TAX POLICY CENTER
URBAN INSTITUTE & BROOKINGS INSTITUTION

MODELING THE TAXATION OF US FOREIGN INVESTMENT THROUGH THE INTERNATIONAL INVESTMENT AND CAPITAL MODEL

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November 2024

ABSTRACT

US multinationals invest and generate significant income abroad. In this report, we expand the International Investment and Capital Model to model average effective and marginal tax rates on income earned from foreign investment by US multinationals. We evaluate the impact of the Tax Cuts and Jobs Act on the tax burden of foreign investments. We model essential elements of the US taxation of foreign income, such as deferral of foreign earnings and the global intangible low-tax income minimum tax regime, before and after the Tax Cuts and Jobs Act. Given the prevalence of income shifting by US corporations, we incorporate profit-shifting behavior and show its impact on average effective and marginal tax rates. We show whether the Tax Cuts and Jobs Act increased or reduced effective average tax rates depends on three crucial factors: the amount of profit generated by the new investment that is shifted to a tax haven, the deferral cost until 2017 of keeping income abroad to avoid paying US taxes upon repatriation, and the treatment of excess foreign tax credits. Firms with a higher cost of deferral before the Tax Cuts and Jobs Act benefit more from the tax reform and the shift toward a territorial system. Firms that shift profit heavily are negatively impacted by the Tax Cuts and Jobs Act because of the global intangible low-tax income minimum tax.

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ACKNOWLEDGMENTS

This report was funded by Arnold Ventures. We are grateful to them and to all our funders, who make it possible for the Urban-Brookings Tax Policy Center to advance its mission.

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The author thanks Eric Ohrn, Eric Toder, Ben Page, Thornton Matheson, Li Liu, Tim Dowd, and others for their comments and feedback.

EXECUTIVE SUMMARY

US multinationals generate large amounts of revenue and invest heavily abroad. The Urban-Brookings Tax Policy Center has extended its International Investment and Capital Model (IICM) to better understand the tax incentives US companies face on their foreign investment.[1] The new model generates forward-looking effective average and marginal tax rates (EATRs and EMTRs) on foreign investment from 2010 to the present and incorporates profit shifting, a tax-avoiding strategy used by many multinational corporations (MNCs).[2] Our model covers one of the largest international tax reforms in history, the Tax Cuts and Jobs Act (TCJA), and derives effective tax rates under TCJA and the previous tax regime.[3]

TCJA implemented broad changes to the taxation of US multinationals. First, it reformed the taxation of foreign profits. The previous system was a worldwide tax system with deferral in which US foreign profits were taxed at the US corporate rate with a credit for foreign income taxes paid, but only when repatriated. TCJA moved the US toward a territorial tax system, whereby foreign profits are exempt from the standard corporate regime but face a global minimum tax known as the global intangible low-tax income (GILTI) regime. Second, as part of an effort to curb profit shifting from corporations operating in the US, TCJA introduced the Base Erosion and Anti-abuse Tax (BEAT), which targets large corporations with deductible payments such as interest or royalties to related foreign affiliates. Finally, TCJA introduced the foreign-derived intangible income (FDII) deduction, which applies a preferential rate on the export income earned from intangible assets located in the US. FDII was part of an effort to incentivize US and foreign companies to relocate some income from intangibles into the US.[4]

Carefully evaluating the tax incentives on foreign investments by US MNCs is a complex but important task. First, US multinationals have been rapidly growing in the last 25 years, generating high levels of employment and production. These firms face complex incentives regarding where to locate production, how much to invest, and where to report profits. Second, multinationals have benefitted from tax rules that enable them to avoid paying some taxes on income they earn in high-tax countries. As many countries adopt provisions to implement a global minimum tax and target tax avoidance, there remains much uncertainty on how multinationals will respond. The ability to carefully evaluate how different aspects of the tax systems change incentives can help policymakers craft tax policy. The new IICM highlights not only the effect of TCJA on foreign investment incentives but also how specific behavior by corporations, such as profit shifting, can affect effective tax rates.

Our model also allows us to compare the tax burden on new investments abroad and in the US. A common intuition is that domestic capital is substituted with foreign capital when US MNCs invest abroad. And while there is evidence to substantiate that claim with investment in specific countries and industries, economic research seems to indicate that foreign capital often complements domestic capital, and higher levels of foreign investment also increase domestic investment (Chodorow-Reich et al. 2023; Desai, Foley, and Hines

2005, 2009). Given the complex relationship between foreign and domestic capital, this report answers questions about the relative tax burden of domestic and foreign income but does not argue whether TCJA changed foreign investment incentives relative to domestic investment as a whole. Rather, we seek to evaluate how TCJA affected tax incentives on investment across foreign countries and jurisdictions. Note that all countries are jurisdictions, but not all foreign jurisdictions are countries; for example, some tax havens are territories that operate as independent jurisdictions. We use both terms, and when we refer to investment in foreign countries, we include independently operated jurisdictions.

We incorporate specific features of the US corporate tax system before and after TCJA to estimate how the reform changed effective average and marginal tax rates for different investments. EATRs are forward-looking tax rates that incorporate essential aspects of the tax systems. They estimate the average tax burden on a new profitable investment and are widely used to compare tax incentives across different locations. EATRs are most relevant for firms choosing where to locate new profitable investments. EMTRs are also forward-looking and estimate the tax burden on a new investment that breaks even after taxes. EMTRs help evaluate how taxes incentivize marginal investment where firms currently have investments and assess the optimal level of investment. We evaluate effective tax rates under a panoply of conditions (e.g., for firms with operations in a single foreign country and for firms with operations in multiple countries).

We find that the effect of TCJA on foreign tax incentives depends on what we assume about the cost of deferral of foreign profits until 2017 and the amount of profit shifting. If we assume no deferral costs and no profit shifting, then replacing worldwide taxation with the GILTI regime had ambiguous effects on foreign effective tax rates. However, with some profit shifted (25 percent), EATRs in most countries went up after 2017. If we assume a deferral cost of 5 percent, TCJA reduced the average foreign effective tax rate, regardless of the amount of profit shifting. The pre-TCJA higher deferral costs increased the value of moving to a territorial tax system. Firms that shift a larger fraction of income see a smaller decline in the EATRs, and sometimes an increase, as the GILTI minimum tax starts binding. Investments in high-tax countries have lower EATRs under the new regime for corporations with excess GILTI liability.

The international tax system continues to evolve. In 2022 and 2023, the Biden administration proposed several ways to reform the current taxation of foreign income, and countries around the world are adopting new rules in their tax systems to adhere to the global minimum tax (Pillar 2) recommended by the Organisation for Economic Co-operation and Development's Base Erosion and Profit Shifting project. Our modeling framework allows for modifications that can help shed light on how potential reforms in the US and abroad impact the effective taxation of foreign investments. Before describing the model, we review the US taxation of US multinationals and discuss the importance of foreign investment in sections 1, 2, and 3. Section 4 presents EATRs and EMTRs for US MNCs before TCJA, and section 5 derives tax states after TCJA. We then show and discuss how TCJA has affected foreign investment incentives under different assumptions.

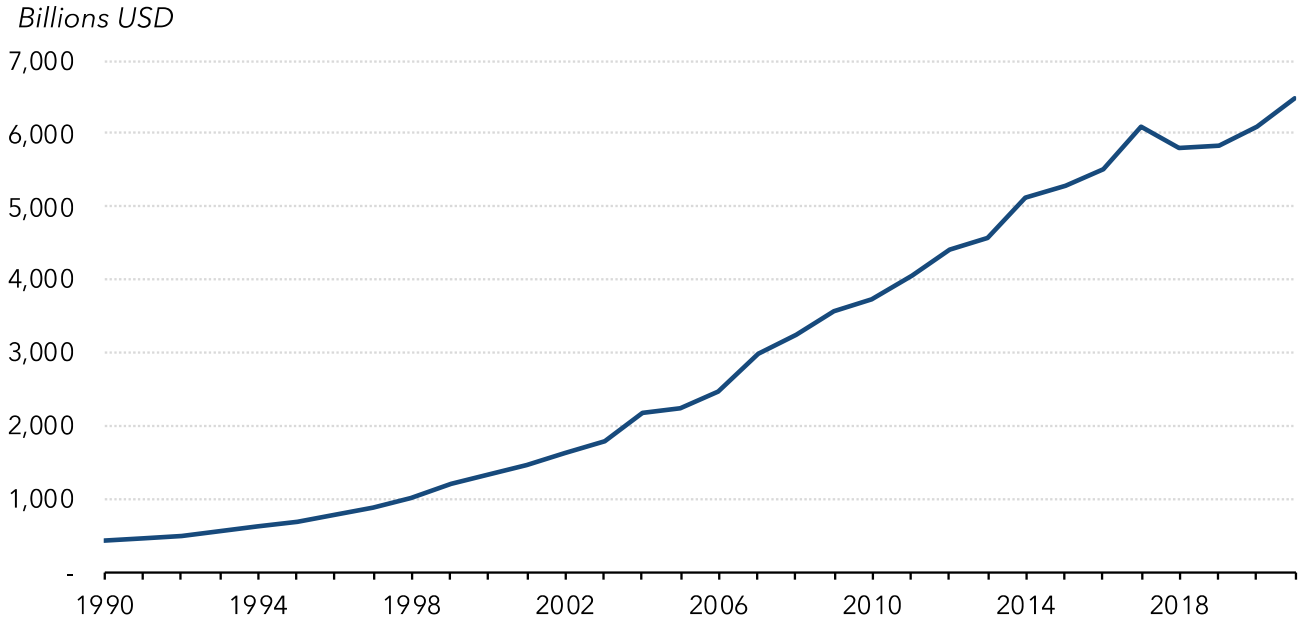
US INVESTMENT ABROAD AND HOW IT IS TAXED

US multinationals can invest in foreign countries directly or through foreign affiliates, such as controlled foreign corporations (CFCs). Foreign affiliates are companies located in foreign countries but are at least partly owned by US companies. Figure 1 highlights the rapid increase in investment abroad by US companies. The value of foreign direct investment (FDI) reported abroad rose from about $450 billion in 1990 to over $6.5 trillion in 2021. After a relatively slow increase in the early 1990s, US FDI rose much faster in the new millennium. The only year this century with a decline in the value of foreign assets was 2018, explained by the substantial amount of income repatriated by US multinational corporations (MNCs) after passage of the Tax Cuts and Jobs Act of 2017 (TCJA).[5]

FIGURE 1

US Direct Investment Abroad

1990–2021



Source: Bureau of Economic Analysis Data, cumulative US direct investment abroad.
Note: We use unadjusted Bureau of Economic Analysis Data to derive the trend in US cumulative foreign direct investment abroad.

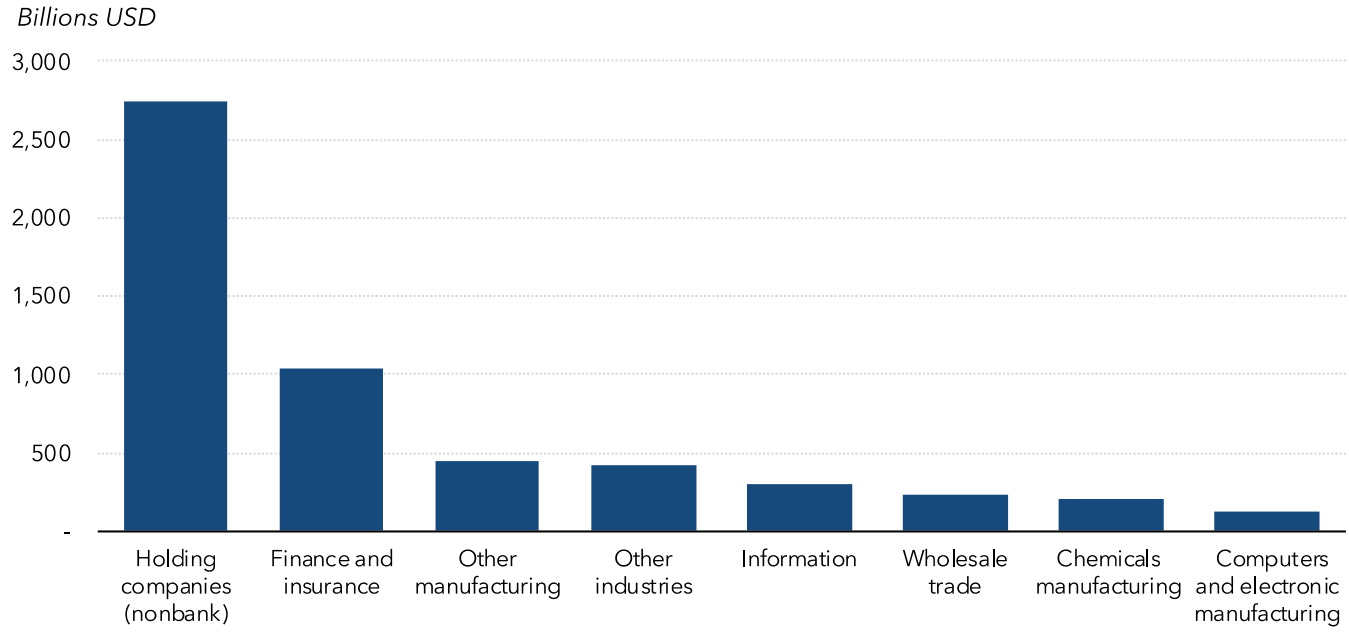
Where is foreign investment?

Figure 2 shows the total direct investment position abroad in 2019 by industry classification. The largest industry category was holding groups, which held over $2.5 trillion in assets.[6] MNCs can be complex—with several "layers" of affiliates and a vast presence of holding companies. Finance and insurance affiliates had above $1 trillion in FDI in 2019. In contrast, total manufacturing affiliates held above $800 billion in FDI, with chemical (which includes pharmaceutical companies) and computer and electronic being the two largest manufacturing industries.

FIGURE 2

US Direct Foreign Investment by Industry

2019



Source: Bureau of Economic Analysis Data, cumulative US direct investment abroad.
Note: We use unadjusted Bureau of Economic Analysis Data to derive the trend in US cumulative foreign direct investment abroad by industry.

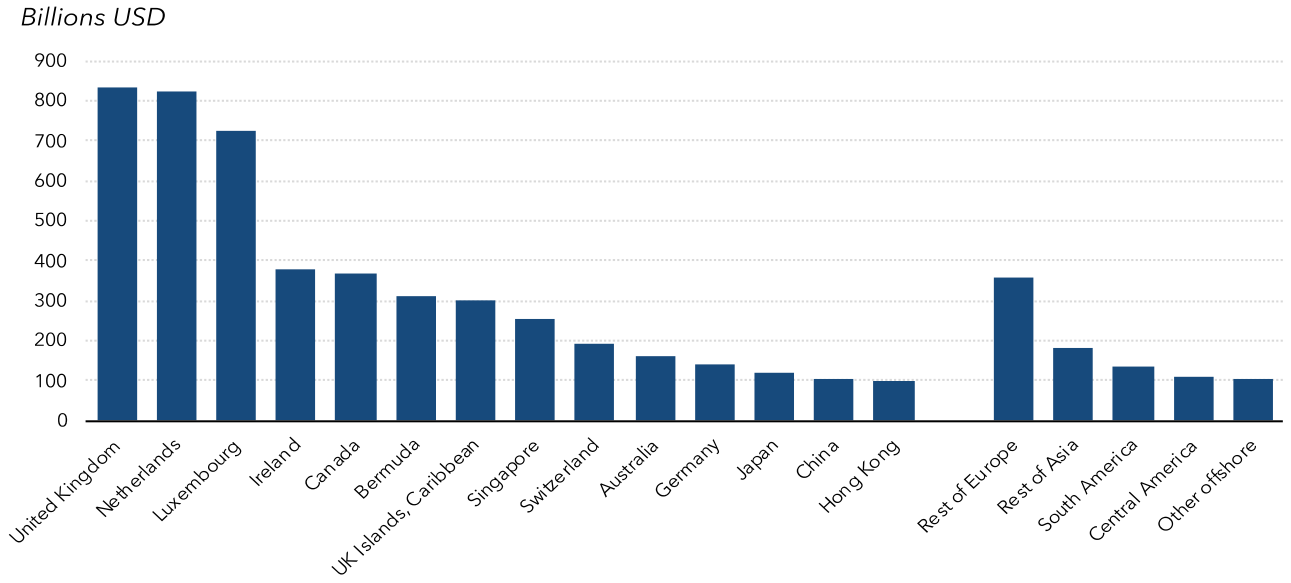
Figure 3 highlights the cumulative FDI across foreign jurisdictions. In 2019, FDI was largest in the United Kingdom and the Netherlands, followed closely by Luxembourg, Ireland, and Canada. Strikingly, many countries with the largest cumulative level of investments are tax havens.[7] Many independent jurisdictions of the United Kingdom are also classified as tax havens, such as Bermuda, the British Caribbean Islands,[8] and the islands of Jersey, Guernsey, and Gibraltar. The Netherlands, Ireland, Singapore, Switzerland, and Hong Kong are all similarly considered tax havens for large MNCs. This figure highlights the relatively small correlation between "real economic activity" and total FDI. Small tax havens are some of the largest recipients of FDI, indicating profit shifting to these jurisdictions.

Foreign direct investment increased drastically since the early 1990s, and most of the cumulative FDIs were in tax havens in 2021 (figure 4). Canada and the United Kingdom had similar investment levels in 1990, but investment in the UK, including its tax havens, grew much faster than in Canada. US MNCs had close to no investment in Ireland and Luxembourg in 1990, but both quickly rose to become some of the largest recipients of US FDI, a potential indication of the rise in profit shifting.

FIGURE 3

US Direct Foreign Investment by Country

2019

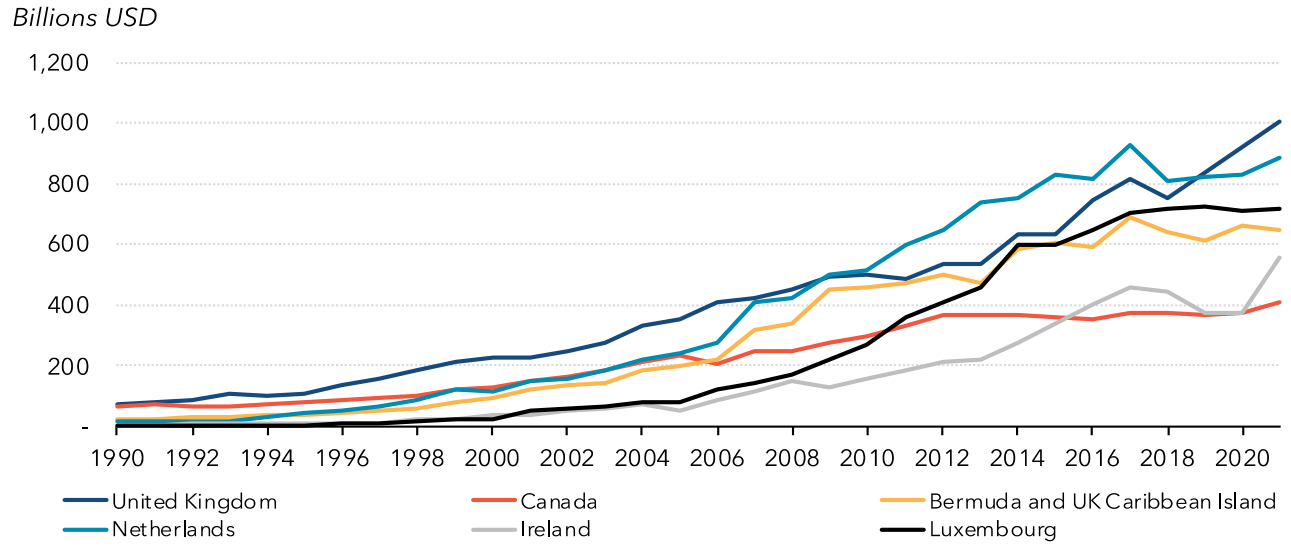


Source: Bureau of Economic Analysis Data, cumulative US direct investment abroad.
Note: We use unadjusted Bureau of Economic Analysis Data to derive the trend in US cumulative foreign direct investment abroad by country.

FIGURE 4

US Direct Foreign Investment by Country

1990–2021



Source: Bureau of Economic Analysis Data, cumulative US direct investment abroad.
Note: We use unadjusted Bureau of Economic Analysis Data to derive the trend in US cumulative foreign direct investment abroad by country.

Does FDI increase or reduce domestic investment?

Whether higher foreign investment increases or reduces domestic investment is a critical and highly debated topic. A common intuition is that a firm's resources are fixed, and that more foreign investment lowers domestic investment. As a result, growing foreign activities by US multinationals have been met with insecurity and antipathy in large segments of the population, including some policymakers. However, the relationship between foreign and domestic investment is complex, and whether more foreign capital lowers domestic capital depends on the structure of firms and whether capital at home and abroad are substitutes or complements. Multinational corporations consider many factors when deciding where to invest, such as production costs, local labor markets, supply chain factors, political and economic stability, financing terms, and tax incentives. Desai, Foley, and Hines (2005) show that when investment is horizontal, that is, when multinationals replicate domestic production in a foreign jurisdiction or move it, doing so can substitute for domestic investment. However, when investment is vertical, and different aspects of production are spread internationally, foreign capital often complements domestic activity, which can increase the demand for domestic capital.

