lack the tax provisions and administrative infrastructure to operate a full-fledged CIT system; this is typically the case in jurisdictions where the statutory rate is zero and there is thus no need to establish much infrastructure. Given this lack of infrastructure in zero-tax jurisdictions, the impact of the proposals on real investment, as opposed to profit shifting, in those jurisdictions will strongly depend on the tax policy responses by the respective government following the implementation of the Pillar One and Pillar Two proposals. For this reason, and to operate on a without prejudice basis, the empirical modelling does not consider the impact of such, more wide-ranging, tax policy changes in the case of zero-tax jurisdictions. The impact of the proposals on foreign profits shifted into these jurisdictions is, nonetheless, accounted for.

¹³ Amount B is not modelled within the ETR framework due to methodological challenges. More specifically, modelling Amount B would require a comprehensive cross-country dataset of entity level data combining

information on (i) the nature of the activities of each entity (to identify which entities would be affected by Amount B) and (ii) their financial information (to quantify the effect of applying Amount B).

¹⁴ As described in Chapter 5, the firm level data for this calibration has been collected from several sources including the ORBIS database, Worldscope and other sources; from ORBIS only consolidated financial account data have been used for this part of the analysis, making concerns about country coverage less pertinent given that coverage of consolidated accounts is much more extensive across countries than coverage of unconsolidated accounts.

¹⁵ As discussed in endnote 9, this approach is mainly driven by the need for empirical calibration and is likely to produce the most accurate results given the data limitations.

¹⁶ Jurisdiction groups are based on the World Bank classification of countries by income group. Investment hubs are defined as jurisdictions with a total inward FDI position above 150% of GDP, based on raw FDI data.

¹⁷ When looking in isolation to the subset of firms affected by Pillar One (with revenues over EUR 750 million, in CFB or ADS and with residual profits defined using a 10% threshold), the change in ETRs is estimated to be of 0.12 percentage points for the EATR and 0.07 percentage points for the EMTR. However, these figures fail to reflect the scope restrictions of Pillar One that will only target a subset of MNEs. The turnover of firms in-scope of Pillar One as defined above, which is used to weight the impact of Pillar One on ETRs, only accounts for 10% of the turnover of all MNEs in the analysis. The same applies to the scope of Pillar Two. The modelling assumes that Pillar Two only applies to MNEs with revenues above EUR 750 million, and thus the impact of Pillar Two on ETRs is weighted by the share of turnover from MNEs above the EUR 750 million threshold. While this subset of MNEs still includes over 90% of the turnover of all firms in the economy, only those with low-taxed profits will be affected by Pillar Two.

¹⁸ Only 4 out of 37 OECD countries retain a worldwide taxation system in 2020. These are Chile, Israel, Mexico and South Korea. These are jurisdictions not offering participation exemptions for foreign capital gains and dividends.

¹⁹ However, policy priorities and tax structures differ across jurisdictions; the costs associated with different distortions may thus be assessed differently across jurisdictions, thereby affecting optimal policy choices at the jurisdiction level.

²⁰ In fact, a reduction in tax rate differentials can be interpreted as a move towards capital export neutrality (CEN).

²¹ More generally, tax incidence also has obvious implications on the progressivity of corporate taxation; however, an analysis of the impacts of the new rules on progressivity of existing tax systems is outside the scope of this chapter.

²² The empirical findings discussed in this paragraph could be driven by several underlying effects, e.g., liquidity constraints, economic rents or profit shifting among others. Since it is difficult to disentangle the effects empirically, it is not possible to determine at this point whether and to what extent the elimination of a specific effect (among many) would change the findings.

²³ The firm-level analysis relies on firm-level data from ORBIS. While ORBIS covers a large number of countries, the final sample of countries is driven by the availability of financial data at the entity level. Although the sample at the entity level is restricted to 17 – mostly European – countries, the results are likely to be applicable to other countries given that the model estimates firm-level effects of corporate tax

everything else being equal, and that the list of countries covered (including for example Nordics, Eastern and Southern European countries, and big European Union countries) is relatively varied both in terms of taxation and economic structure.