There are many instances of substitution between domestic and foreign production, whereby foreign investment has diverted activity away from the US. For example, a large body of literature has documented the shift in manufacturing investment and jobs from the US to China, fueling the already existing decline in US manufacturing (Autor, Dorn, and Hanson 2016). In contrast, Desai, Foley, and Hines (2009) analyze manufacturing firms in the US between 1982 and 2004 and find that a 10 percent increase in foreign investment is associated with a 2.6 percent increase in domestic investment. More recently, Chodorow-Reich and colleagues (2023) find strong complementarities between foreign and domestic investment when evaluating the TCJA. Using a canonical model of capital and investment in a multinational setting and leveraging administrative tax data, they show the TCJA created strong incentives for multinationals to increase foreign capital, especially for tangible assets, which led to higher foreign investment and spurred domestic investment.

How do countries tax foreign income?

International corporate taxation typically falls under two categories: territorial tax regimes and worldwide tax regimes.[9] In a territorial tax regime, multinational corporations are taxed where they earn income. For example, a French multinational is taxed in France only on its income earned in France, and income earned in other countries is not taxed by the French government. In a worldwide tax regime, multinationals are taxed on their worldwide income in the country where they reside. For example, the Korean government taxes a Korean multinational on total income earned in Korea and other countries.

Most countries in the Organisation for Economic Co-operation and Development (OECD) have shifted to territorial taxation, starting in the 1990s. As of 2023, only a few OECD countries still applied a worldwide tax system for multinationals. Although countries that apply a worldwide system typically allow tax credits and

other deductions to avoid double taxation, the tax rates involve complex calculations, and a portion of profits may still be taxed twice: by the country where economic activity occurs and by the country of official tax residency. Territorial tax systems can alleviate double taxation and promote capital flows and investment between countries. Yet, territorial taxation gives more opportunity for tax avoidance and profit shifting. Because a country can only tax income reported within the country, multinationals get incentivized to shift profit out of high-tax countries into tax havens. Shifting income may be costly, but the benefits often outweigh the costs.

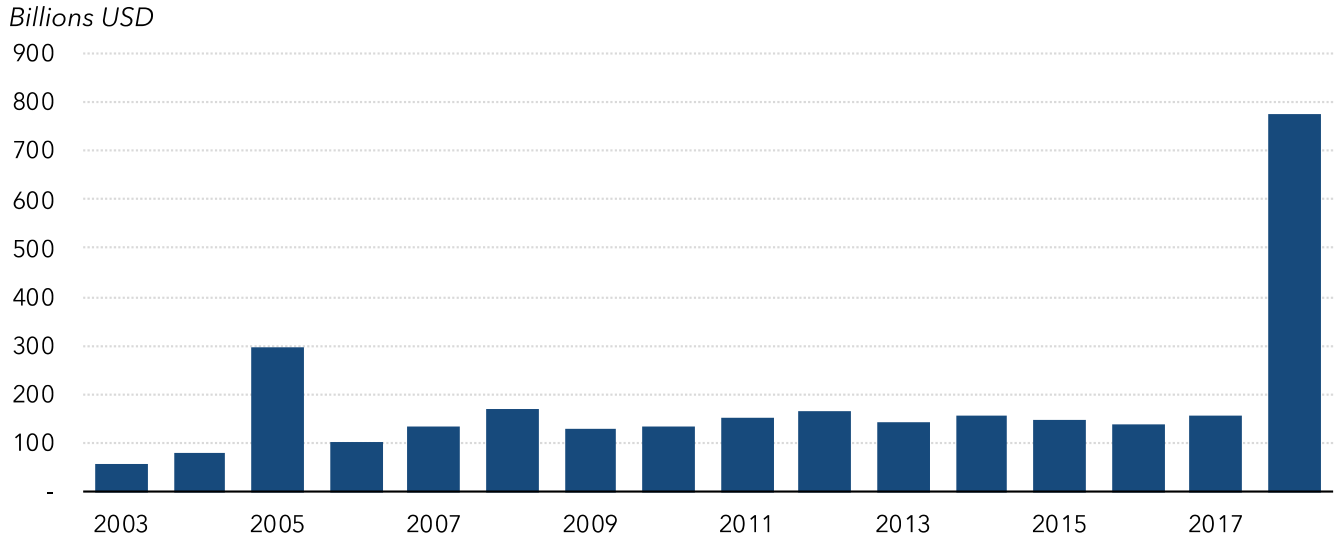
How were US multinational companies taxed before TCJA?

Between World War II and 1986, the tax rate on corporations was relatively high, above 45 percent. The Tax Reform Act of 1986 introduced a new structure and a maximum tax rate of 34 percent for large corporations. Between 1993 and 2017, the top statutory corporate income tax rate was 35 percent, and businesses could deduct interest expenses with limited restrictions.[10] Until 2017, the US corporate tax system was a de jure worldwide tax regime. Technically, all foreign income of US MNCs was taxed by the US. However, the US taxed only MNCs' repatriated income, with the exception of passive income, and in practice, firms could avoid US tax liability on most profit earned abroad until repatriation. The deferral incentive pushed many US multinationals to retain income in foreign countries (see Grubert and Altshuler 2013). To incentivize repatriation, the US sometimes offered a "tax holiday" on repatriated earnings. Foreign earnings repatriated during a tax holiday would benefit from a much lower tax rate than the statutory tax rate.

FIGURE 5

Repatriated Income by US Multinationals

2003–18



Source: Bureau of Economic Analysis Data, balance of payments data.

Figure 5 shows total foreign income repatriated to the US by US MNCs from foreign affiliates.[11] Two years stand out: 2005 and 2018. US MNCs repatriated about $300 billion in 2005 following the passage of the

Homeland Investment Act of 2004, which provided a one-time tax rate of 5.25 percent (instead of 35 percent) on earnings repatriated between November 2004 and December 2006. After 2017, TCJA mandated a tax on unrepatriated assets, with a reduced rate of 15.5 percent on cash or cash equivalent and 8 percent on other assets. In 2018 only, US multinationals repatriated almost $800 billion.

The combination of deferral and occasional tax holidays meant that US corporations sometimes paid low effective tax rates on their foreign earnings, and the corporate tax system was de facto closer to a territorial tax regime. The value of deferral compounds over time and reduces the effective tax rate. For example, a foreign subsidiary makes $1 million in profit and invests it into new capital with a rate of return of 10 percent. Over 25 years, the initial investment would grow to $10.8 million. If the company then repatriates the full amount with a corporate tax rate of 35 percent, it has $7 million of after-tax income. This is equivalent to a yearly effective tax rate of 19 percent, almost half the statutory rate.

Companies could also reasonably expect tax holidays in the future, thereby lowering the expected tax rate on repatriated income. A common worry among policymakers and economists was that the rise of deferral lowered domestic investment and led to inefficient allocations of capital because MNCs could not readily use their retained earnings without paying additional taxes. However, multinationals have devised new ways to use retained earnings without repatriation. Common practices included taking out capital loans between affiliates or between an affiliate and its parent, and using unrepatriated earnings as collateral when borrowing capital. If a US parent borrowed from its Irish affiliate, for example, it could deduct some (or all) of its debt interest payment from US taxable income (Beer, de Mooij, and Liu 2018).

Until TCJA, the use of business interest expenses to lower tax liability had few limits. Dyreng and Hanlon (2023) review the literature on the impact of "trapped cash," or foreign retained earnings, and find that companies with more trapped cash tended to have more domestic debt and a higher likelihood of less-profitable foreign acquisitions. Dharmapala, Foley, and Forbes (2011) look at the Homeland Investment Act of 2004 and find that the most common use of repatriated income was larger shareholder distribution, without any noticeable effect on domestic investment and wages.

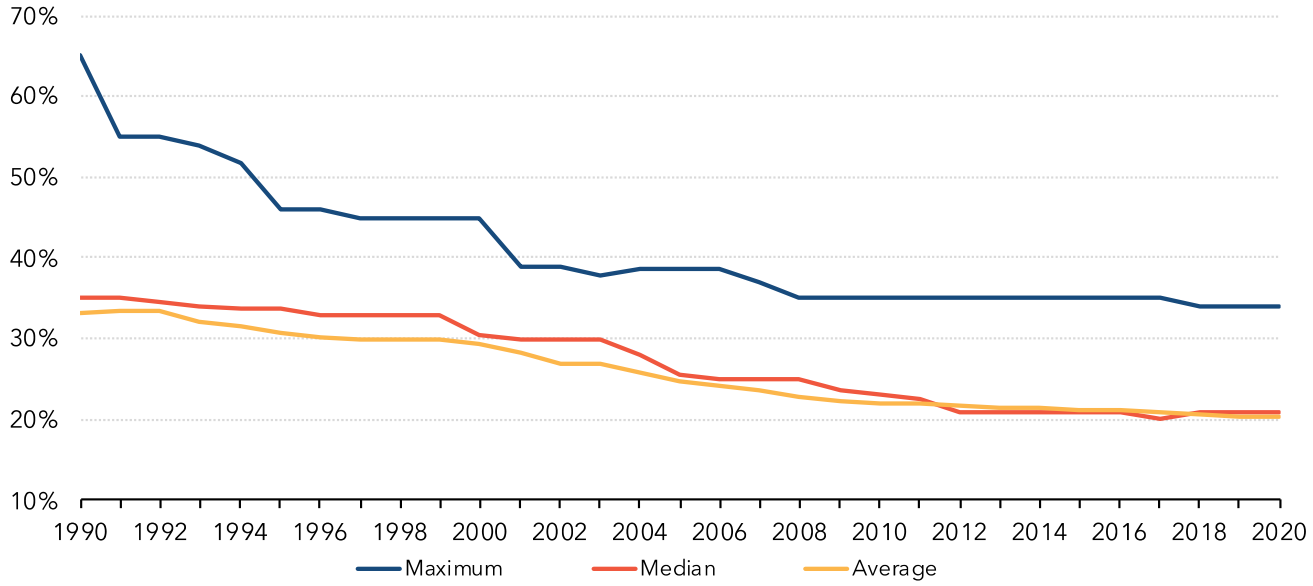
How does tax competition lead to profit shifting?

Wier and Zucman (2023) outline three forms of profit shifting. First, multinationals can use intragroup exports and imports by manipulating prices. The low-tax subsidiary sells goods and services at an artificially inflated price to an affiliate in a high-tax country, and vice versa. Second, affiliates can use intragroup payments, such as interest expenses, whereby the high-tax country affiliate borrows from the low-tax affiliate. Third, multinationals can transfer intangibles to low-tax country affiliates, which then charge royalties to subsidiaries in high-tax countries for using the intangible asset. All these practices could be curbed if tax authorities were to enforce the arm's length principle. However, tax agencies often struggle to enforce this principle in practice (Tørsløv et al. 2023), and many transactions of unique intangible assets are not well defined and are difficult to price.

FIGURE 6

Statutory Corporate Tax Rate Across 49 Countries

1990–2021



Source: "CBT Tax Database," Oxford University Centre for Business Taxation, January 2017, https://oxfordtax.sbs.ox.ac.uk/cbt-tax-database and OECD, "Table II.1. Statutory corporate income tax rate".
Note: This includes OECD members, large economies, and some tax heavens (list of countries is available in the appendix).

Profit-shifting mechanisms have important implications for international taxes and have been used by large multinational corporations to engage in legal tax avoidance. Globalization and the rise of intangibles have also created more opportunities for profit shifting. These developments intensified tax competition between countries, with tax havens and low-tax countries able attract more taxable corporate income through both real economic activity and shifted profits. Figure 6 shows the median, average, and maximum corporate income tax rate for 49 OECD member countries, other large economies, and tax havens.[12] In 1990, the median corporate tax rate was around 35 percent, while the largest rate in the sample was 65 percent. In 2020, the median was 21 percent, and the largest rate was 34 percent.

Besides lowering the statutory corporate tax rate, countries also introduced preferential tax regimes designed to attract investment and specific assets like intangibles. Many countries have "patent box" regimes, which lower taxes on income generated by some assets, typically patents or similar intangible assets. In 2017, the US had one of the highest corporate tax rates in the world, and TCJA had an explicit goal of making the US more competitive while curbing some profit-shifting behavior.

How do territorial taxation and the GILTI regime function after TCJA?

The Tax Cuts and Jobs Act of 2017 was the largest US reform of the taxation of foreign income in decades. It included a large reduction in the statutory rate, from 35 to 21 percent, and four key components for multinationals: (1) the participatory exemption (moving to a territorial tax regime), (2) the global intangible

low-taxed income (GILTI), (3) the Base Erosion and Anti-Abuse Tax (BEAT), and the (4) foreign-derived intangible income (FDII) deduction.

The participatory exemption means that a US corporation that owns at least 10 percent of a foreign corporation does not pay US corporate taxes on certain foreign-sourced dividends. This component of TCJA moved the US from a worldwide to a territorial tax system with a minimum tax on foreign earnings (i.e., GILTI). TCJA also introduced new limits on interest deductions for businesses with at least $25 million in gross receipt. Between 2018 and 2021, net interest could be deducted only up to 30 percent of business income before interest, taxes, depreciation, and amortization (i.e., EBITDA). Since 2022, the new limit on interest deduction is 30 percent of business income *after* depreciation and amortization (i.e., EBIT).

GLOBAL INTANGIBLE LOW-TAXED INCOME

The GILTI regime is a global minimum tax on the foreign-earned income of US multinationals. The GILTI is calculated as the total active income earned by the foreign affiliates of a US company that exceeds a 10 percent return on the firm's depreciable tangible property.[13] Corporations can deduct 50 percent of GILTI in calculating US tax liability, which means the tax rate on GILTI income is 10.5 percent (half of the regular corporate income tax rate of 21 percent). In addition, companies can claim foreign tax credits (FTCs) for 80 percent of foreign taxes paid or accrued on GILTI. Although TCJA moved the US to a territorial tax system under the standard corporate tax regime, GILTI acts as a minimum average tax rate on foreign earnings. The territorial standard regime and the worldwide minimum GILTI tax represent a new hybrid regime.

For example, suppose a large US corporation owns foreign subsidiaries in Bermuda and France. The Bermuda subsidiary records $40 million in foreign income and pays no tax, and the French subsidiary earns $20 million in foreign income and pays $5 million in taxes. The Bermuda subsidiary owns no tangible assets, whereas the French subsidiary owns $100 million of depreciable property. The GILTI for this corporation would be $50 million ($60 million in foreign income minus 10 percent of $100 million in depreciable tangible assets). The US tax on GILTI would be $5.25 million (half of $50 million times the 21 percent corporate rate), against which the company can claim $4 million in foreign tax credit (80 percent of the $5 million paid in France). Thus, under the GILTI regime, this corporation would owe an additional $1.25 million in tax to the US.

In 2018, the only year for which such data are available from the Internal Revenue Service, the US recorded $342 billion in GILTI, most of which ($310 billion) was attributable to companies with over $2.5 billion in assets. Two sectors made up almost two-thirds of total GILTI: manufacturing, with $123 billion, and information, with $98 billion. The Joint Committee on Taxation estimated repatriated tax revenues from GILTI at close to $10 billion a year until 2025, and between $15 and $20 billion each in 2025 and 2026. The increase is driven by the scheduled decrease in the GILTI deduction from 50 percent to 37.5 percent after December 31, 2024, bringing the GILTI statutory rate to 13.125 percent.

BASE EROSION AND ANTI-ABUSE TAX

Along with GILTI, the US introduced the Base Erosion and Anti-Abuse Tax (BEAT), designed to limit some methods of profit shifting that enable tax avoidance.[14] BEAT targets US multinational corporations that engage in tax-avoidance mechanisms such as deductible payments (e.g., interest or royalties) and service payments to related foreign entities. BEAT is a minimum tax added to the regular tax liability. A US corporation calculates its tax at the BEAT rate (5 percent in 2018, 10 percent in 2019 through 2025, and 12.5 percent in 2026 and beyond) on its regular taxable income, adding back deductible payments. If the BEAT liability is greater than the regular US tax, the corporation must pay the difference between the BEAT liability and the regular tax.

FOREIGN-DERIVED INTANGIBLE INCOME

Along with GILTI and BEAT, TCJA introduced the FDII regime, which offers reduced taxation on foreign-earned income reported by domestic corporations (income earned from exporting goods and services). A type of patent box regime,[15] FDII, was enacted to encourage multinational corporations to locate intangible assets in the US rather than in offshore jurisdictions.[16] The FDII regime, which applies only to C-corporations, became effective in January 2018[17] and offers a reduced tax rate of 13.125 percent on export income in excess of a 10 percent return from tangible assets. This implies that all export income from intangible assets and export income above a 10 percent return from tangible assets are taxed at the lower rate of 13.125 percent, which is set to increase to 16.4 percent after 2025.[18]

A simple example illustrates FDII: a company's US income is $200 million, of which $50 million is from foreign sales (export income), and the company has US tangible assets worth $400 million. Total income in excess of 10 percent of tangible assets is $160 million (200 − 0.1 * 400), and the fraction of income from export is one-quarter, so FDII is 0.25 * (200 − 0.1 * 400), or $40 million. The $40 million of FDII is taxed at the preferential rate of 13.125 percent, while the remainder of income ($160 million) is taxed at the regular corporate income tax rate of 21 percent.

What is the empirical evidence for profit shifting?

Profit shifting has garnered significant attention in recent years, and the International Investment and Capital Model (IICM) allows us to show how different levels of profit shifting impact effective average and marginal tax rates. A rich and growing body of literature estimates the fraction of income that has shifted from high-tax to low-tax countries and its impact on corporate tax revenues. Clausing (2016) reports that among the top nine foreign locations by gross profits, seven are tax havens (the Netherlands, Ireland, Luxembourg, Bermuda, Switzerland, Singapore, and the UK Caribbean Islands, including the Caymans), a finding analogous to figure 3. Clausing uses data from the Bureau of Economic Analysis (BEA) to show that the seven tax havens account for 50 percent of all foreign income earned by affiliates of US multinationals, but only 5 percent of foreign employment. She finds that profit shifting cost the US government between $77 and $111 billion in corporate tax revenue in 2012 (30–45 percent of corporate tax collections).

It is worth mentioning that findings in Clausing (2016) were challenged by Blouin and Robinson (2020), who argue that the double counting of profits in the data largely overestimates profit shifting.[19] They find a much smaller cost of 4–8 percent of corporate tax revenues. However, Clausing (2020a) responded, arguing that Blouin and Robinson's adjustment omits some types of profit shifting and underestimates the issue, a sentiment experts at BEA and the Joint Committee on Taxation share. Clausing (2020b) relied on different sources and finds profit shifting likely cost the US $100 billion a year in 2017 (or roughly 34 percent of corporate tax revenues).

In addition, numerous studies on profit shifting by US and foreign multinationals report that a large fraction of profits is shifted. Guvenen and others (2022) use firm-level data on US multinationals from 1982–2016 and find that, on average, 38 percent of income is shifted from the US to foreign affiliates. Dowd, Landefeld, and Moore (2017) analyze the sensitivity of profit shifting between the US and tax havens with respect to the tax rate over 2002–12. Their findings also show that a majority of US foreign earnings is reported in a few tax havens. They suggest that the elasticity of reporting profits with respect to the tax rate is unlikely to be linear. This is consistent with nonlinear costs and incentive structures around profit shifting.

Many studies try to estimate the share of profits shifted to tax havens. For example, Garcia-Bernardo, Janský, and Zucman (2022) and Tørsløv and others (2023) find that close to 40 percent of profits worldwide are shifted to low-tax jurisdictions. Notably, Tørsløv and others (2023) show that US multinationals shift comparatively more profit than foreign MNCs. Using foreign affiliate statistics, they estimate that US multinationals shifted about 50 of foreign income to tax havens. Tørsløv and others address double counting and show that the data they use do not double count profits. Garcia-Bernardo, Janský, and Zucman (2022) find that the share of profit shifting is relatively stable before and after TCJA.

COUNTRY-LEVEL EFFECTIVE AVERAGE AND MARGINAL TAX RATES

The biggest challenge in comparing effective tax rates across countries is the treatment of depreciation and special tax regimes. Different countries classify, depreciate, and amortize assets in different ways. Several countries, such as the US, offer bonus depreciation. Many countries also have special tax treatment for certain assets, such as intangibles.

Methodology

We model effective average and marginal tax rates following the methodology of Devereux and Griffith (1998, 2003), who developed the concept of forward-looking effective tax rates. A simple version of the model is described in appendix A. Both EATRs and EMTRs incorporate essential elements of the tax system, such as the applicable tax rate, depreciation allowances, financing costs, tax credits, and special tax regimes. The rates are theoretical and forward-looking as they apply to new investments: EATRs apply to profitable inframarginal investments, whereas EMTRs apply to marginal investments that just break even. EATRs are primarily used to compare the tax burden on new profitable investment across locations. EMTRs are helpful in evaluating how

taxes impact marginal investments where companies are already located and in determining the optimal level of investment given a location choice.

Assets and data

We use data from the Oxford Center for Business Taxation (CBT),[20] the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), and the Center for European Economic Research (ZEW) (Spengel et al. 2021). The data include statutory national corporate tax rates and average local tax rates, economic and tax depreciation rules for three types of assets (buildings, machinery, and intangibles), and inventory. The database consists of 43 G20 and OECD countries. Years covered are 2000–20.

CORPORATE TAX RATES

The statutory tax rate applied on corporate income includes the national-level tax, as well as the average of local taxes when applicable.[21]

The applicable statutory rate when local taxes are deductible from national taxes is calculated $\tau^F = \tau^{main} * (1 - \tau^{local}) + \tau^{main} * (1 - \tau^{local}) * surcharge + \tau^{local}$. When a surcharge applies to income above a certain level, we include the surcharge.

CORPORATE TAX BASE

To compare the tax burden on investments across countries, three types of assets are normalized and evaluated: industrial buildings, plants and machinery, and intangibles (patents).[22] Assets can be depreciated for tax purposes according to different methods, including straight-line depreciation and declining balance depreciation.

Straight-line depreciation assumes that the same fraction of an asset is depreciated each year. For example, a firm would write off $200 a year for a machine worth $1,000 with a five-year straight-line depreciation schedule and no salvage value. Declining balance depreciation is an accelerated method whereby the company can depreciate higher amounts in the early life of the asset. For example, a 200 percent declining balance implies the firm can depreciate 20 percent of the remaining value of the asset. For a $1,000 machine, the firm would depreciate $200 the first year, then $160 the second year (20 percent times the remaining value of $800), $128 the third year (20 percent of $640), and so on. Most countries allow firms to switch to a straight line when the allowed depreciation becomes larger than the declining balance amount. The data also reflect when countries have expensing or bonus depreciation, that is, when the tax law allows an additional fraction or the entirety of the cost of an asset to be deducted from taxable income the year of acquisition.

Data include the type of depreciation allowed and the schedule for each type of asset by country. When information is not available on a country's depreciation schedule, we assume a useful life of 25 years for buildings, 7 years for plants and machinery, and 10 years for intangibles. Economic depreciation is 32.3 years for buildings, 5.7 years for machinery, and 6.5 years for intangibles.[23]

INTANGIBLES AND PATENT BOXES

We gather OECD data on the presence of a patent box, or a specific tax treatment of intangibles, between 2019 and 2022.[24] We complement the data going backward to 2012 using Silva-Gamez and others (2022) and our own searches. We document the 23 countries that have a patent box out of the 43 for which we calculate effective tax rates.[25]

The earliest patent box reported in our data is in Ireland, which implemented its first special regime in 1973. The other patent boxes in the dataset were established after 2000, most of them by 2010 (with a few notable exceptions). France was the first large economy to enact a special patent box rate in 2000. Among other large OECD countries, the United Kingdom effected its patent box in 2013, Spain in 2008, and Italy in 2015. Among large non-OECD countries, China implemented its intellectual property (IP) regime in 2008 and India in 2016.

Patent boxes typically work by applying a lower rate to the returns of IP. Some patent boxes restrict the type of assets that are eligible. Patents are typically eligible, and some countries also include software and other intangible assets. Laws specify a reduced tax rate that applies to eligible income or an exemption to taxable income derived from intangibles, which is equivalent to a lower rate on income. Eligible income is defined by each patent box law, usually as income that can be directly linked to the intangible asset, such as granting licensing rights to use the patent or selling or transferring the asset.

For example, France has a statutory corporate tax rate of 25 percent as of 2022, down from 33.4 percent. The patent box in France grants a special rate of 10 percent to applicable income derived from specified IP assets. IP that can benefit from the special rate are patents, software protected by copyright, and plant variety certificates, as well as industrial processes that are essential components to the patent and that have been developed by the company. The gross income derived from IP assets is calculated by computing income derived from the granting of licenses for eligible assets, as well as the transfer of eligible assets. However, French law requires companies to subtract the direct and indirect research and development (R&D) expenditure related to the development of eligible assets in the same financial year as it occurs. Hence, the tax liability granted by the French patent box is 10 percent times net income (gross income minus R&D costs).

EATR on IP income

Although we estimate tax liability for all income and all assets abroad, we highlight the incentives companies face when investing in different types of assets, and with equity or debt. We then consider how the mix of investments across assets and countries affects overall tax liability.

We derive country-by-country effective tax rates for three types of assets (buildings, machinery, and intangibles) and inventories, and with two financing mechanisms (retained earnings and debt).[26] We assume that the use of retained earnings for investment carries no financial cost and that foreign countries allow the deduction of interest for investments financed with debt. In practice, many countries have thin capitalization

rules, which limit allowed interest deduction to a fraction of reported income. The goal of these rules is to limit excessive leveraging as a way to lower tax liability and to prevent the use of debt as a tax-avoidance mechanism, such as a subsidiary in a low-tax country loaning capital to a subsidiary in a high-tax country to shift profit and lower taxes for the parent company.

Composite rates assume 35 percent of investments are financed with debt and 65 percent with equity. For the asset composite rate, we assume buildings represent 41 percent of investments, machines are 44 percent of investments, and intangibles are 15 percent of investments.[27] Country-by-country effective rates are shown in appendix A. Table 1 highlights the 2019 EATRs for income from acquired intangibles and under the patent box regime when it applies. The lowered rate can result in drastic differences in EATRs. For example, in Belgium, the standard corporate tax rate is almost 30 percent, but eligible returns from intangibles can benefit from a lower rate of 4.4 percent.[28]

TABLE 1

Effective Average Tax Rates on Income from Intellectual Property, 2019

By country with and without intellectualproperty box regime

	Statutory tax rate		Equity-financed EATR	
Country	**Ordinary income**	**Eligible IP income**	**Ordinary income**	**Eligible IP income**
Belgium	29.6%	4.4%	28.2%	4.2%
China	25.0%	15.0%	25.5%	15.3%
France	32.0%	10.0%	28.3%	8.8%
Greece	28.0%	10.0%	28.6%	10.2%
Hungary	11.0%	4.5%	9.7%	4.0%
India	29.0%	11.9%	26.9%	11.0%
Ireland	12.5%	6.3%	15.2%	7.6%
Israel	23.0%	8.0%	22.3%	7.8%
Italy	26.6%	14.0%	20.9%	11.0%
Lithuania	15.0%	5.0%	11.8%	3.9%
Luxembourg	26.0%	5.0%	23.0%	4.4%
Netherlands	25.0%	7.0%	25.5%	7.1%
Poland	19.0%	5.0%	16.8%	4.4%
Portugal	24.4%	10.5%	24.9%	10.7%
Singapore	17.0%	10.0%	15.0%	8.8%
Slovakia	21.0%	10.5%	18.6%	9.3%
South Korea	27.5%	15.0%	28.1%	15.3%
Spain	30.6%	10.0%	49.6%	16.2%
Turkey	22.0%	11.0%	24.8%	12.4%
United Kingdom	19.0%	10.0%	17.6%	9.3%

Source: "Intellectual Property Regimes," Organisation for Economic Co-operation and Development, accessed February 12th, 2024, https://qdd.oecd.org/data/IP_Regimes; and author's calculations.
Note: EATR = effective average tax rate; IP = intellectual property.

EFFECTIVE TAX RATES ON FOREIGN INVESTMENT BEFORE TCJA

We adapt the Devereux-Griffith framework to foreign investments from the perspective of a US multinational choosing to invest in a foreign country. In practice, incentives for a multinational to invest in a specific country also depend on their operations in other countries and how the new investment impacts total tax liability. For example, investing in an Irish subsidiary could lower the tax liability of other subsidiaries by shifting income to Ireland. Similarly, the true tax cost of investing in a French subsidiary may not be fully captured by French and US taxes, if the multinational can shift profit out of the French company into its Irish subsidiary.

In addition to profit shifting, we have incorporated several features specific to the US corporate tax regime into the IICM. First, income was taxed only upon repatriation before TCJA. Grubert and Altshuler (2013) discuss the cost of deferring repatriation. Theoretically, a company could defer forever, for example, by investing in passive assets such as bonds the parent company could use as collateral to borrow, thereby indirectly using foreign income. However, Grubert and Altshuler point out that such a scenario is inconsistent with the data. Desai, Foley, and Hines (2001) show that dividends increase when the repatriation tax is lower, suggesting that tax-avoidance strategies and deferral are costly. If deferral were costless, there would never be any repatriation with a nonzero tax. Second, before TCJA, the US government allowed US multinationals to claim credits on foreign taxes paid to avoid double taxation. When a company's FTCs exceeded US tax liability on repatriated earnings, the company had excess credits. When the FTCs were lower than the US tax liability, the company had to pay a residual tax equal to the US tax liability net of FTCs on the income repatriated. Multinationals were also allowed to pool foreign credits across jurisdictions.

To model the effective tax burden on deferred income from new investments, we incorporate deferral costs into the IICM. Those costs include the present value of future expected US taxes (through repatriation, tax holidays, or future tax reform), administrative and tax planning costs, financing costs (e.g., issuing debt in the US and using income held abroad as collateral), and other frictions in the tax system, such as potential inefficiencies in allocating capital. In the effective tax rate framework, it is advantageous to represent the cost of deferral as an added tax rate on foreign income. To understand the approximate size of deferral costs, we can leverage data on firms that repatriate income during tax holidays and infer deferral costs.

Let us define the US tax burden on foreign income before TCJA as $T^{defer} = \alpha(\tau^{US} - \tau^{F})Y^{F} + c$, where α is the value of deferral for the company, Y^{F} is foreign income, and c represents other costs when a company chooses to defer. When a multinational expects to never repatriate income and deferral creates no financial frictions or misallocation of capital, $\alpha = 0$ and only foreign taxes matter. US multinationals with access to cheap financing and a high discount rate would likely have a small α.

During a tax holiday, such as the American Jobs Creation Act of 2004, corporations have the option to repatriate income at a lower rate and have a lower foreign tax credit as well. For example, in 2005, MNCs could repatriate foreign income at 15 percent of the current rate and use 15 percent of FTCs on repatriated

income. The US tax burden upon repatriation is $T^{repat} = \beta * (\tau^{US} - \tau^{F})Y^{F}$, where $\beta = 0.15$. A firm will repatriate only when $T^{repat} \leq T^{defer}$. To simplify the exercise, we assume that the administrative cost can be expressed as a percentage of foreign income, $c = \gamma Y^{F}$. Setting $T^{repat} = T^{defer}$ allows us to find the minimum deferral costs for companies that repatriate income and implies that $\beta = \alpha + \frac{\gamma}{\tau^{US} - \tau^{F}}$. With positive administrative costs, a firm is willing to repatriate income when $\alpha < \beta$.

To map the calculations into a deferral cost rate, we can express the total tax burden as $T^{tot} = (\tau^{F} + d)Y^{F}$. To calibrate d, we assume $T^{tot} = T^{repat} = T^{defer}$, which implies $d = \beta(\tau^{US} - \tau^{F}) = \alpha(\tau^{US} - \tau^{F}) + \gamma$. To calculate d, we need to know the foreign tax rate paid on foreign income and assumptions on α or γ. Kleinbard and Driessen (2008) find that during the 2005 tax holiday, FTCs constituted about 30 percent of US tax liability. This implies an average foreign tax rate of 10.5 percent (the US rate of 35 percent times 0.3). If $\gamma = 0.01$ (equal to a 1 percent administrative cost), then $\alpha = \beta - \frac{\gamma}{0.245} = 0.109$. This means that in 2005, we estimate a cost of deferral equal to 10.9 percent of the gap between the US rate of 35 percent and the average foreign rate. A corporation with an average tax rate of 25 percent would have a deferral cost of 2.1 percent (0.109 * 0.1 + 0.01), and a corporation with an average rate of 5 percent would have a cost of 4.3 percent (0.109 * 0.3 + 0.01).

Because the cost of deferral is a function of the difference between the US and the foreign tax rates, it is larger when investments are made in low-tax countries. Across firms that repatriate income, some will have deferral costs higher than what we estimate. Similarly, the implied deferral cost we estimate is the maximum implied cost for corporations that choose not to repatriate. Redmiles (2008) evaluates the American Jobs Creation Act to show that only 7 percent of US firms reporting foreign affiliates on their tax returns choose to repatriate income, and estimates an average cost of repatriation of 3.6 percent. Blouin and Krull (2009) examine American Jobs Creation Act repatriation for all listed public firms in the Compustat database and find that 13 percent of firms repatriated income. However, repatriating firms tend to be larger. Weighting the number of firms by their worldwide assets shows that almost 50 percent of firms choose to repatriate. If firms were all the same size, about half would have deferral costs above what we estimate.

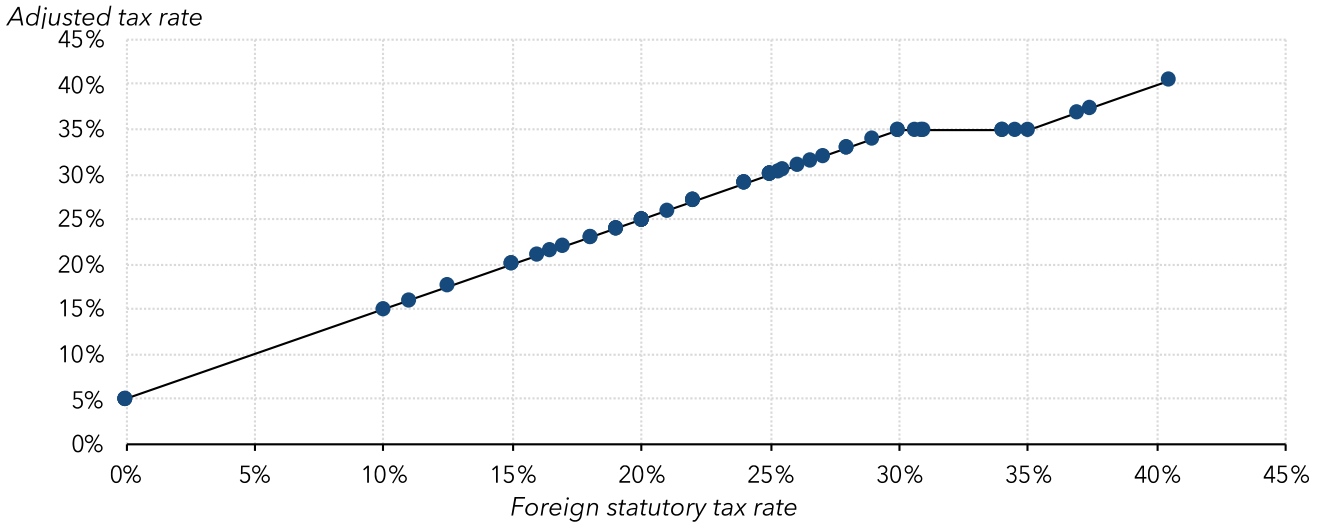
In the IICM, we allow for the deferral rate to depend on the average foreign tax rate paid on a new investment. However, in most specifications, we choose a fixed deferral cost of 0, 3, or 5 percent. On the one hand, a flexible cost deferral incorporates how profit shifting can increase costs by lowering average foreign taxes paid. On the other hand, the cost of deferral is based on a firm's average foreign tax rate, rather than on the foreign tax paid on new investments. A constant deferral cost for large multinationals seems more plausible when evaluating the average tax burden on new investments. Based on the 2005 tax holiday, the average foreign tax rate on repatriated income was 10.5 percent, and β was 0.15. It follows that the implied cost of deferral was about 3.7 percent. However, Grubert and Altshuler (2013) argue that the cost of deferral increases with amount of income held abroad, which was significantly larger in 2017 than in 2005. Therefore, we choose a baseline cost of deferral of 5 percent in our estimates, and we discuss the implications of a

smaller cost of 0 percent, or of a higher cost of 10 percent on effective average and marginal tax rates. Figure 7 shows the adjusted tax rate with a 5 percent deferral cost.

FIGURE 7

Adjusted Statutory Rate with Deferral Costs

2017



Source: Author's calculations.
Note: Adjusted tax rate assumes a 5 percent deferral cost.

To incorporate the cost of deferral in the Devereux-Griffith framework, we assume that only pure profits face a cost of deferral and not income from the consumption (or depreciation) of productive assets. In this framework, income is the sum of profit (p) and the depreciation of the productive asset (δ). The net present value (NPV) of an investment with cost of deferral is characterized as

$$R^{repatriation} = -\frac{r+\delta}{1+r}(1-A) + \frac{p}{1+r}(1-\tilde{\tau}^F) + \frac{\delta}{1+r}(1-\tau^F) + F, \quad (1)$$

where $\tilde{\tau}^F = \min\{\tau^F + d, \max\{\tau^{US}, \tau^F\}\}$ as displayed in figure 7, r is the real interest rate , δ is economic depreciation of the asset, p is the profit generated, A is the tax present value of depreciation ($A = \tau^F * PV(depreciation\ allowances)$), and F is the financing cost. The tax value of depreciation and financing costs is calculated using the foreign statutory rate, not the adjusted rate. When the foreign tax rate is larger than the US tax rate, the foreign tax rate applies. When the foreign tax rate is smaller than the US tax rate but adding the cost of deferral makes it larger than the US rate, the US rate applies. Finally, when the foreign tax rate and the cost of deferral combined is smaller than the US tax rate, $\tau^F + d$ is the relevant tax cost.

Multiple country investments and profit shifting

We define profit shifting as a tax-motivated transfer of profits from a high-tax country to a low-tax jurisdiction. We incorporate profit shifting in the IICM by assuming that a fraction of income from the new investment in the foreign country is shifted and taxed in a low-tax jurisdiction. We also consider the possibility that shifting is costly, as shifting can include fixed and variable costs. For example, fixed costs include establishing an affiliate

in a low-tax jurisdiction or transferring an intangible asset. Variable costs incorporate accounting and legal expenses, which vary depending on the complexity and size of the firm and the investment. Companies shift a fraction of profits ζ and face a cost $\eta = f(\zeta)$ on the share of profit shifted. We assume that the shifting costs are not tax deductible, but we can easily relax that assumption.

We assume firms are still able to take the full amount of deductions, like depreciation allowances and interest expenses, in the country of investment. The tax present value of depreciation allowances (A) and the cost of financing (F) are calculated using the statutory rate applied in the foreign country of investment. When a firm invests, it generates output $Q = p + \delta$, where p is the profit generated by the investment, and δ is the economic cost of depreciation (or the consumption of the productive asset). Although we allow for total profits to be shifted, most companies would likely still report a fraction of income in the country of production for two reasons: (1) depreciation allowances are typically more generous than economic depreciation, so the fraction of income generated from the depreciation of the asset would be offset by depreciation allowances, and (2) firms also must replace productive assets periodically, so they have less incentive to shift income used to reinvest.

INVESTMENT IN A HIGH-TAX COUNTRY

Consider an investment in a high-tax country by a MNC that has a low-tax affiliate. The NPV of that investment depends on how much profit can be shifted to the low-tax affiliate. We can rewrite equation (1) as

$$R^{PS} = -\frac{r+\delta}{1+r}(1-A) + \frac{(\mathrm{p}+\delta)}{1+r}[\zeta(1-\tau^{LT}) + (1-\zeta)(1-\tau^{HT})] - \frac{\eta}{1+r} + F, \qquad (2)$$

where ζ is the share of profit shifted and η is the profit-shifting cost. A represents the present value of depreciation based on where deductions are taken. We can rewrite the tax rate as a weighted average of the high tax and low tax country rates: $(1-\hat{\tau}) = \zeta(1-\tau^{LT}) + (1-\zeta)(1-\tau^{HT})$.

INVESTMENT IN A LOW-TAX COUNTRY

Investing in a low-tax country may be beneficial on its own, if the country provides investment opportunities that generate a profit (p^{LT}) that is high enough. But even if p^{LT} is small, investing in a low-tax country may be highly beneficial if it creates profit-shifting opportunities from high-tax countries for a company. It can be difficult to characterize the value of having operations in a low-tax country purely for profit-shifting opportunities. Investing in a low-tax country may also be beneficial if the firm can shift some costs to high-tax countries through cost-sharing agreements. For these reasons, we can expect effective average and marginal tax rates to be low or negative. Because it is difficult to model the additional value created by these investments, we exclude them from our modeling strategy. We compute EATRs and EMTRs for low-tax jurisdictions using the same methodology we apply to high-tax countries.

COST OF DEFERRAL

We include the cost of deferral in equation (2):

$$R^{PS} = -\frac{r+\delta}{1+r}(1-A) + \frac{(p+\delta)}{1+r}[\zeta(1-\tau^{LT}-d) + (1-\zeta)(1-\tilde{\tau}^{HT})] + \frac{d'\,\delta}{1+r} - \frac{\eta}{1+r} + F\,, \qquad (3)$$

where $\tilde{\tau}^{HT} = \min\{\tau^{HT}+d, \max\{\tau^{US}, \tau^{HT}\}\}$, and $d' = \zeta * d + (1-\zeta)(\tilde{\tau}^{HT} - \tau^{HT})$ is the average cost of deferral for income δ. If the tax rate in the high-tax country is less than or equal to 30 percent, $d' = d$. We include $d'\,\delta/(1+r)$ because we assume income generated from the consumption of the productive asset (δ) does not face any deferral costs. This is because the consumption of the asset (or the cost of depreciation) is part of the "normal returns" and not the real financial returns (p). Intuitively, a firm compares the benefit of shifting (lower total tax liability) with the cost of shifting (lower profits) to determine the optimal amount of profit shifted.