²⁴ Due to limitations of the available data, the analysis focuses on the short-term reaction of investment to tax changes. The economic literature suggests that investment is lumpy and that reactions to tax rate changes are larger in the long term than in the short term (Sorbe and Johansson, 2017^[7]). The fact that profitable MNE groups are less sensitive to taxes than less profitable groups in the short term suggests that this may be the case in the long term as well.

²⁵ In some business models, the reallocation of residual profit will be to the jurisdiction of the user rather than the consumer.

²⁶ Depending on the final design of the proposals, there may be a risk of additional disputes stemming from the interaction of Amounts A and B with the existing transfer pricing system.

²⁷ Available evidence also suggests that EMTRs have fallen over the observed period (Devereux et al., 2002^[63]).

²⁸ For the purpose of this chapter, “market jurisdictions” are jurisdictions where an MNE group sells its products or services or, in the case of highly digitalised businesses, provides services to users or solicits and collects data or content contributions from them.

²⁹ Assuming simultaneous tax rate setting (i.e., a Nash equilibrium), the introduction of minimum taxation leads the high-tax jurisdiction to increase its rate. Assuming sequential tax rate setting with the high-tax jurisdiction being the leader (i.e., Stackelberg equilibrium), the high-tax jurisdiction tends to reduce its rate when minimum effective taxation is introduced (Keen and Konrad, 2013^[79]). In a simultaneous game, the best response of a given jurisdiction, in terms of the effective tax rate, is increasing to the level of other jurisdictions’ effective tax rates; i.e., a jurisdiction can increase its own rate without losing its attractiveness as long as other jurisdictions have higher effective tax rates. In this setting, the introduction of minimum effective taxation increases the optimal tax rate chosen by jurisdictions with rates above the minimum. However, in a sequential game, the leader takes into account that setting a lower tax rate might not be beneficial because the followers can decrease theirs. With a minimum effective tax rate, this threat from the followers is weaker.

³⁰ Note by Turkey: The information in this document with reference to “Cyprus” relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the “Cyprus issue”.

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³¹ Innovation activities are defined as “all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations” and the Oslo Manual recognises eight different categories, of which investment in research and development (R&D) is only one of them. Among the other innovation activities recognised in the Oslo Manual are: engineering, design and other creative work activities; marketing and brand equity activities; intellectual property related activities;

employee training activities; software development and database activities; activities related to the acquisition or lease of tangible assets and innovation management activities. Note that innovation activities may or may not lead to innovations.

³² The focus on the targeted tax provisions is due to their direct interaction with the new Pillar One and Pillar Two rules.

³³ Under the assumption that Pillar Two operates with jurisdictional blending.

³⁴ For example, a share of the profits previously attributed to preferential regimes could become subject to reallocation, and therefore higher taxation, under Pillar One, however, this effect is highly dependent on the design of Pillar One, in particular the rules for double tax relief, and relevant only for the qualifying share of income as defined in the preferential regime.

³⁵ It is important to note that even though innovation appears responsive to taxation, heterogeneity in firms' responses is to be expected. This might be due to the industry and markets where they operate, the type of business model, the organisational, management and ownership structure, the technology they use (Desai and Hines, 2002_[200]; Egger, Erhardt and Keuschnigg, 2018_[201]; Griffith, Miller and O'Connell, 2014_[173]). Agglomeration effects also diminish the sensitivity of firms to taxation (Akcigit et al., 2018_[209]).

³⁶ Depending on the design of the rules, there might be instances where the benefits granted through direct support measures are curtailed. Tax incentives targeted to younger or smaller firms that are out of scope of the new provisions will most likely be unaffected by these developments.

³⁷ This indicator refers to innovation-active firms in product and process. Innovation is defined following the Oslo Manual 2005 edition. Product innovation is defined as the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Process innovation is defined as the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Further information on this indicator is available in the data link provided in the note to Figure 4.10.

³⁸ The degree of acceleration granted to these investments will affect the generosity of these incentives and if deemed too generous could potentially drive ETRs below the minimum threshold. However, this effect will be less pronounced than in the case of enhanced provisions that provide relief over and above the value of the investment.

³⁹ However, recent empirical research suggests that the effects of FDI on growth could be lower than previously thought (Bermejo Carbonell and Werner, 2018_[203]).

⁴⁰ Similarly, investment tax incentives are sometimes used to stimulate domestic investment in specific, less-advanced regions within a country.