PRACTICAL IMPLICATIONS

When estimating equation (3) to calculate EATRs, we must consider some practical implications of profit shifting. First, apart from some refundable tax credits, an MNC will not receive money from a foreign government if the firm has negative tax liability in the country of investment. Most tax jurisdictions allow for negative tax liability to be carried forward against future tax liability. However, in our baseline estimates, we consider the situation whereby the tax liability in the country of investment is bounded at zero. To do this, we compare the NPV of a new investment with and without taxes in the country of investment.[29] When the NPV with tax is higher than the NPV without taxes, this implies a negative tax liability, so the firm pays no taxes in the country of investment. If the firm pays no taxes, then we estimate equation (3), setting $\tau^{HT} = 0$. When there are no shifting costs and the tax rate in the low-tax jurisdiction is zero, it follows that the EATR is simply equal to the deferral costs.

COST OF CAPITAL AND EMTR

The EMTR estimates the tax burden on an investment that just breaks even after taxes. This means the NPV of a new investment equals zero. Setting equation (3) equal to zero, we find the marginal return on capital $\tilde{p}$ for a given amount of profit shifted by

$$\tilde{p} = \frac{(1-A)(r+\delta) - d'\delta - \eta}{1-\hat{\tau}^{HT}} - \mathrm{F}\frac{1+\mathrm{r}}{1-\hat{\tau}^{HT}} - \delta, \qquad (4)$$

where $(1-\hat{\tau}^{HT}) = \zeta(1-\tau^{LT}-d) + (1-\zeta)(1-\tilde{\tau}^{HT})$ and $\tilde{\tau}^{HT} = \min\{\tau^{HT}+d, \max\{\tau^{US}, \tau^{HT}\}\}$. Profit shifting reduces total tax liability, which lowers the marginal cost of capital and leads to more investment. Deferral costs increase the tax cost, which lowers the denominator and leads to a higher marginal cost of capital. However, the share of profit (δ) is exempt from deferral costs, which lowers the numerator and brings down the marginal cost of capital. Shifting costs increase the marginal cost of capital and reduce the optimal level of marginal investment.

EATRs before TCJA

In this section, we discuss how EATRs vary across high-tax countries and under different scenarios (different costs of deferral and amounts of profits shifted).

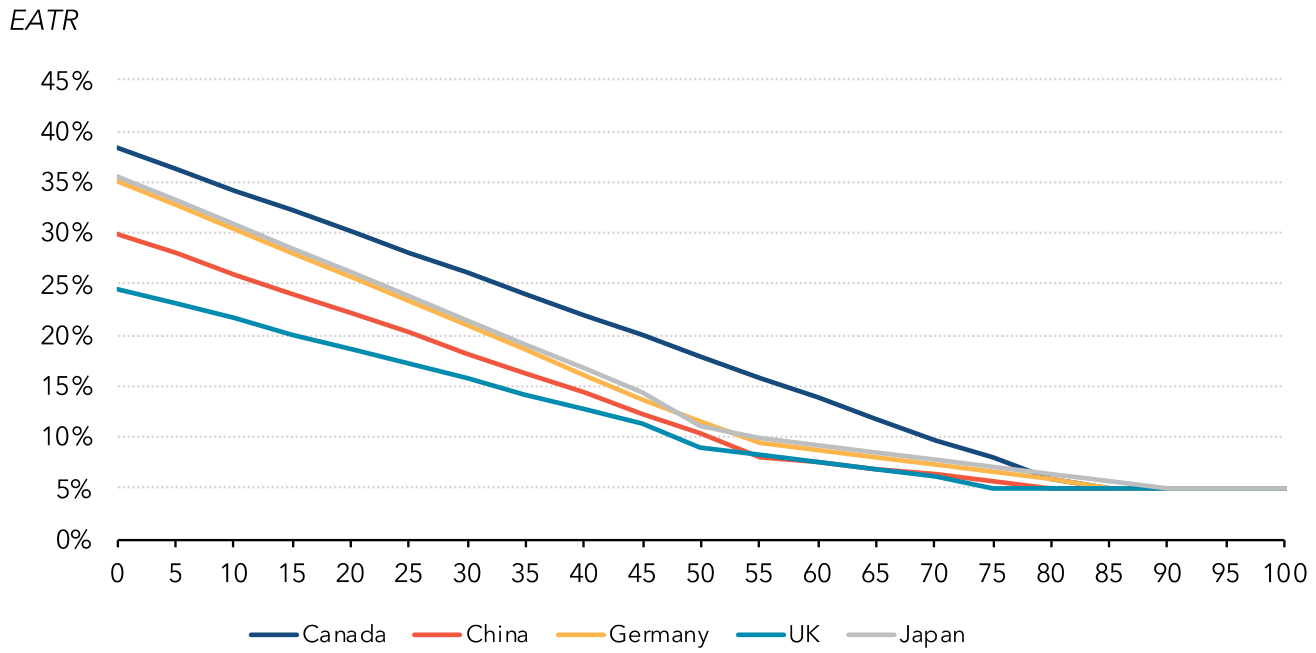
EATRS WITH PROFIT SHIFTING

We present outcomes assuming no shifting costs and a zero-tax rate in the low-tax jurisdictions. Figure 8 highlights the effect on the average EATR of profit shifting to selected countries. Without profit shifting and assuming a deferral cost of 5 percent, EATRs are widely dispersed across countries, depending on their respective tax systems. As a larger share of profit is shifted, EATRs steadily decline and converge to the implied deferral cost. The slopes vary across countries of investment and depend on the tax parameters in each country. Because deductions are taken in the country of investment, their value is not impacted by the amount of profit shifted. EATRs presented here are composite rates of three underlying assets, so the slopes change when the taxable income generated by one of the underlying assets becomes zero in the country of investment.

FIGURE 8

Effective Average Tax Rates with Profit Shifting

Equity-financed assets, 2016



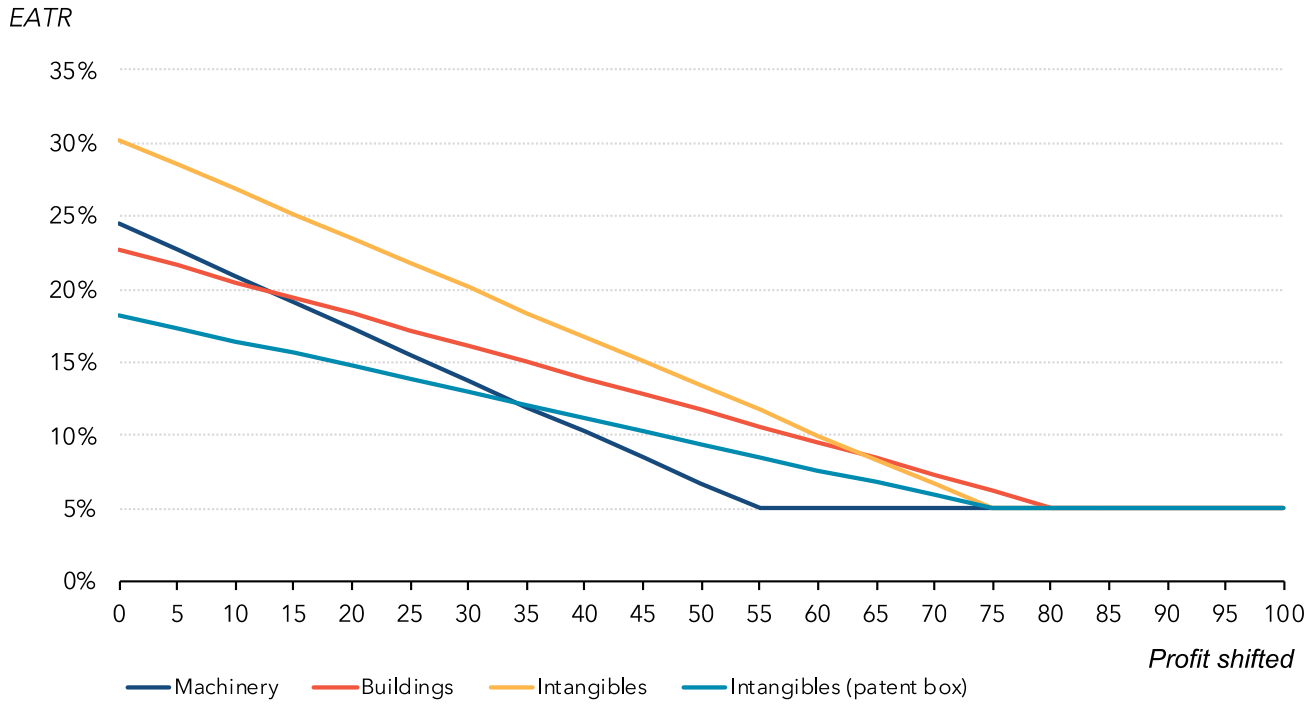
Source: Author's calculations.
Note: EATR = effective average tax rate. Please see text for share of each asset in composite EATR.

Figure 9 displays EATRs in the UK by type of equity-financed underlying asset. Assets with higher economic depreciation have steeper slopes because they generate more total income for a given fraction of profit shifted. The EATR on machinery has a steeper slope and reaches the 5 percent minimum EATR, representing deferral costs when between 45 and 60 percent of profit is shifted. The EATR on buildings has a flatter slope because buildings depreciate slowly, and it reaches the minimum EATR only when levels of profit are shifted above 75 percent. The EATR on intangibles, both with the ordinary regime and with the patent box rate, reach the minimum EATR when profit shifting is between 60 and 75 percent.

FIGURE 9

Effective Average Tax Rates for Investment in the UK

By type of equity-financed assets, 2016



Source: Author's calculations.
Note: EATR = effective average tax rate.

EMTRS WITH PROFIT SHIFTING

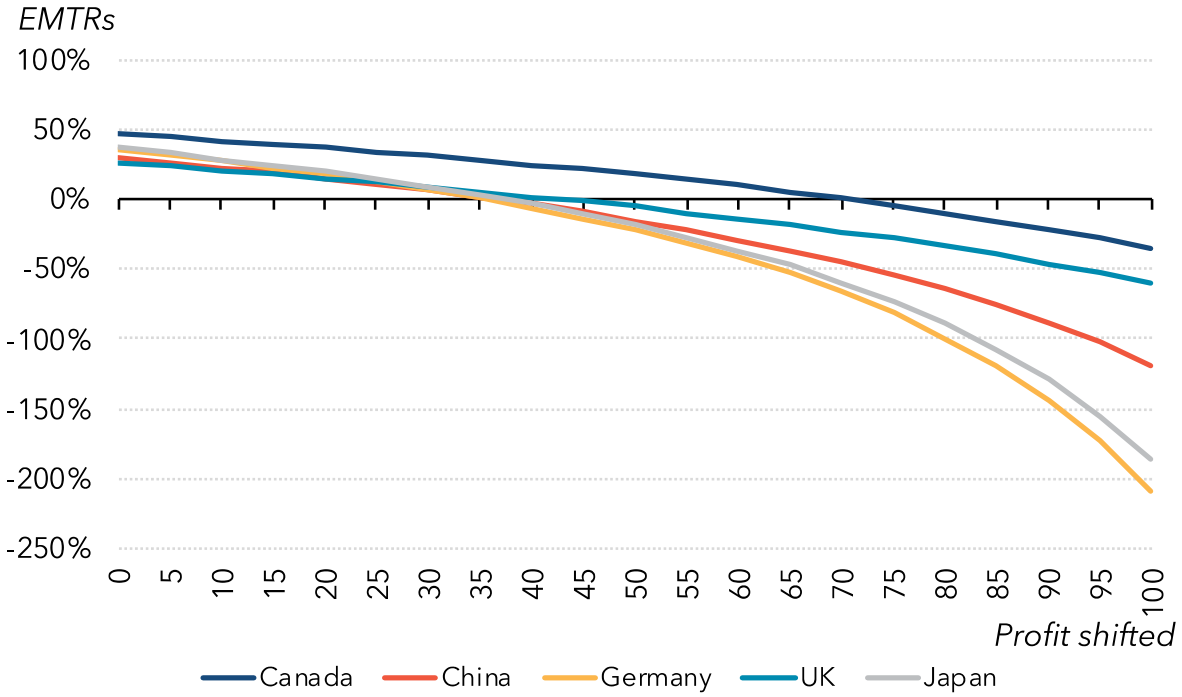
Effective marginal tax rates are important in understanding how much a company will invest (conditional on a location choice) or how marginal investments are taxed where the company already has investments. Recall that the EMTR is the fraction of taxes paid on a marginal investment that breaks even. Without profit shifting, the deferral cost implies higher EMTRs, but introducing profit shifting lowers the tax liability on a marginal investment and the cost of capital.

Figure 10 displays the composite EMTR in five foreign countries. The introduction of profit shifting lowers the cost of capital and EMTRs. With EMTRs, the slope is contingent on the parameter A, which captures the value of depreciation allowances. More generous depreciation allowances imply a lower numerator in calculating the cost of capital (see equation (4)). And the relationship between profit shifting and cost of capital is not linear because profit shifting affects the denominator in determining the marginal cost of capital. The value of deductions is based on the tax rate in the high-tax country, but returns are taxed at the average tax rate between the high-tax and the low-tax jurisdictions. This implies that EMTRs become negative when an MNC shifts a significant share of income to a low-tax jurisdiction (we assume all deductions from the marginal investment can be used).

FIGURE 10

Effective Marginal Tax Rates with Profit Shifting

Equity-financed assets, 2016



Source: Author's calculations.
Notes: EMTR = effective marginal tax rate. Please see text for share of each asset in composite EMTR.

EFFECTIVE TAX RATES AFTER TCJA

We start modeling tax incentives on new investments after TCJA by deriving effective average and marginal tax rates under the GILTI regime, absent foreign taxes. Several challenges arise with TCJA. First, companies are required to depreciate foreign assets under a different regime than domestic assets to determine foreign taxable income.[30] Second, companies are allowed to deduct 10 percent of their depreciable tangible assets (that is, the qualified business asset investment deduction) from their taxable GILTI income. Third, firms are allowed to use foreign taxes as tax credits against GILTI liability, but FTCs are limited to 80 percent of total foreign taxes paid. Finally, US MNCs are allowed to pool foreign income and foreign taxes. As such, they can use excess FTCs in one jurisdiction to lower their GILTI liability in another jurisdiction.

In the next section, we highlight how GILTI liability is derived and outline some simplifying assumptions we make in modeling effective tax rates.[31]

Determination of GILTI liability

GILTI applies to all CFCs, that is, foreign corporations in which no more than five US persons own more than 50 percent.[32] GILTI applies to foreign-tested income, which is the gross income of the CFC minus subpart F income, US effectively connected income,[33] dividends received from a related person,[34] and oil- and gas-

related income less deductions (Joint Committee 2019). The US tax code allows a 10 percent deduction for qualified business asset investment (QBAI). Interest expenses are deducted from gross QBAI to determine the net QBAI deduction. The adjusted depreciated base is determined according to the alternative depreciation system, which mostly uses the straight-line method to depreciate, a slower depreciation method than for domestic assets.

Table 2 shows a simple GILTI example for tangible and intangible investments. We assume a tax rate of 30 percent in the high-tax countries and 5 percent in the low-tax jurisdictions. Row B is the CFC-tested income before foreign taxes. Net tested income (D) is equal to net foreign income after foreign taxes paid. Rows E through G compute the net QBAI deduction. Rows H through L compute the GILTI tax liability. Section 78 of the Internal Revenue Code stipulates that firms must "gross up" their GILTI income by the amount of deemed foreign taxes paid.[35] This gross-up (J) is equal to the inclusion percentage times the amount of foreign taxes paid. The inclusion percentage (I), equal to the GILTI base income net of QBAI (H) divided by net tested income (D), captures the share of foreign income taxable under GILTI. When there is no QBAI the inclusion percentage is 100 percent, and the GILTI tax base is equal to foreign income before foreign taxes. Rows M through O calculate the FTCs. We compute deemed foreign taxes paid (M) by multiplying actual foreign taxes paid (C) with the inclusion percentage (I). In this simple example, we abstract from the role of expense allocations and how they affect foreign tax credits. We discuss the role of expense allocations in appendix A.

TABLE 2

Global Intangible Low-Tax Income Calculation Example

Tangible versus intangible investment

Step		Tangible investment		Intangible investment	
		High-tax country (30%)	Low-tax country (5%)	High- tax country (30%)	Low-tax country (5%)
A	New Investment (tangible)	100	100	100	100
B	Foreign income before taxes	30	30	30	30
C	Foreign Taxes paid	9	1.5	9	1.5
D	Net-tested income	21	28.5	21	28.5
	Calculation of QBAI deduction				
E	QBAI (10% of A)	10	10	0	0
F	Interest expense	-5	-5	0	0
G	QBAI deduction	5	5	0	0
	Calculation of GILTI				
H	GILTI after QBAI	16	23.5	21	28.5
I	Inclusion percentage (H divided by D)	76.2%	82.5%	100%	100%
J	GILTI gross-up (I times C)	6.86	1.24	9	1.5
K	GILTI tax base (H+J times 50%)	11.43	12.37	15	15
L	US GILTI tax (21% times K)	2.40	2.60	3.15	3.15
	Calculation of Foreign Tax Credits				
M	Deemed foreign tax paid (C times I)	6.9	1.24	9	1.5
N	FTC (80% times M)	5.5	1.0	7.2	1.20
O	Net GILTI tax liability (L minus N)	0	1.61	0.00	1.95
P	**Effective tax rate paid (C + O divided by B)**	**30.0%**	**10.4%**	**30.0%**	**11.5%**

Source: Author's calculations.
Notes: CFC = controlled foreign corporation; FTC = foreign tax credit; GILTI = global intangible low-tax income; QBAI = qualified business asset investment.To simplify calculations, we assume tested income is the same for US and foreign tax purposes. US and foreign tax purposes will often differ, as the US and other countries may have different rules on depreciation allowances and the like. We also assume all shareholders of the CFC are US persons.

GILTI EATRs without foreign taxes

We start by outlining the mechanics of GILTI absent foreign taxes. For exposition, we assume greenfield investments. With GILTI, intangible foreign income is taxed fully, and it follows that the NPV of an investment in an intangible asset is

$$R^{INTANG} = -\frac{r+\delta}{1+r}\left(1-\hat{A}\right) + \frac{1}{1+r}\,(p+\delta)(1-\tau^{GILTI}) + \hat{F}, \qquad (5)$$

where $\hat{A} = \tau^{GILTI} PV^{GILTI}$ is the tax present value of depreciation allowances under the GILTI regime. The parameter $\hat{F}$ represents the tax cost of new financing. For investments financed with retained earnings, it is simply zero.[36] For investments financed with debt, $\hat{F} = dB_t \left[1 - \frac{1+i(1-\tau)}{(1+i)}\right]$, where dB_t equals the amount of bonds issued, net of first-year depreciation deductions.

Income from tangible assets benefits from the QBAI exemption equal to 10 percent of the depreciable value of tangibles. Because the Devereux-Griffith model considers an investment $dK_t = 1$, returns up to 0.1 are exempt from taxation, and equation (5) becomes

$$R^{TANG} = -\frac{r+\delta}{1+r}\left(1-\hat{A}\right) + \frac{1}{1+r}\left\{\left(p+\delta-\left(0.1-\hat{f}\right)\right)\left(1-\tau^{GILTI}\right) + \left(0.1-\hat{f}\right)\right\} + \hat{F}, \qquad (6)$$

where $\hat{f} = (1-\phi\tau^{GILTI}) * i\tau^{GILTI}/(1+i)$ for debt-financed investments and zero otherwise, and $(0.1 - \hat{f})$ represents the value of the QBAI deduction. As in the Devereux-Griffith model, when a firm finances an investment of 1 with debt, it borrows $(1-\phi\tau^{GILTI})$, the cost of the asset minus the value of immediate depreciation allowances. The firm then pays interest on the principal in the following period, which is discounted. It follows that the marginal cost of capital is

$$\tilde{p}^{TANG} = \frac{1}{(1-\tau^{GILTI})}\left[\left(1-\hat{A}\right) * (r+\delta) - (0.1-\hat{f}) * \tau^{G}\right] - \delta - \frac{\hat{F}(1+r)}{(1-\tau^{GILTI})}. \qquad (7)$$

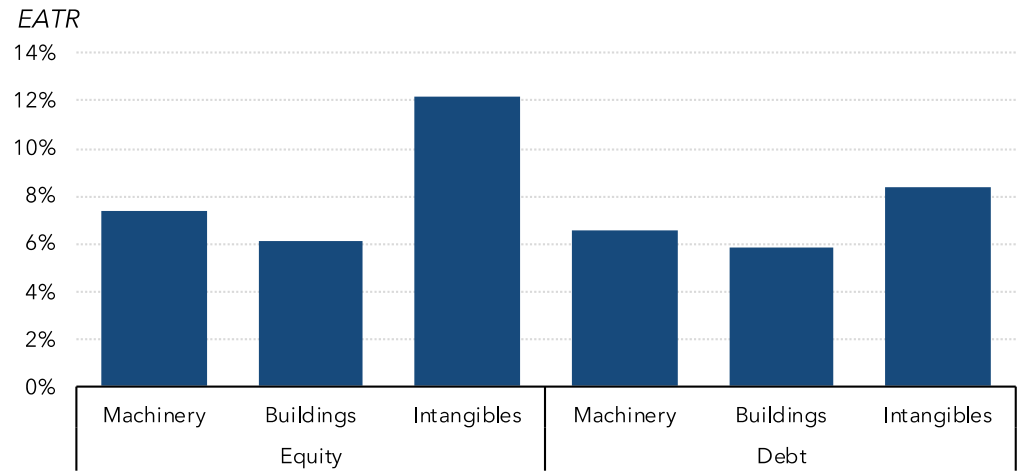
Investments that generate returns above 10 percent are exempt from US taxation. However, an additional investment also increases the QBAI that can be applied to inframarginal investments. For example, a firm invests $1 in an asset abroad with retained earnings, which generates a return of 5 cents. The marginal investment is exempted from taxation, and the firm can apply an additional 5 cents (half of 10 percent times $1) to its income from inframarginal returns.