⁴¹ Alternative policies include investment promotion and facilitation measures to simplify administrative procedures for companies in their operations in sometimes complex legal and institutional environments. They also include infrastructure provision and institutional stability.

⁴² Increasing market concentration is not synonymous with weakening competition. For example, a large firm with many small competitors may be subject to less competitive pressure than a large firm with only a few similarly large competitors. In addition, in existing studies concentration is typically measured at an aggregate industry level, which is unlikely to be reflective of the competitive dynamics within markets.

⁴³ Different policy options to achieve this are still under discussion.

⁴⁴ The extent to which investment would be relocated remains an open question. If investment in one foreign affiliate can be substituted by investing in another affiliate, overall effects on group level investment would be small, however, negative effects on group level investment would be relatively larger if foreign and domestic investment were complements (Becker and Riedel, 2012^[206]) (Suárez Serrato, 2018^[205]).

⁴⁵ Group level EATRs and EMTRs are computed for a stylised investment in the ultimate parent jurisdiction taking into account the possibility to shift profits to other locations within the MNE group.

⁴⁶ The model is described online at: <https://www.oecd.org/economy/growth/scenarios-for-the-world-economy-to-2060.htm#papers>.

⁴⁷ This result corresponds to the MNE group level effect for a stylised investment project, including a combination of assets, i.e., non-residential structure, tangible assets and acquired intangibles. The empirical calibration assumes that the investment takes place in the ultimate parent jurisdiction, such that the empirically observed location of profits and tangible assets matches an ultimate parent entity headquartered in the respective jurisdiction. As discussed in Hanappi and González Cabral (2020^[12]), the aggregate figure is constructed as a GDP-weighted average across the jurisdiction level results.

⁴⁸ As discussed in Millot et al. (2020^[44]), the tax sensitivity of entities in MNE groups with profitability above 10% is estimated to be -0.085, while the tax sensitivity in average MNE groups is estimated to be -0.131. The short-term tax sensitivity is thus around 35% lower for entities in more profitable MNE groups. The adjustment assumes that this difference also holds in the long term.

⁴⁹ The MNE shares in business investment and value added may differ; however, additional cross-checks show that the share of foreign MNEs in business investment and value added are almost identical in the European Union (see [Eurostat data on the structure and activity of foreign affiliates](#)).

⁵⁰ The Analytical AMNE database is accessible online at <https://www.oecd.org/industry/ind/analytical-amne-database.htm>.

⁵¹ Note by Turkey: The information in this document with reference to “Cyprus” relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the “Cyprus issue”.

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⁵² Hines and Park (2019^[202]) investigate the effects of tax subsidies for investments in specific assets (but not others), suggesting that such a selective approach leads to substitution effects that could largely offset positive effects on investment. If such substitution effects would materialise also in response to a DST, e.g., from digital advertisements to other forms of advertisement, a similar effect could undermine DST revenue.

⁵³ The concerns raised focused on the following points: (i) the potentially discriminatory nature of the DST; (ii) the retroactivity; (iii) the DST's application to revenue rather than income; (iv) its application to revenues unconnected to a physical presence in France; and (v) its application to a small group of digital companies.

⁵⁴ Given that the French DST is expected to raise around EUR 450-500 million in its first year, the proposed US response, which amounts to USD 2.4 billion corresponds to approximately a fivefold increase in revenues compared to the revenues raised from the DST.

⁵⁵ A brief description of the model is available [online](#).

⁵⁶ The database is accessible [online](#), including documentation.

⁵⁷ It should be noted that the statistical classification of digital services is still subject to considerable discussion, and the choice made in this study follows closely the insights in the Handbook on Measuring Digital Trade, Version 1, OECD, WTO and IMF (2020_[2041]) and mapping into the GTAP v10 sector aggregation which is used as input in the METRO database. More information is available at <https://www.oecd.org/sdd/its/Handbook-on-Measuring-Digital-Trade.htm>.

⁵⁸ The 5% rate is also modelled on the basis that a number of jurisdictions have proposed DSTs with a higher rate than France (see Table 4.1 above).

⁵⁹ Each simulated case takes the new equilibrium reached under the previous simulation as a starting point; see Annex 4.D for a detailed description.