Figure 11 shows the GILTI effective average rate before any FTCs are applied. Unsurprisingly, when financing through equity, EATRs for tangible investments are much lower than the statutory rate for intangible investment.[37] The EATR is 7.4 percent for equity-financed machinery and 6.0 percent for buildings. However, because interest costs are deducted from the QBAI deduction, debt financing only slightly reduces EATRs to 6.6 percent for machinery and 5.8 percent for buildings. The EATR is 12.0 percent for equity-financed intangibles and 8.0 percent for debt financing.

FIGURE 11

Global Intangible Low-Tax Income Effective Average Tax Rates with No Foreign Taxes

By asset and financing method, 2019



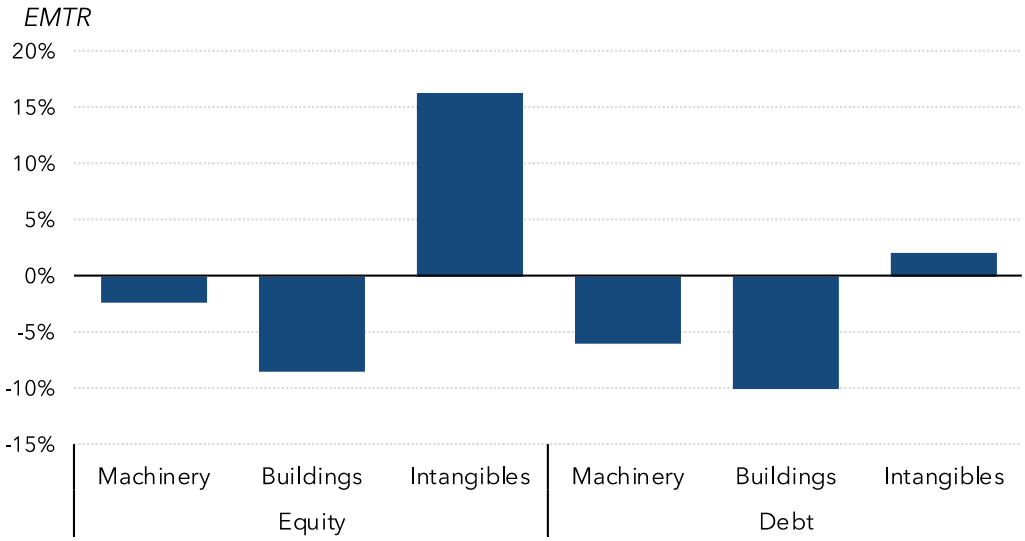
Source: Author's calculations.

EMTRs are negative for buildings and machinery because of the QBAI deduction, which effectively lowers the taxation of inframarginal investments (figure 12). Debt-financed EMTRs are lower than equity-financed EMTRs for all assets, but intangible assets see the largest reduction because of the reduction in the QBAI for machinery and buildings. These results highlight the incentives of the GILTI regime. The policy was designed to limit the taxation of tangible investments and promote equity-financed investments for tangible assets. Next, we turn to estimating effective tax rates, combining both foreign taxes and GILTI.

FIGURE 12

Global Intangible Low-Tax Income Effective Marginal Tax Rates with No Foreign Taxes

By asset and financing method, 2019



Source: Author's calculations.

GILTI EATRs incorporating foreign taxes and foreign tax credits

When incorporating foreign taxes, it is useful to distinguish potential tax burdens between firms in different situations. We consider three possible initial situations:

- Greenfield investment. The firm has no GILTI liability or FTCs from other affiliates.
- Initial GILTI liability. The firm has residual GILTI liability from affiliates in other jurisdictions.
- Excess foreign tax credits. The firm has residual FTCs from affiliates in other jurisdictions.

FTCs can be used to offset GILTI tax liability only for the year in which they are available, and they cannot be carried back or forward. This means a company with excess FTCs has incentives to generate tax liability in other jurisdictions. Table 3 summarizes total tax burden after a new investment, depending on the firm's initial situation and its situation after the new investment has generated profit and tax liability. For exposition purposes, we assume an inclusion percentage of 100 percent.

GREENFIELD INVESTMENT

A greenfield investment has two possible outcomes.

1. There is residual GILTI liability after using FTCs. The tax burden of the new investment is the GILTI liability on the new investment and 20 percent of foreign taxes that are not allowed as FTCs.
2. There is no residual GILTI liability after using FTCs. The country-specific new tax burden applies.

With the case of a greenfield investment, the investment generates a GILTI liability that is either higher than FTCs (case 1) or lower than FTCs (case 2).

TABLE 3

Tax Burden on New Investment

By initial situation of the parent company

Tax situation of the parent company before new investment	Tax burden on new investment	
	Residual GILTI liability after the investment	NO residual GILTI liability after the investment
Greenfield investment	GILTI tax burden + 20% foreign tax burden	Foreign tax burden
Firm has initial GILTI liability		Foreign taxes minus initial GILTI liability
Firm has excess FTCs		Foreign tax burden

Source: Author's calculations.
Note: GILTI = global intangible low-tax income; FTC = foreign tax credit.

GILTI LIABILITY BEFORE NEW INVESTMENT

A new investment has two possible outcomes with regard to GILTI liability:

1. There is a residual GILTI liability after the new investment. All the FTCs are used but do not fully cover the initial GILTI liability from other affiliates and the new GILTI liability. In this case, the tax burden on the new investment is the new GILTI liability plus the 20 percent of foreign taxes not allowed as FTCs, as with greenfield investment.

2. There is no residual GILTI liability after the new investment. The tax burden is the difference between the foreign tax burden and the initial GILTI liability. Hence, the tax burden on the new investment lies between case 1 and the country-specific tax burden.

When a firm has residual GILTI liability from other affiliates, we now have a range of possible outcomes. If residual GILTI liability remains after the new investment, it implies that all FTCs have been used, so the tax cost of the new investment is the new GILTI tax plus the 20 percent of foreign taxes not allowed as FTCs. However, if there is no residual GILTI tax after the investment, this implies a fraction of new FTCs were used to cover the GILTI tax. If all FTCs were used, case 1 again applies. The theoretical upper bound is the foreign country tax liability. Suppose a firm has $10 million in initial GILTI liability. The new investment generates a new GILTI liability of $5 million, foreign taxes of $20 million, and $16 million in FTCs. The FTCs fully cover the total GILTI

liability of $15 million. The additional tax burden from the new investment is simply $10 million, the difference between foreign taxes of $20 million, and the initial GILTI liability of $10 million.

EXCESS FTCS BEFORE NEW INVESTMENT

A new investment has two possible outcomes with regard to excess FTCs.

1. There is a residual GILTI liability after the new investment. Both initial and new FTCs are used, but FTCs do not fully cover the new GILTI liability. In this case, the tax burden on the new investment is the new GILTI liability plus 20 percent of foreign taxes not allowed as FTCs, as with greenfield investment.

2. There is no residual GILTI liability after the new investment. The country-specific tax burden applies.

In the first scenario, we have the same tax burden as in the initial GILTI liability situation. When no residual GILTI liability remains after the new investment, the new tax burden is simply any foreign tax burden generated.

GILTI effective average and marginal tax rates

We next present the derivations to estimate the ETRs for the lower bound, where the tax burden is the new GILTI liability and 20 percent of foreign taxes is not allowed as tax credits.

BASELINE EATRS WITH RESIDUAL GILTI LIABILITY

We start with intangible investments and modify the derivation of dividends from the Devereux-Griffith model (equation A.2 in the appendix) by including the cost of GILTI and foreign taxes. For an investment in intangibles,

$$D_t = Q(1-\tau^F) - I_t + \tau^F\phi^F - [Q\tau^G - \tau^G\phi^G - 0.8 * (\tau^F Q - \tau^F\phi^F)],$$

where $Q(1-\tau^F)$ is the return on the investment after foreign taxes, I_t is the cost of the investment, $\tau^F\phi^F$ is the value of depreciation allowances in the foreign country, $Q\tau^G - \tau^G\phi^G$ is the GILTI tax liability (GILTI tax net of depreciation allowances), and $0.8 * (\tau^F Q - \tau^F\phi^F)$ is the foreign tax credit (80 percent of deemed foreign taxes paid).

The treatment of depreciation requires special consideration when determining the EATR with GILTI liability. The foreign subsidiary calculates its foreign tax liability using the relevant depreciation method in the country of investment. However, the taxable income that determines GILTI relies on the alternative depreciation method, which is often less generous than standard depreciation regimes. The value of depreciation allowances under GILTI and the foreign tax regime is a combination of both foreign depreciation and GILTI depreciation. Because not all FTCs are allowed, a fraction (20 percent) of foreign depreciation allowances remains. The present value of depreciation allowances (A) translates to $\tilde{A} = \hat{A}^G + 0.2A^F$, where $\hat{A}^G = \tau^G * PV^G$ and $A^F = \tau^F * PV^F$ are, respectively, the tax present value of depreciation allowances under the GILTI

regime and under the foreign regime. When a residual GILTI tax liability is triggered, the after-tax return for an intangible investment is simply $(p+\delta)(1-0.2\tau^F-\tau^G)$. It follows that the NPV of an intangible investment is

$$R^{INTANG} = -\frac{r+\delta}{1+r}\left(1-\tilde{A}\right)+\frac{p+\delta}{1+r}(1-0.2\tau^F-\tau^G)+\tilde{F}, \tag{8}$$

where $\tilde{F}=\hat{F}^G+0.2F^F$ is the financing cost. Because the tax liability combines the GILTI tax liability and the foreign tax liability, the company can deduct interest expenses against each. However, different rules apply. The value of the GILTI interest expense deduction depends on the GILTI rate and can be limited by US rules. The value of interest deduction against foreign taxes depends on the foreign statutory tax and foreign rules and limits on interest expenses. The marginal cost of capital for intangibles is

$$\tilde{p}^{INTANG}=\frac{1}{(1-0.2\tau^F-\tau^G)}\left[\left(1-\tilde{A}\right)*(r+\delta)\right]-\delta-\frac{\hat{F}(1+r)}{(1-0.2\tau^F-\tau^G)}. \tag{9}$$

TANGIBLE ASSETS

The after-tax return on tangible investments requires more attention because of the QBAI exemption, which lowers GILTI liability but also affects foreign tax credits. First, a company cannot claim FTCs on the share of returns exempted from GILTI because of the QBAI deduction. Second, interest expenses lower the value of the QBAI exemption. Before we calculate EATRs, we derive how to gross up GILTI income with foreign taxes. We define net tested income as $NTI=Y^F(1-\tau^F)$, where Y^F is net foreign income before foreign taxes. The inclusion percentage is defined as $INC=(NTI-QBAI)/NTI$, and GILTI is equal to net tested income minus QBAI plus the gross-up, which is foreign taxes paid times the inclusion percentage: $GrossUp=Y^F\tau^F*INC$. It follows that the GILTI tax base is equal to $GILTI_{Base}=NTI-QBAI+GrossUp=Y^F(1+\tau^F)-\frac{QBAI}{1-\tau^F}$. The dividend equation for tangible investment is

$$D_t=Q(K_{t-1})(1-\tau^F)-I_t+\mathrm{B_t}-\left[1+\mathrm{i}\left(1-\tau^{\mathrm{F}}\right)\right]\mathrm{B_{t-1}}+\tau^F\phi^F(I+K_{t-1}^T)$$
$$-[(Q-i-\mathrm{QBAI})\tau^G-\tau^G\phi^G-0.8*x*\tau^{\mathrm{F}}\mathrm{Y^F}],$$

where $\tau^{\mathrm{F}}\mathrm{Y^F}=\tau^FQ-\tau^F\phi^F(I+K_{t-1}^T)-\tau^F\mathrm{B_{t-1}}$ represents the foreign taxes paid by the foreign subsidiary and x is the inclusion percentage. We estimate the inclusion percentage as $x=1-(0.1-\hat{f})/(Q-\phi-\hat{f})$, and $\hat{f}=(1-\phi\tau^{GILTI})*i/(1+i)$ when the investment is debt financed. The after-tax return on this investment before depreciation and interest deductions is $(p+\delta)(1-\tau^F)-\left[\left[(p+\delta)-(0.1-\hat{f})\right]\tau^{GILTI}-0.8*x*\tau^FY^F)\right]$, where $(p+\delta)(1-\tau^F)$ represents profit net of foreign taxes paid, $\left[(p+\delta)-(0.1-\hat{f})\right]\tau^{GILTI}$ is the GILTI tax liability, and $0.8*x*\tau^FY^F$ represents allowed FTCs.[38] The tax present value of depreciation allowance for net foreign taxes and GILTI becomes $\tilde{A}=\hat{A}^G+A^F(1-0.8*x)$, and the post-tax economic rent is

$$R^{TANG}=-\frac{r+\delta}{1+r}\left(1-\tilde{A}\right)+\frac{p+\delta}{1+r}(1-(1-0.8x)\tau^F-\tau^{GILTI})+\frac{0.1-\hat{f}}{(1+r)(1-\tau^F)}\tau^{GILTI}+\tilde{F}, \tag{10}$$

where the value of interest expenses $\tilde{F} = \hat{F}^G + F^F(1 - 0.8 * x)$ follows the same logic as the value of depreciation allowances and is reduced by the share of foreign taxes allowed. The marginal cost of capital for tangibles is

$$\tilde{p}^{TANG} = \frac{1}{(1-(1-0.8x)\tau^F - \tau^{GILTI})}\left[(1-\tilde{A}) * (r+\delta) - \frac{(0.1-\hat{f})}{1-\tau^F} * \tau^G\right] - \delta - \frac{\hat{F}(1+r)}{(1-(1-0.8x)\tau^F - \tau^{GILTI})} \quad (11)$$

Our calculations imply an inclusion percentage specific to that investment, but the actual inclusion percentage may differ. If an affiliate has other capital that generates income, the actual inclusion percentage that determines GILTI and FTCs may be higher or lower. If an affiliate has little QBAI compared to its income, the inclusion percentage will be closer to 1, and when an affiliate has a high ratio of QBAI to income, the inclusion percentage will be smaller. This issue also applies to intangible investments, for which the GILTI gross-up and FTCs are determined by the total inclusion percentage of the firm.

BASELINE EATRS WITH PROFIT SHIFTING

Despite the implementation of GILTI and other TCJA provisions like BEAT, which are designed to limit profit shifting, US firms still engaged in profit shifting after 2017. First, shifting income is still valuable to lower foreign tax liability. And because of global averaging, an investment will trigger additional taxes under GILTI only if the firm shifts a large fraction of profits. Without profit shifting, new investments in high-tax countries are likely to trigger excess foreign tax credits. And even if a MNC does not have excess credits, it still has to pay the fraction of foreign taxes not allowed as foreign tax credits. Second, if a company has excess FTCs to use against GILTI liability (as in case 1 of high-tax country investments above), it can use the excess FTCs against the potential GILTI liability triggered by shifting profits to tax havens. We use the following assumptions (which we can relax in our model) to derive EATRs with profit shifting:

- the firm takes deduction in the country of investment
- it shifts profit to a low-tax jurisdiction
- the FTC is an average of low and high tax rates based on the amount of profit shifted
- all FTCs can be utilized
- the investment always benefits from the QBAI

Under these assumptions, it follows that the after-tax NPV from a new investment is

$$R^{intang} = -\frac{r+\delta}{1+r}(1 - A^G - 0.2A^{HT}) + \frac{p^{HT}+\delta}{1+r}(1 - 0.2\tilde{\tau} - \tau^G) - \frac{\eta}{1+r} + F^G + 0.2F^{HT} \quad (12)$$

And for tangible investments,

$$R^{tang} = -\frac{r+\delta}{1+r}\left(1-\tilde{A}\right)+\frac{p^{HT}+\delta}{1+r}(1-\tilde{\tau}-\tau^{G})+\frac{0.1-\hat{f}}{(1+r)(1-\tau^{F})}\tau^{GILTI}$$
$$+\frac{p^{HT}+\delta}{1+r}\left((1-\zeta)*0.8x*\tau^{HT}+\ \zeta*0.8*\tau^{LT}\right)-\frac{\eta}{1+r}+F^{G}+\ (1-0.8x)F^{HT}\ , \qquad (13)$$

where $\tilde{A}=\hat{A}^{G}+A^{F}(1-0.8x)$, the composite tax rate is $1-\tilde{\tau}=\zeta(1-\tau^{LT})+(1-\zeta)(1-\ \tau^{HT})$, the fraction of allowed FTCs in the high tax country is $0.8*x$ and shifting costs are captured by η. The FTC for tangible investment is smaller than 80 percent because the QBAI deduction reduces allowed credits in the high-tax country. The fraction of returns exempted from GILTI taxation is not allowed as FTC. In the example outlined in table 2, the QBAI exemption was $5, with a tested income of $30. That means the inclusion percentage is 83 percent, and the FTC will be 67 percent of foreign taxes paid. The MNC takes no deductions in the low-tax country, so FTCs are simply 80 percent of taxes paid in the low-tax country.

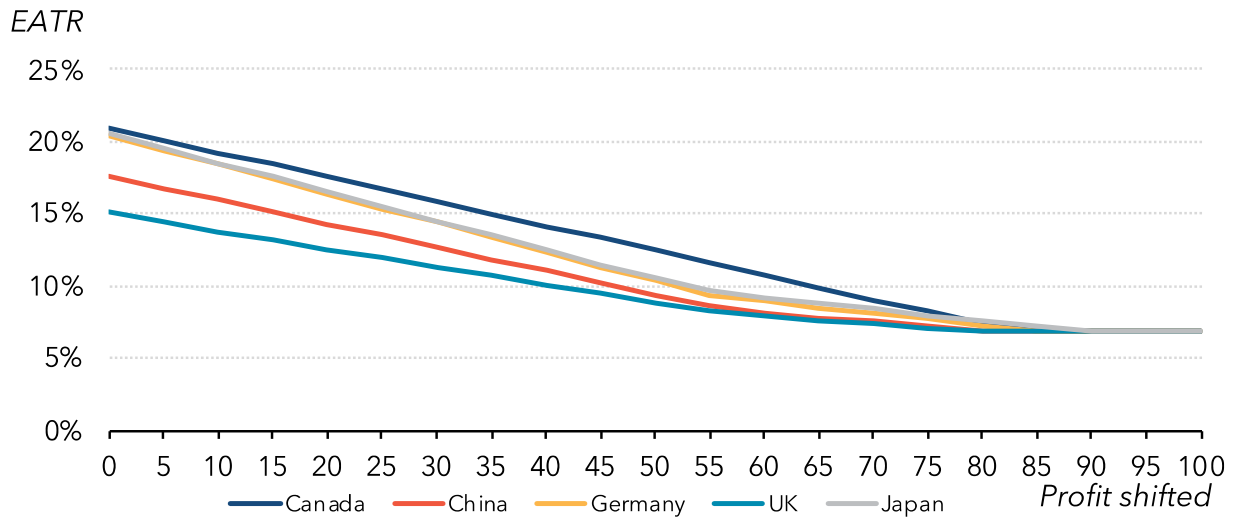
Figure 13 shows the average equity-financed EATR in 2020 by the amount of profit shifted when all FTCs are used. We assume the statutory rate in the low-tax jurisdiction is zero. Even without profit shifting, the EATRs are lower than country-level EATRs (without GILTI). The effective tax rates represent the combination of the GILTI liability and the residual foreign tax liability. For intangibles, the residual foreign tax liability is 20 percent, which is the floor on foreign tax credits. For tangible assets, the residual is typically higher because of the QBAI exemption, which reduces the value of FTCs. Conversely, the GILTI liability is lower for tangible assets. Introducing profit shifting lowers all EATRs substantially, although marginal benefits are smaller than before TCJA because shifting profits reduces the amount of foreign taxes paid and lowers foreign tax credits. As the share of profits shifted increases, the EATRs converge toward the GILTI EATRs without foreign tax credits.

Note that the EATRs bottom out because we assume that the QBAI can always be claimed. If this was not true, the rate would jump up at the point where the tested income in the country of investment becomes negative. Firms would have no incentive to shift profit to lose the value of QBAI, so there is little practical use with this alternative assumption.

FIGURE 13

Effective Average Tax Rates with Profit Shifting

Equity-financed assets and all foreign tax credits used, 2020



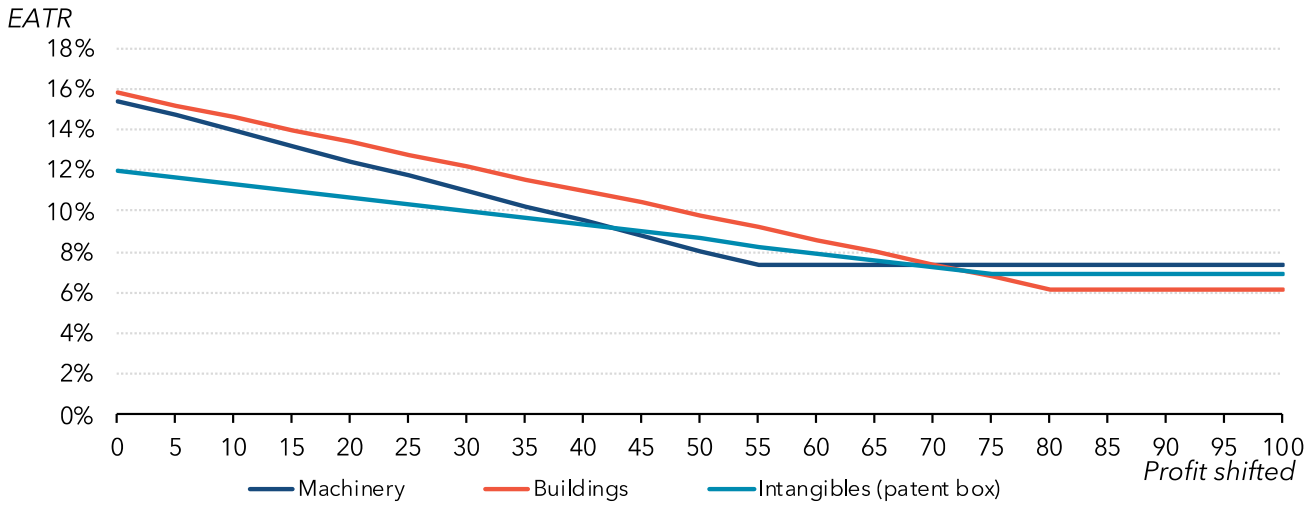
Source: Author's calculations.
Notes: EATR = effective average tax rate; FTC = foreign tax credit. EATRs are the residual foreign liability assuming all foreign tax credits are used.

Figure 14 displays equity financed EATRs in the UK by type of asset. Intangibles taxed under the patent box regime do not benefit from profit shifting because the UK rate is low, and the EATR simply represents the GILTI liability. EATRs for machinery and buildings slowly decline with profit shifting before reaching the GILTI minimum. Because buildings are depreciated slowly, a residual foreign tax liability remains, even with large amounts of profit shifted.

FIGURE 14

Effective Average Tax Rates for Investment in the UK

By type of equity-financed assets and all foreign tax credits used, 2020



Source: Author's calculations.
Notes: EATR = effective average tax rate. EATRs are the residual foreign liability assuming all foreign tax credits are used.

BASELINE EMTRS WITH PROFIT SHIFTING

With the assumption that all FTCs are used, we can determine the marginal cost of capital $\tilde{p}^{HT}$ for an investment that breaks even. We set equations (12) and (13) equal to zero and solve for p.

$$\tilde{p}^{INTANG} = \frac{1}{1 - 0.2\tilde{\tau} - \tau^{G}} * [(r + \delta) * (1 - A^{G} - 0.2A^{HT}) + \eta - (1 + r) * (F^{G} + 0.2F^{HT})] - \delta \qquad (14)$$

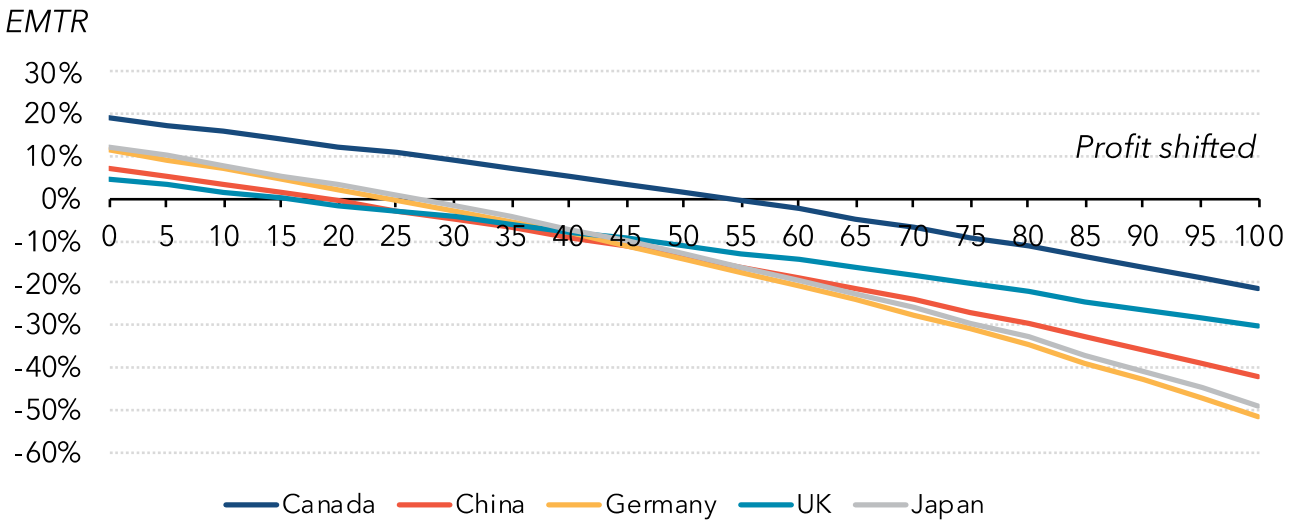
$$\tilde{p}^{TANG} = \frac{1}{1 - \tilde{\tau} - \tau^{G} + (1 - \zeta)0.8x\tau^{HT} + \zeta * 0.8\tau^{L}} * \left[(r + \delta) * (1 - A^{G} - 0.2A^{HT}) + \eta - (1 + r) * (F^{G} + 0.2F^{HT}) - \frac{(0.1 - \hat{f})}{1 - \tau^{F}} * \tau^{GILTI}\right] - \delta \qquad (15)$$

The amount of profit shifted leads to a higher denominator and a lower marginal cost of capital, which means that optimal investment will be larger. The QBAI also increases the cost of capital. Figure 15 highlights EMTRs when a company shifts a fraction of income derived from the investment. The EMTRs benefit from profit shifting and become negative for all countries except Canada when 45 percent of profit is shifted. Profit shifting leads to negative EMTRs because the investment benefits from deductions in the home country, but only a fraction of earnings is taxed. However, the reduction in EMTRs with high levels of profit shifting is less important than before TCJA because we assume only 20 percent of foreign taxes are paid, and the GILTI liability represents a larger share of total taxes as more profit is shifted.

FIGURE 15

Effective Marginal Tax Rates with Profit Shifting

Equity-financed assets and all FTCs used, 2020



Source: Author's calculations.
Notes: EATR = effective average tax rate. EATRs are the residual foreign liability assuming all foreign tax credits are used.

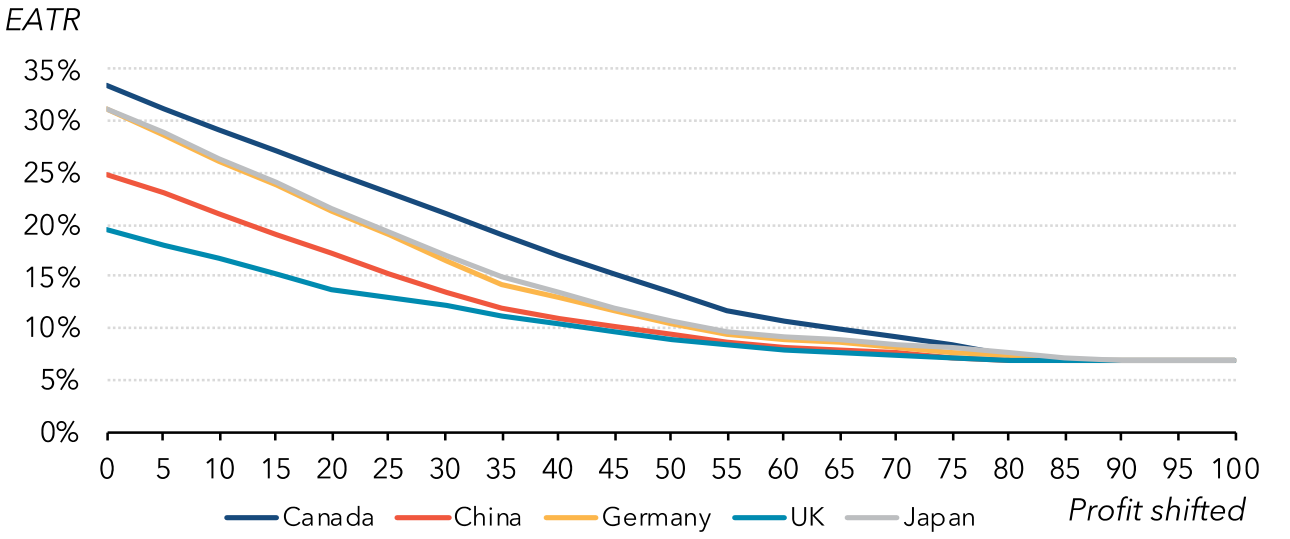
EATRS WITH EXCESS FOREIGN TAX CREDITS

Of course, not all FTCs can be used if a MNC has excess foreign tax credits. We generate EATRs where the excess tax credits generated by the new investment are unused. This is depicted in the second column of table 3.

FIGURE 16

Effective Average Tax Rates with Profit Shifting

Equity-financed assets and excess foreign tax credits allowed, 2020



Source: Author's calculations.
Notes: EATR = effective average tax rate. EATRs are the residual foreign liability assuming all foreign tax credits are used.

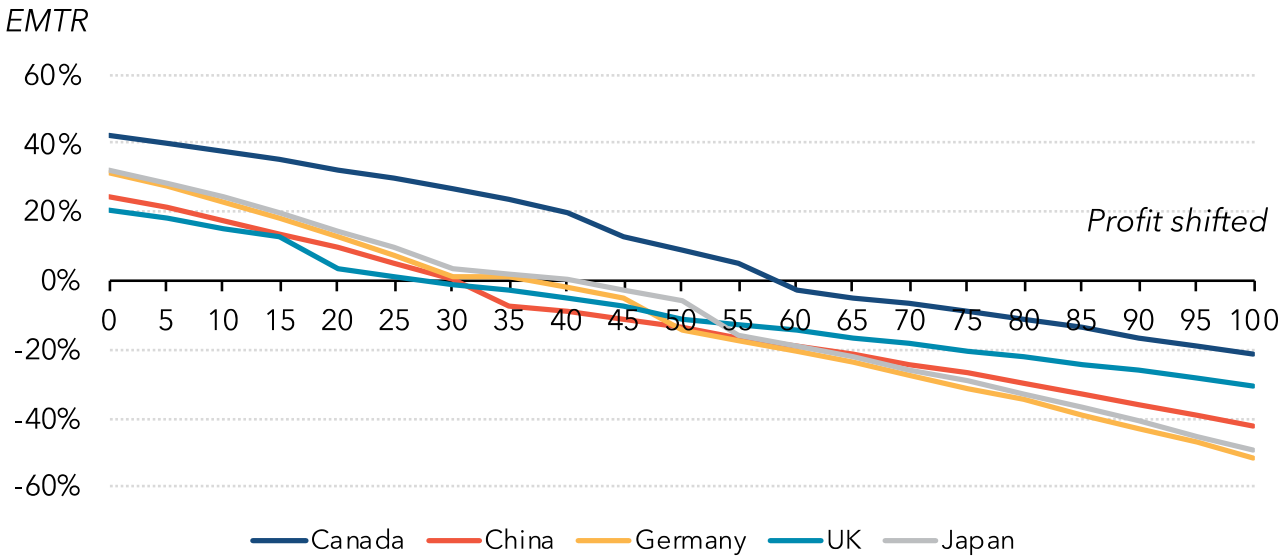
For each country and fraction of profit shifted, we estimate under which scenario the investment falls. Figure 16 shows the average EATRs for equity-financed assets by share of profit shifted. Without profit shifting, the EATRs represent the foreign tax burden. When profit shifting is introduced, however, EATRs drop rapidly as the amount of excess FTCs decreases. The EATRs converge to the rates described in the previous section when all FTCs are used against GILTI liability. EATRs for equity-financed assets follow the same pattern as in figure 13 but are higher with no or little profit shifting before converging to the same values when there are no excess FTCs.

With EMTRs, allowing for excess FTCs similarly leads to higher effective rates when there is little or no profit shifting (figure 17). As all FTCs are used (around 45 percent of profit shifted), the EMTRs are similar to figure 15. There are breaks in the EMTRs when the taxation of underlying assets switches to foreign taxes only to GILTI and residual foreign taxes not allowed as foreign tax credits.

FIGURE 17

Effective Marginal Tax Rates with Profit Shifting

Equity-financed assets and excess foreign tax credit allowed, 2020



Source: Author's calculations.
Note: EATR = effective average tax rate. EATRs are the residual foreign liability assuming all foreign tax credits are used.

PRE- AND POST-TCJA TAX INCENTIVES

Before TCJA, profit shifting could reduce overall tax liability if companies deferred earnings. Effectively, a 5 percent deferral cost meant that income shifted to a jurisdiction with no corporate income tax still faced an implied tax rate of 5 percent. After TCJA, shifting income to a tax haven triggers additional GILTI liability. However, investments in high-tax countries generate foreign tax credits, which can be applied against the GILTI liability.

Comparing EATRs before and after TCJA

We can now compare country-by-country effective tax rates on new investments before and after TCJA. The effect of TCJA on foreign investment incentives is driven by three major assumptions:

- the amount of profit shifted
- the cost of deferral until 2017.
- the treatment of excess FTCs after 2017

We compare EATRs before and after TCJA for selected countries among the largest recipients of FDI. Because some countries changed their tax rate or depreciation systems between 2017 and 2020, we derive pre- and post-TCJA EATRs on the basis of foreign tax regimes in 2019.

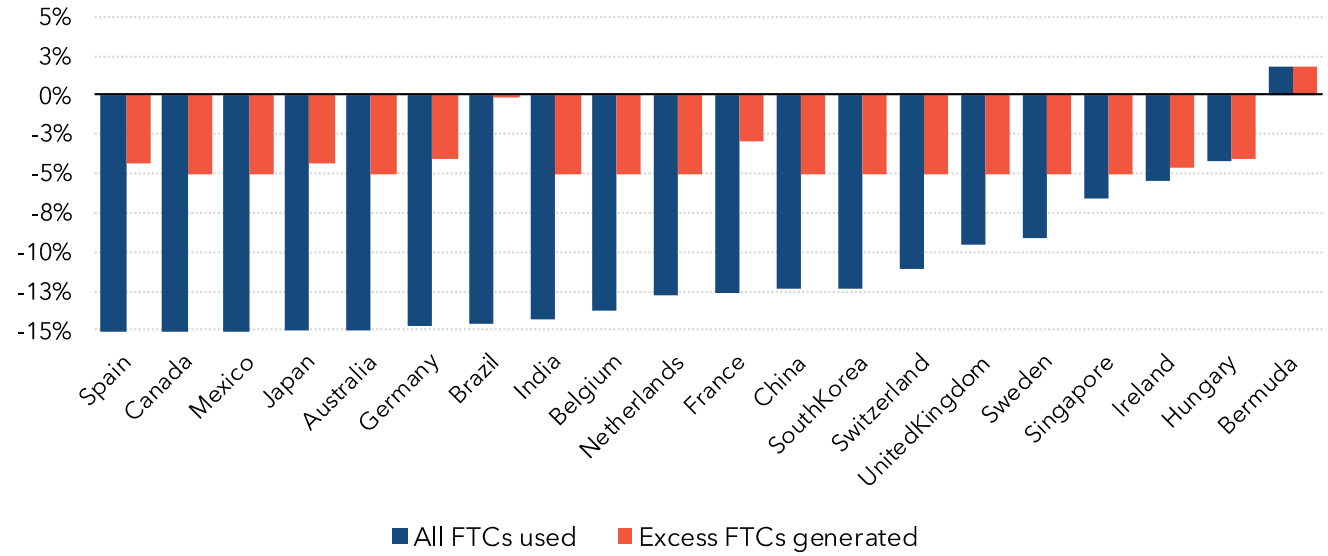
For example, suppose a company shifts one-quarter of profits from a French investment. Before TCJA, the French investment generated $100 in French taxes. After shifting 25 percent of profits, the company generated $75 of French taxes and $5 of deferral costs in the low-tax country. The final tax cost was $80. After TCJA, the French investment generated $100 of French taxes and $20 of GILTI liability. The company can use the French foreign tax credit against GILTI taxes, and its final tax liability is still $100. After shifting one-quarter of profits, the investment generated $75 of French taxes and $30 of GILTI liabilities, which means the overall tax liability is now $75 because the French tax credit still covers all GILTI liabilities.

FIGURE 18

Effect of Tax Cuts and Jobs Act on Outbound Effective Average Tax Rates

No profit shifting, 5 percent pre-Tax Cuts and Jobs Act deferral costs

Equity-financed EATR for investments in tangible assets



Source: Author's calculations.
Notes: EATR = effective average tax rate; FTC = foreign tax credit. The reported EATRs are a composite of equity (66.7 percent) and debt finance (33.3 percent) with machinery, buildings, and intangibles.

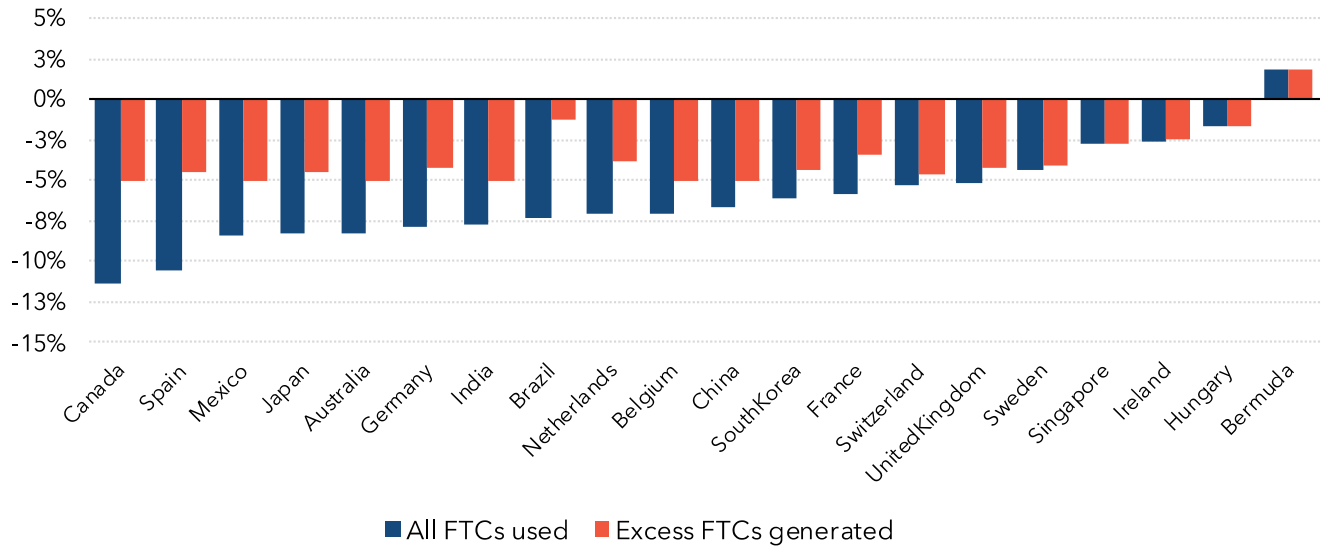
Figure 18 shows the impact of TCJA on EATRs without profit shifting and with a 5 percent deferral cost. When all FTCs are used, TCJA has a large negative effect in all countries except Bermuda (which has a zero tax rate). After 2017, there are no deferral costs, and corporations pay only 20 percent of foreign taxes. In countries with high baseline EATRs, the added post-TCJA GILTI liability is small relative to foreign taxes. When we restrict FTCs to only cover the GILTI liability generated by the new investment, the effect of TCJA is smaller. The reduction in EATR comes from moving toward a territorial system and removing the cost of deferral. Under these assumptions, TCJA has a small or no effect in countries with high tax rates (e.g., Brazil or France). The EATRs in tax havens with no or low taxes (e.g., Bermuda) increase because of GILTI.