⁶⁰ Given the opposition to DSTs and similar measures expressed by the United States and its clearly stated policy position of reacting to such measures through trade retaliation, it is assumed to never introduce a DST, but always retaliate where a DST or similar measure has been introduced. China has also expressed very strong public opposition to DSTs and similar measures, although it has not publicly stated that it would take any trade related actions in response to the introduction of such measures. On this basis, China is not considered to implement a DST, even under the scenario with broad DST implementation, nor is it assumed that China implements a retaliatory trade response under any of the scenarios.

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Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

⁶² Although GDP effects are not linear with respect to modelling parameters in the OECD METRO Model, intermediate scenarios, e.g., when different groups of jurisdictions implement DSTs or different DST rates or retaliation factors are chosen, are likely to produce GDP effects between the ranges mentioned in this paragraph.

⁶³ Although high costs of financing is one of the reasons behind the policy support for innovation, large performers do not particularly observe high costs of financing established and thus government

intervention towards large performers on these grounds does not appear justified (Hall and Lerner, 2010^[87]).

⁶⁴ This estimate obtained by the CBO considers companies that reported positive income in the financial year pre and post the inversion. There is variability across firms' experiences post inversion.

⁶⁵ Voget (2011^[189]) finds that 6% of multinationals relocated their headquarters from 1997–2007. The CBO (2017^[187]) identified sixty inversions from the US from 1983 through 2015. Fourteen inversions have been proposed between 2014 and 2017, with eleven being completed by 2016. Although seemingly small in numbers, a more informative metric for corporate inversions might be the level of total assets held by inverting companies, e.g. in 2001 three US companies inverted with total assets amounting to \$22 billion compared to six in 1999 that had total assets of \$13 billion. In 2014, 10 corporations considering inversions in the US amounted to USD 300 billion in total assets and had a much larger share of foreign profits than previous inverted companies, which would turn into permanently reinvested earnings and would not be taxed again in the US. Only four companies completed the inversion after tightening of inversion rules in 2014 announced by the Treasury (U.S. Department of the Treasury, 2014^[207]).

⁶⁶ For certain types of passive income that are highly mobile, taxation occurs on a current basis, i.e. not deferred. This is through the application of controlled-foreign-corporation rules. Territorial systems in practice do not provide a full exemption of foreign income and certain types of income, e.g. passive income are taxed as worldwide income (Joint Committee of Taxation, 2011^[210]).

⁶⁷ These are Chile, Israel, Mexico and South Korea. These jurisdictions are not offering participation exemptions for foreign capital gains and dividends.

⁶⁸ These rules however move the tax system away from a purely territorial system to tax certain types of income at a worldwide level.

⁶⁹ Independent of the system of taxation, CFC rules makes the tax liability current and therefore there is no possibility of further deferral.

⁷⁰ Examples of these are the American Jobs Creation Act of 2004 and the regulations issued by the Treasury in 2014 and 2016; as well as the most recent measures introduced as part of the Tax Cut and Jobs Act in the US (U.S. Department of the Treasury, 2014^[207]) (U.S. Department of the Treasury, 2016^[208]) (Chalk, Keen and Perry, 2018^[211]).

⁷¹ It has been suggested that inversions might be responsive to changes in these taxes, i.e. inversions might be more prone when there is an expected hike in the capital gains tax rate for the sale of the stock that leads to the inversion or during economic downturns when the amount of realised capital gains would be lower.

⁷² See <https://www.oecd.org/trade/topics/metro-trade-model/> for an overview.

⁷³ The results clearly depend on the choice of those sectors. The alternative would be to design a rule that selects sectors for each country based on some objective criteria such as their weight in a county's export bundle or in value added. Even with such a rule, one would likely miss the details of tariffs that are set at a very disaggregate level (for example, a tariff on cognac is very targeted, but the beverage is contained in the more aggregate 'agriculture and food' category of the model database. The approach in this analysis bypasses those intricacies, but nonetheless addresses the sectors where historically trade disputes have been most frequent. A recently published piece under the auspices of the OECD Trade Committee follows essentially the same approach (with the exception of electronics): https://issuu.com/oecd.publishing/docs/oecd-trade-scenario-2-increasing_ta?e=3055080/65009159.



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