FIGURE 19

Effect of the Tax Cuts and Jobs Act on Outbound Effective Average Tax Rates

25 percent profit shifted, 5 percent pre-Tax Cuts and Jobs Act deferral costs

Equity-financed EATR for investments in tangible assets



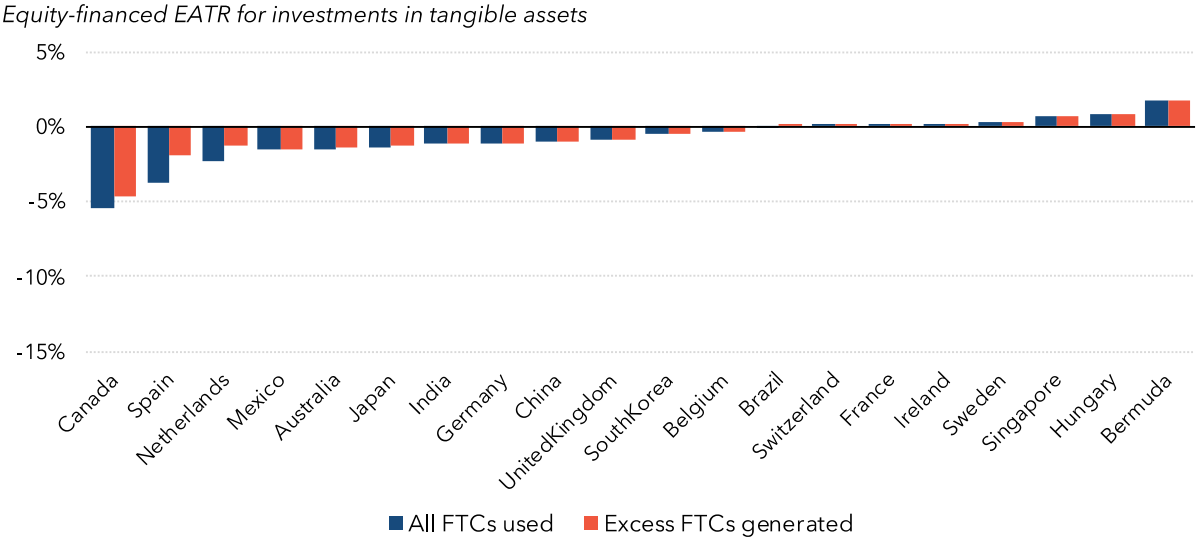
Source: Author's calculations.
Notes: EATR = effective average tax rate; FTC = foreign tax credit. The reported EATRs are a composite of equity (66.7 percent) and debt finance (33.3 percent) with machinery, buildings, and intangibles.

Figure 19 assumes that 25 percent of profit gets shifted to a tax-free jurisdiction. Introducing profit shifting reduces the effect of TCJA on EATRs when all FTCs are used because average foreign taxes decrease. When investments generate excess foreign tax credits, profit shifting lowers foreign tax liabilities but also creates new GILTI liabilities that are typically higher than the implied cost of deferral and reduces the effect of TCJA on EATRs. As more profit is shifted, the investments generate GILTI liability not covered by foreign tax credits.

FIGURE 20

Effect of the Tax Cuts and Jobs Act on Outbound Effective Average Tax Rates

50 percent profit shifted, 5 percent pre-Tax Cuts and Jobs Act deferral costs



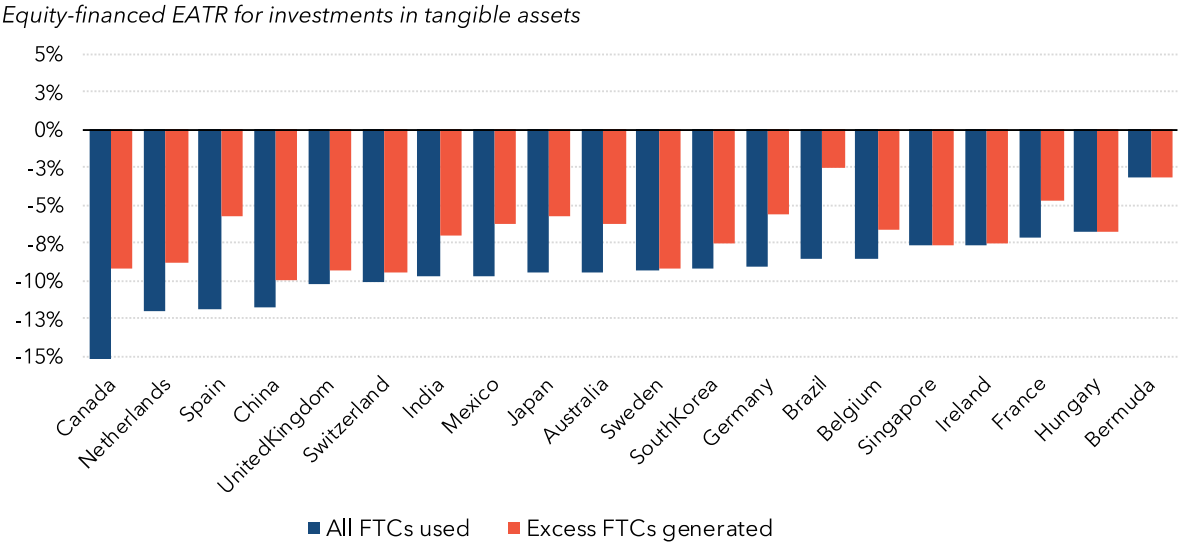
Source: Author's calculations.
Notes: EATR = effective average tax rate; FTC = foreign tax credit. The reported EATRs are a composite of equity (66.7 percent) and debt finance (33.3 percent) with machinery, buildings, and intangibles.

Figure 20 highlights the effect of TCJA on EATRs when 50 percent of income is shifted to a low-tax jurisdiction. Other than in Canada, the impact of TCJA is very small. In most countries, TCJA affected EATRs by less than 1 percentage point. In some countries, EATRs increased by 1–3 percentage points. The intuition is that GILTI creates a lower bound that is higher than the previous lower bound from the implied cost of deferral.

FIGURE 21

Effect of TCJA on Outbound EATRs

25 percent profit shifted, 10 percent pre-TCJA deferral costs



Source: Author's calculations.
Notes: EATR = effective average tax rate; FTC = foreign tax credit. The reported EATRs are a composite of equity (66.7 percent) and debt finance (33.3 percent) with machinery, buildings, and intangibles.

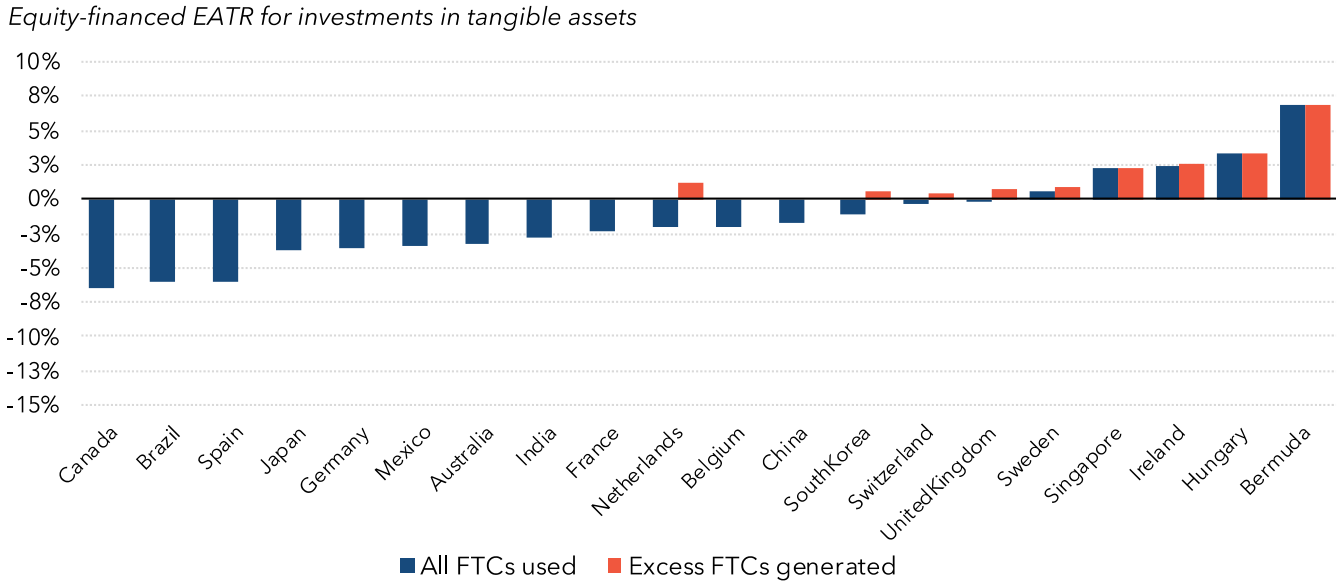
Conversely, when deferral costs are higher at 10 percent (figure 21), TCJA has a larger negative effect on EATRs. This is unsurprising, as higher deferral costs increase the value of moving to a territorial tax system, even with the GILTI minimum tax regime.

When pre-TCJA deferral costs are removed (figure 22), the effect of TCJA varies by country. With no deferral costs, shifting profits before TCJA was highly beneficial, but after TCJA, it triggered a GILTI liability. When a firm can use all its FTCs, the impact is still negative in countries with high baseline EATRs (e.g., Canada and Brazil). However, if an investment is allowed to generate excess FTCs, EATRs are slightly higher because of the GILTI liability created where profit was shifted.

FIGURE 22

Effect of Tax Cuts and Jobs Act on Outbound Effective Average Tax Rate

25 percent profit shifted, 0 percent pre-Tax Cuts and Jobs Act deferral costs



Source: Author's calculations.
Notes: EATR = effective average tax rate; FTC = foreign tax credit. The reported EATRs are a composite of equity (66.7 percent) and debt finance (33.3 percent) with machinery, buildings, and intangibles.

Summary

Table 4 (top half) presents the average impact of TCJA on EATRs with different deferral costs and amounts of profit shifted, assuming all FTCs are used. Table 4 (bottom half) shows the same weighted averages assuming excess tax credits are generated (Tables A.7 and A.8 present changes in EATRs by type of asset). We use the total stock of FDI in 2019 in each foreign country for which we estimated effective tax rates to calculate weighted averages. In all scenarios, a higher cost of deferral means a larger negative impact on EATRs, as moving to a territorial tax system becomes more valuable. More profit shifting reduces the negative impact of TCJA on EATRs. As more profit is shifted, the difference in taxation before and after TCJA is essentially the

difference between the cost of deferral and GILTI. With no deferral costs, heavy profit shifting is less valuable after TCJA. However, with higher deferral costs (above 6–7 percent), investments with higher levels of profit shifting still face a lower tax burden under TCJA.

TABLE 4

Average effect of Tax Cuts and Jobs Act on outbound Effective Average Tax Rates (Equity-Financed)

All foreign tax credits used

Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	-5.5%	-0.5%	4.0%	6.2%
Deferral cost of 5 percent	-10.4%	-5.3%	-1.0%	1.2%
Deferral cost of 10 percent	-14.3%	-9.6%	-5.5%	-3.7%

Excess tax credits allowed

Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	0.4%	1.5%	4.2%	6.2%
Deferral cost of 5 percent	-4.4%	-3.4%	-0.7%	1.2%
Deferral cost of 10 percent	-8.3%	-7.6%	-5.3%	-3.7%

Source: Author's calculations.

Table 6 presents the weighted average impact of TCJA on EMTRs. The patterns are similar to EATRs, but differences are larger because of the structures of EMTRs.

CONCLUSION AND FUTURE ENHANCEMENTS TO THE INTERNATIONAL INVESTMENT AND CAPITAL MODEL

In this report, we review the US taxation of foreign income before and after the Tax Cuts and Jobs Act, and we develop a new model of effective average and marginal tax rates that captures the total tax burden on foreign investments by US multinationals. Our expanded IICM captures profit shifting, an essential aspect of the behavior and taxation of multinational companies. Academics and policymakers have long identified mechanisms that multinationals deploy to shift income from high-tax countries to low-tax jurisdictions. Until TCJA, US multinationals were taxed on their worldwide income, but only upon repatriation. When repatriating income, companies could use foreign taxes paid on repatriated income as foreign tax credits. Many companies chose to repatriate small amounts, which led to a huge buildup of retained earnings overseas. However, deferring repatriation of foreign income is not costless. The cost of deferral likely varies by company, time, and country. We allow the cost of deferring income to vary in our model, both to capture firm- and

situation-specific incentives and to clarify how this assumption changes the effect of TCJA on foreign investment incentives.

TABLE 5

Average effect of Tax Cuts and Jobs Act on outbound Effective Marginal Tax Rates (Equity-Financed)

All foreign tax credits used

Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	-14.6%	-4.1%	14.3%	50.5%
Deferral cost of 5 percent	-19.7%	-10.0%	7.1%	41.1%
Deferral cost of 10 percent	-23.8%	-15.1%	0.6%	32.3%

Excess tax credits allowed

Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	0.3%	3.3%	16.1%	50.5%
Deferral cost of 5 percent	-4.7%	-2.6%	8.9%	41.2%
Deferral cost of 10 percent	-8.9%	-7.7%	2.4%	32.3%

Source: Author's calculations.

TCJA introduced the GILTI regime, a minimum tax on foreign income. We incorporate essential features of the GILTI regime into the IICM. First, tangible assets benefit from a carveout (QBAI exemption) that reduces the GILTI tax liability. Second, TCJA allows foreign taxes as foreign credits against the GILTI liability but limits the amount to the inclusion percentage times 80 percent of foreign taxes paid. The total tax burden on income from a new foreign investment greatly depends on the initial situation of the firm, and our flexible model can accommodate a range of assumptions.

We find that the introduction of TCJA possibly greatly impacted foreign incentives. Our results highlight some important mechanisms. First, the implied cost of deferral until 2017 can drive different conclusions on whether TCJA reduced or increased tax incentives on foreign investments. With no deferral costs and no profit shifting, the GILTI regime had ambiguous effects, but with no deferral costs and some profit shifting (25 percent of income), EATRs and EMTRs went up after 2017. Introducing a deferral cost of 5 percent flips the results and shows TCJA leading to smaller effective tax rates on average, regardless of the amount of profit shifting. Assuming larger deferral costs increases the average foreign tax burden until 2017 and makes the negative impact of TCJA on EATRs even larger.

Our model follows current law to calculate foreign tax liability but is flexible for evaluating policy reforms. A natural extension of the model would be to evaluate several effective mechanisms proposed under the global minimum tax pillar (Pillar 2 of the Base Erosion and Profit Shifting framework). For example, we can alter

our modeling assumptions to evaluate a country-by-country minimum tax rate, rather than use the current "global averaging" method. Small changes on foreign tax credit limitations, the exemption for tangible assets, or the applicable GILTI tax rate can easily be implemented.

DEVEREUX-GRIFFITH EFFECTIVE TAX RATE MODEL

To illustrate effective tax rate calculations, we present the simple framework of the Devereux-Griffith model, in which an investment is undertaken to maximize the value of the firm, V_t:

$$V_t = \frac{\alpha D_t - N_t + V_{t+1}}{1+\beta} \qquad (A.1)$$

where N_t represents new equity issuances and D_t is dividends, α and β are financing parameters that can incorporate investor-level taxes, and b is the corporate discount rate, which equals the nominal interest rate *I* multiplied by 1 minus the investor-level tax on interest income: $\beta = r(1-\tau^{int})$.[39] α reflects the after-tax relative value to investors of dividends and capital gains: $\alpha = (1-\tau^{div})/(1-\tau^{CG})$.[40] The IICM focuses only on corporate-level taxes, ignoring investor-level taxes other than taxes on foreign corporate parents. At the US corporate level, $\alpha = 1$ and $\beta = i$.

Dividends equal after-tax income less net investment and financing charges,

$$D_t = Q(K_{t-1})(1-\tau) - I_t(1-ITC) + B_t - [1+i(1-\tau)]B_{t-1} + \tau\phi(I + K_{t-1}^T) + N_t \ , \qquad (A.2)$$

where $K_t$is the capital stock, $Q(K_t)$ is output, I_t is investment, τ is the corporate tax rate, ITC is the investment tax credit rate, B_t is the amount of bond issuance, and ϕ is the allowed tax depreciation rate. The Research and Experimentation tax credit is a tax subsidy that reduces the cost of investment, I_t, by a fraction, ITC.

The NPV of the rent, R_t, is equal to the change in the market value of the firm:

$$R_t = dV_t = \sum_{s=0} \frac{\alpha dD_{t+s} - dN_{t+s}}{(1+i)^s} \qquad (A.3)$$

The Devereux-Griffith model evaluates the NPV of rents by a one-time perturbation in investment in period t that is then sold at period $t+1$. The change in the NPV of rents from an investment can be expressed as

$$R = -\alpha(1-A-ITC) + \frac{\alpha}{1+i}\{(1+\pi)(p+\delta)(1-\tau) + (1+\pi)(1-\delta)(1-A-ITC)\} + F. \qquad (A.4)$$

The parameter A represents the tax benefit of depreciation allowances, $t * Z$, where t is the income tax rate, and Z is the present value of depreciation or amortization allowances. With full expensing, Z equals 1 and A equals t, whereas slower depreciation reduces the values of Z and therefore A. The rate of economic depreciation, d, is the rate at which an asset's productivity declines (which may differ from the rate at which is it written down for tax purposes). For intangibles, we assume an economic depreciation rate of 15 percent.[41] The inflation rate, p, we assume equals 2 percent.[42]

F is a financing term, which equals zero for corporate investment financed out of retained earnings. For debt-financed investments, $F = dB_t\left[1 - \frac{1+i(1-\tau)}{(1+i)}\right]$, where dB_t equals the amount of bonds issued, net of first-

year depreciation deductions.[43] Because of interest deductibility, debt-financed investments typically have a lower marginal cost of capital than equity-financed investments. For investments financed with retained earnings, $F = 0$.

For simplification, in our analysis, we abstract from specific investment credits granted by foreign countries, and we evaluate effective tax rate at the corporate level, which implies $\alpha = 1$ and $\beta = i$. It follows that the NPV of an investment equals

$$R = -(1 - A) + \frac{(p + \delta)}{1 + r}(1 - \tau) + \frac{1 - \delta}{1 + r}(1 - A) + F \quad \text{(A.5)}$$

The effective marginal tax rate (EMTR) measures the tax burden on an investment that just breaks even after taxes. We can derive the marginal cost of capital by setting $R = 0$ and solving equation (4) for p. The corporate-level cost of capital for a marginal investment that just breaks even after taxes is

$$\tilde{p} = \frac{(1 - A)(r + \delta)}{(1 - \tau)} - \delta - F\frac{(1 + r)}{(1 - \tau)} \quad \text{(A.6)}$$

The EMTR is calculated as $\frac{\tilde{p} - r}{\tilde{p}}$, where *r* is the real interest rate. By contrast, the effective average tax rate (EATR) measures the tax burden on an investment that yields a positive profit, p. It is calculated as the present value of all future tax liabilities to the present value of pretax income,

$$EATR = \frac{(R^* - R)}{\left[\frac{p}{(1 + r)}\right]} \quad \text{(A.7)}$$

where R^* is the present value of pretax income,[44] R is the present value of after-tax income, and the denominator $\frac{p}{(1+r)}$ is the present value of total pretax capital income.[45] We assume a pretax profit rate, p, of 20 percent.

COUNTRY-SPECIFIC SPECIAL REGIMES FOR DEPRECIATION AND PATENT BOXES

Special regimes

- *Czech Republic and Slovakia*: Capital allowance for cost recovery follows a special schedule in the Czech Republic and Slovakia. We input allowed capital depreciation using data from the IMF.
- *Finland*: Depreciation on machines for the first two years is twice the declining balance rate.
- *Italy*: Italy allows double depreciation for years 2 and 3 on assets that are depreciated according to a straight line.

Patent boxes

Table A.1 provides a short summary of the special rate on intangibles in 2015 and 2020 for countries with a patent box regime.

COUNTRY-SPECIFIC STATUTORY RATES AND BASELINE EFFECTIVE TAX RATES

The statutory rate for each country is provided in table A.2. The statutory rate is the combination of national corporate income taxes and the average tax collected on business income at the subnational level. For example, the US rate combines the 21 percent federal corporate income tax with the average state corporate income tax, in this case, 7.7 percent.[46] We observe that effective tax rates can be higher than the statutory rate. This happens when the allowed tax depreciation is less generous than economic depreciation.[47]

Country-specific EATRs are reported in table A.2. Country-specific EMTRs are reported in table A.3. We validated our effective tax rates with those reported by the Oxford CBT, IMF, and OECD. Although these organizations often compute composite rate to include the taxation of inventories, we use only buildings, machinery, and intangibles. We derive the taxation of inventories for each foreign country. Average EATRs under different assumptions are available upon request. We do not report EMTRs by type of asset for debt financing, as the structure of the formula with standardized depreciation creates negative rates that do not convey information. More generally, fully debt-financed effective average and marginal rate may be flawed, as many countries restrict the interest allowed to be deducted against taxable income. When a country has an IP box, we assume the rate applies to intangibles when computing the average EATRs and EMTRs.

TABLE A.1

Preferential Rate on Intellectual Property Income

2015-2020

	Preferential rate on income derived from IP	
	2015	2020
Belgium	4.44%	3.76%
Belize	0.00%	-
China	15.00%	15.00%
United States	13.13%	13.13%
United Kingdom	10.00%	10.00%
Turkey	11.00%	11.00%
Spain	10.00%	10.00%
Slovak Republic	-	10.50%
Singapore	-	10.00%
Portugal	10.50%	10.50%
Netherlands	7.00%	7.00%
Luxembourg	5.20%	5.00%
Lithuania	5.00%	5.00%
Korea	15.00%	15.00%
Italy	13.95%	13.95%
Israel	-	8.00%
Ireland	6.25%	6.25%
Switzerland	-	11.80%
India	-	11.85%
Hungary	4.50%	4.50%
France	15.00%	10.00%
Greece	-	10.00%
Poland	-	5.00%

Source: "Intellectual Property Regimes," Organisation for Economic Co-operation and Development, accessed February 13th, 2024, https://qdd.oecd.org/data/IP_Regimes.
Notes: IP = intellectual property. Includes countries with a reduced rate applied to specific income from intangibles. Does not include countries with no available foreign investment data. Switzerland's IP box is at the canton (state) level.

TABLE A.2

Country-Level Effective Average Tax Rates

By type of asset, 2020

Country	Statutory rate	Composite EATR	Effective Average Tax Rate (EATR) by type of asset and method of finance					
			Equity-financed			Debt-financed		
			Machines	Building	Intangibles	Machine	Building	Intangibles
Argentina	30.0%	27.6%	31.5%	31.3%	30.6%	20.6%	20.2%	19.8%
Australia	30.0%	26.6%	27.6%	28.9%	36.4%	17.4%	17.9%	25.4%
Austria	25.0%	21.7%	24.1%	25.5%	25.5%	15.1%	16.3%	16.4%
Belgium	29.6%	24.6%	28.1%	26.4%	28.2%	18.0%	15.7%	17.6%
Bermuda	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Brazil	37.4%	33.8%	39.2%	36.0%	38.2%	25.8%	22.3%	24.8%
Bulgaria	10.0%	8.2%	8.4%	9.6%	9.3%	4.8%	5.9%	5.7%
Canada	26.1%	27.6%	40.1%	26.4%	32.5%	30.4%	16.8%	22.9%
Cayman Islands	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chile	27.0%	25.5%	31.5%	27.5%	27.5%	21.7%	17.6%	17.8%
China	25.0%	22.4%	26.2%	23.4%	25.5%	17.1%	14.2%	16.4%
Colombia	33.0%	26.8%	28.5%	30.9%	29.2%	17.3%	18.8%	17.7%
Croatia	18.0%	14.7%	14.2%	15.4%	14.1%	8.1%	8.9%	8.1%
Czech Republic	19.0%	16.1%	17.0%	17.8%	17.3%	10.2%	10.8%	10.5%
Denmark	22.0%	19.7%	20.8%	21.2%	20.7%	13.1%	13.1%	12.8%
Estonia	21.2%	25.4%	39.8%	24.5%	37.5%	31.9%	16.6%	29.6%
Finland	20.0%	18.0%	18.9%	18.9%	20.4%	11.9%	11.6%	13.1%
France	32.0%	27.2%	29.1%	29.9%	28.3%	18.3%	18.2%	17.2%
Germany	30.9%	27.0%	32.4%	30.9%	27.4%	21.3%	19.5%	16.6%
Greece	28.0%	24.5%	29.4%	27.0%	28.6%	19.2%	16.7%	18.4%
Hong Kong	16.5%	13.6%	13.7%	15.0%	14.6%	8.6%	9.1%	8.7%
Hungary	11.0%	9.7%	10.4%	11.5%	9.7%	6.4%	7.4%	5.7%
Iceland	20.0%	17.7%	18.2%	19.3%	18.9%	11.2%	11.9%	11.7%
India	29.0%	25.8%	31.1%	26.3%	26.9%	20.8%	15.8%	16.9%
Indonesia	25.0%	23.0%	28.1%	23.4%	27.2%	19.1%	14.2%	18.2%
Ireland	12.5%	11.3%	12.4%	12.0%	15.2%	7.8%	7.4%	10.6%
Israel	23.0%	21.2%	25.6%	23.0%	22.3%	17.2%	14.5%	14.0%
Italy	26.6%	22.5%	27.5%	27.6%	11.5%	17.9%	17.8%	6.4%
Japan	30.7%	27.1%	31.1%	32.0%	29.8%	20.3%	20.7%	18.8%
Jersey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lithuania	15.0%	11.6%	12.9%	12.3%	11.8%	7.6%	6.9%	6.8%
Luxembourg	26.0%	18.7%	12.1%	25.0%	23.0%	3.2%	15.5%	13.8%
Mexico	30.0%	26.1%	31.5%	28.0%	30.6%	20.6%	17.1%	19.8%
Netherlands	25.0%	19.3%	19.7%	25.5%	7.1%	11.6%	16.3%	4.6%
New Zealand	28.0%	25.8%	29.5%	28.9%	28.6%	19.6%	18.6%	18.4%
Norway	22.0%	20.4%	22.0%	22.1%	22.4%	14.1%	14.0%	14.4%
Poland	19.0%	16.7%	19.9%	19.4%	16.8%	13.0%	12.3%	10.0%
Portugal	24.4%	20.8%	21.4%	22.8%	24.9%	13.1%	13.8%	16.0%
Romania	16.0%	13.4%	14.0%	16.3%	14.4%	8.5%	10.4%	8.9%
Russia	20.0%	16.7%	18.1%	18.8%	20.4%	11.0%	11.6%	13.1%
Saudi Arabia	20.0%	18.1%	19.6%	19.8%	23.4%	12.5%	12.4%	16.1%
Serbia	15.0%	18.7%	28.1%	17.3%	26.5%	22.5%	11.7%	20.9%
Singapore	17.0%	14.5%	14.1%	15.6%	15.0%	8.1%	9.6%	8.9%
Slovakia	21.0%	19.3%	20.7%	24.3%	18.6%	13.2%	16.4%	11.1%
Slovenia	19.0%	16.6%	17.1%	19.0%	19.4%	10.3%	11.9%	12.4%
South Africa	28.0%	24.1%	23.6%	26.2%	34.0%	14.3%	15.9%	23.7%
South Korea	27.5%	22.5%	23.1%	25.7%	28.1%	14.1%	15.6%	18.1%
Spain	30.6%	29.5%	30.7%	32.2%	49.6%	19.7%	20.9%	38.2%
Sweden	21.0%	18.5%	19.1%	20.2%	18.8%	11.8%	12.5%	11.5%
Switzerland	25.3%	20.8%	23.0%	23.6%	21.4%	14.3%	14.4%	13.0%
Turkey	22.0%	19.0%	19.5%	23.0%	24.8%	11.9%	14.8%	16.8%
Ukraine	18.0%	15.4%	16.2%	16.8%	18.4%	9.7%	10.2%	11.8%
United Kingdom	19.0%	18.0%	19.5%	17.7%	25.2%	12.6%	10.7%	21.6%

Source: Author's calculations.

Notes: EATR = effective average tax rate. The composite EATR is 24.0 percent buildings, 25.6 percent machinery, 8.7 percent intangibles, and 41.7 percent inventories. EATRs on inventories are used to align with EATRs published by Oxford CBT, IMF, and OECD. See text for information on data used to calculate EATRs.

TABLE A.3

Country-Level Effective Marginal Tax Rates

By type of asset, 2020

Country	Statutory rate	Composite EMTR	Composite EMTR	Effective Marginal Tax Rate (EMTR) by type of asset and method of finance		
				Equity-financed		
			Equity-financed only	Machines	Building	Intangibles
Argentina	30.0%	22.7%	34.0%	33.9%	33.5%	31.6%
Australia	30.0%	19.1%	31.2%	22.5%	26.7%	44.3%
Austria	25.0%	13.6%	24.8%	22.1%	26.4%	26.5%
Belgium	29.6%	12.0%	25.8%	25.1%	19.3%	25.5%
Bermuda	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Brazil	37.4%	26.7%	40.1%	41.6%	33.7%	39.2%
Bulgaria	10.0%	2.8%	8.0%	3.9%	8.6%	7.5%
Canada	26.1%	30.3%	38.2%	52.7%	26.9%	41.1%
Cayman Islands	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chile	27.0%	22.5%	32.5%	38.2%	28.5%	28.6%
China	25.0%	16.2%	26.8%	28.5%	19.8%	26.5%
Colombia	33.0%	11.1%	27.2%	18.3%	26.7%	20.9%
Croatia	18.0%	5.7%	14.6%	3.4%	8.6%	3.1%
Czech Republic	19.0%	8.3%	17.5%	11.9%	14.8%	13.2%
Denmark	22.0%	14.1%	23.6%	18.2%	19.4%	17.8%
Estonia	21.2%	32.5%	38.4%	54.8%	30.4%	52.3%
Finland	20.0%	12.9%	21.6%	16.5%	16.4%	21.3%
France	32.0%	16.0%	29.9%	23.2%	25.8%	20.2%
Germany	30.9%	18.2%	31.1%	34.9%	30.8%	19.4%
Greece	28.0%	16.5%	28.4%	31.7%	24.9%	29.6%
Hong Kong	16.5%	5.7%	13.7%	5.9%	11.3%	9.6%
Hungary	11.0%	6.2%	11.5%	9.0%	12.7%	6.2%
Iceland	20.0%	12.0%	20.9%	13.8%	17.6%	16.5%
India	29.0%	18.5%	30.3%	34.5%	20.5%	22.6%
Indonesia	25.0%	18.5%	28.5%	33.2%	19.8%	31.0%
Ireland	12.5%	8.1%	13.9%	12.2%	10.8%	21.0%
Israel	23.0%	17.0%	26.5%	30.2%	22.9%	20.8%
Italy	26.6%	15.3%	26.4%	29.1%	29.5%	2.4%
Japan	30.7%	19.1%	31.6%	31.7%	34.2%	28.0%
Jersey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lithuania	15.0%	1.8%	9.7%	7.1%	4.8%	2.4%
Luxembourg	26.0%	-4.8%	11.7%	-66.3%	23.0%	15.9%
Mexico	30.0%	17.1%	29.9%	33.9%	24.1%	31.6%
Netherlands	25.0%	8.2%	19.7%	5.0%	26.4%	7.5%
New Zealand	28.0%	21.0%	31.7%	32.2%	30.5%	29.6%
Norway	22.0%	16.5%	25.5%	21.9%	22.3%	23.4%
Poland	19.0%	10.7%	19.4%	21.9%	20.2%	11.2%
Portugal	24.4%	11.8%	22.9%	14.1%	19.3%	25.8%
Romania	16.0%	6.2%	14.0%	8.7%	17.0%	10.3%
Russia	20.0%	7.9%	17.6%	13.4%	16.1%	21.3%
Saudi Arabia	20.0%	13.4%	22.0%	18.7%	19.3%	29.5%
Serbia	15.0%	26.0%	30.7%	44.3%	22.2%	41.8%
Singapore	17.0%	7.6%	15.7%	6.0%	12.2%	9.9%
Slovakia	21.0%	15.4%	24.1%	20.2%	30.1%	12.5%
Slovenia	19.0%	10.3%	19.0%	12.2%	18.9%	20.2%
South Africa	28.0%	14.8%	27.0%	12.4%	22.3%	42.0%
South Korea	27.5%	9.6%	22.8%	11.9%	21.9%	29.1%
Spain	30.6%	27.3%	37.6%	30.8%	34.7%	60.5%
Sweden	21.0%	12.3%	21.6%	14.5%	18.4%	13.3%
Switzerland	25.3%	8.8%	21.1%	17.8%	19.8%	11.7%
Turkey	22.0%	11.5%	21.5%	13.4%	24.9%	29.9%
Ukraine	18.0%	8.6%	17.1%	11.5%	14.0%	19.2%
United Kingdom	19.0%	12.6%	20.6%	20.5%	14.6%	7.3%

Source: Author's calculations.

Notes: EMTR = effective marginal tax rate. The composite EMTR is 24.0 percent buildings, 25.6 percent machinery, 8.7 percent intangibles, and 41.7 percent inventories. EMTRs on inventories are used to align with EMTRs published by Oxford CBT, IMF, and OECD. See text for information on data used to calculate EMTRs.

TABLE A.4

EATRs on Outbound Foreign Investment with No Profit Shifting

By type of asset, 2017

Country	Statutory rate	Adjusted rate with deferral costs	Composite EATR	Effective Average Tax Rate (EATR) by type of asset and method of finance					
				Equity-financed			Debt-financed		
				Machines	Building	Intangibles	Machine	Building	ntangible
Argentina	35.0%	35.0%	32.0%	36.7%	36.5%	35.7%	24.1%	23.6%	23.1%
Australia	30.0%	35.0%	30.7%	32.6%	33.9%	41.4%	22.4%	22.9%	30.4%
Austria	25.0%	30.0%	26.7%	29.1%	30.5%	30.5%	20.1%	21.3%	21.4%
Belgium	34.0%	35.0%	25.2%	33.3%	31.3%	33.4%	21.9%	19.1%	21.4%
Bermuda	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Brazil	37.4%	37.4%	33.0%	39.2%	36.0%	38.2%	25.8%	22.3%	24.8%
Bulgaria	10.0%	15.0%	12.8%	13.4%	14.6%	14.3%	9.8%	10.9%	10.7%
Canada	26.1%	31.1%	26.6%	25.6%	31.4%	37.5%	17.2%	21.8%	27.9%
Cayman Islands	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Chile	25.5%	30.5%	29.4%	34.8%	31.0%	31.0%	25.5%	21.6%	21.8%
China	25.0%	30.0%	25.2%	31.2%	28.4%	30.5%	22.1%	19.2%	21.4%
Colombia	34.0%	35.0%	27.3%	30.4%	32.8%	31.1%	18.8%	20.4%	19.3%
Croatia	18.0%	23.0%	17.5%	19.2%	20.4%	19.1%	13.1%	13.9%	13.1%
Czech Republic	19.0%	24.0%	19.9%	22.0%	22.8%	22.3%	15.2%	15.8%	15.5%
Denmark	22.0%	27.0%	23.2%	25.8%	26.2%	25.7%	18.1%	18.1%	17.8%
Estonia	20.0%	25.0%	33.7%	42.5%	28.1%	40.4%	35.1%	20.7%	32.9%
Finland	20.0%	25.0%	21.6%	23.9%	23.9%	25.4%	16.9%	16.6%	18.1%
France	36.9%	36.9%	27.2%	33.6%	34.5%	32.6%	21.3%	21.0%	19.9%
Germany	30.9%	35.0%	31.2%	36.5%	34.9%	31.4%	25.4%	23.5%	20.6%
Greece	29.0%	34.0%	30.6%	35.4%	32.9%	34.6%	24.9%	22.3%	24.1%
Hong Kong	16.5%	21.5%	17.6%	19.3%	20.0%	19.6%	13.7%	14.1%	13.7%
Hungary	11.0%	16.0%	13.5%	15.4%	16.5%	14.7%	11.4%	12.4%	10.7%
Iceland	20.0%	25.0%	21.2%	23.2%	24.3%	23.9%	16.2%	16.9%	16.7%
India	34.5%	35.0%	27.7%	37.5%	31.8%	32.5%	25.3%	19.4%	20.8%
Indonesia	25.0%	30.0%	27.8%	33.1%	28.4%	32.2%	24.1%	19.2%	23.2%
Ireland	12.5%	17.5%	14.9%	17.4%	17.0%	20.2%	12.8%	12.4%	15.6%
Israel	24.0%	29.0%	24.7%	31.7%	29.0%	28.3%	22.9%	20.1%	19.6%
Italy	26.6%	31.6%	27.8%	32.5%	32.6%	37.7%	22.9%	22.8%	32.6%
Japan	30.9%	35.0%	31.7%	35.4%	36.3%	34.1%	24.6%	24.9%	23.0%
Jersey	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Lithuania	15.0%	20.0%	14.5%	17.9%	17.3%	16.8%	12.6%	11.9%	11.8%
Luxembourg	27.1%	32.1%	18.9%	17.6%	31.1%	28.9%	8.4%	21.1%	19.4%
Mexico	30.0%	35.0%	31.1%	36.5%	33.0%	35.6%	25.6%	22.1%	24.8%
Netherlands	25.0%	30.0%	23.2%	24.7%	30.5%	45.5%	16.6%	21.3%	43.6%
New Zealand	28.0%	33.0%	30.6%	34.5%	33.9%	33.6%	24.6%	23.6%	23.4%
Norway	24.0%	29.0%	26.1%	29.0%	29.1%	29.5%	20.5%	20.3%	20.8%
Poland	19.0%	24.0%	21.8%	24.9%	24.4%	21.8%	18.0%	17.3%	15.0%
Portugal	24.0%	29.0%	22.1%	26.0%	27.4%	29.5%	17.9%	18.6%	20.7%
Romania	16.0%	21.0%	18.0%	19.0%	21.3%	19.4%	13.5%	15.4%	13.9%
Russia	20.0%	25.0%	21.2%	23.1%	23.8%	25.4%	16.0%	16.6%	18.1%
Saudi Arabia	20.0%	25.0%	22.7%	24.6%	24.8%	28.4%	17.5%	17.4%	21.1%
Serbia	15.0%	20.0%	19.4%	20.0%	22.3%	22.2%	14.6%	16.7%	16.7%
Singapore	17.0%	22.0%	17.8%	19.1%	20.6%	20.0%	13.1%	14.6%	13.9%
Slovakia	21.0%	26.0%	24.2%	25.7%	29.3%	23.6%	18.2%	21.4%	16.1%
Slovenia	19.0%	24.0%	20.8%	22.1%	24.0%	24.4%	15.3%	16.9%	17.4%
South Africa	28.0%	33.0%	27.8%	28.6%	31.2%	39.0%	19.3%	20.9%	28.7%
South Korea	22.0%	27.0%	21.1%	23.5%	25.6%	27.4%	16.1%	17.5%	19.4%
Spain	30.6%	35.0%	29.7%	35.1%	36.5%	53.9%	24.1%	25.2%	42.6%
Sweden	22.0%	27.0%	22.7%	25.0%	26.2%	24.7%	17.4%	18.1%	17.0%
Switzerland	25.3%	30.3%	24.9%	28.0%	28.6%	26.4%	19.3%	19.4%	18.0%
Turkey	20.0%	25.0%	20.7%	22.8%	25.9%	27.6%	15.7%	18.5%	20.2%
Ukraine	18.0%	23.0%	19.5%	21.2%	21.8%	23.4%	14.7%	15.2%	16.8%
United Kingdom	20.0%	25.0%	21.3%	25.5%	23.6%	32.0%	18.3%	16.3%	28.3%

Source: Author's calculations.

Notes: EATR = effective average tax rates. The composite EATR is 41.2 percent buildings, 43.9 percent machinery, and 14.9 percent intangibles. The adjusted rate includes the cost of deferral. We assume all earnings are kept abroad when calculating EATRs. Country tax rates and parameters reflect laws in 2017.

TABLE A.5

EMTRs on Outbound Foreign Investment with No Profit Shifting

By type of asset, 2017

Country	Statutory rate	Adjusted rate with deferral costs	Composite EMTR	Composite EMTR	Effective Marginal Tax Rate (EMTR) by type of asset and method of finance		
				Equity-financed only	Equity-financed		
					Machines	Building	Intangibles
Argentina	35.0%	35.0%	26.2%	38.6%	39.1%	38.7%	36.8%
Australia	30.0%	35.0%	21.5%	33.5%	28.0%	32.0%	48.3%
Austria	25.0%	30.0%	19.3%	29.6%	27.3%	31.3%	31.4%
Belgium	34.0%	35.0%	26.6%	37.7%	30.3%	23.8%	30.6%
Bermuda	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Brazil	37.4%	37.4%	24.1%	38.2%	41.6%	33.7%	39.2%
Bulgaria	10.0%	15.0%	6.7%	11.6%	9.2%	13.7%	12.7%
Canada	26.1%	31.1%	15.8%	27.2%	11.7%	31.8%	45.1%
Cayman Islands	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Chile	25.5%	30.5%	27.3%	36.0%	40.7%	31.9%	31.9%
China	25.0%	30.0%	23.7%	32.8%	33.2%	25.1%	31.4%
Colombia	34.0%	35.0%	6.0%	24.3%	20.3%	28.7%	22.9%
Croatia	18.0%	23.0%	1.3%	11.3%	9.3%	14.2%	9.0%
Czech Republic	19.0%	24.0%	9.3%	18.7%	17.4%	20.1%	18.6%
Denmark	22.0%	27.0%	13.9%	23.8%	23.4%	24.5%	23.1%
Estonia	20.0%	25.0%	44.3%	48.3%	55.9%	33.3%	53.5%
Finland	20.0%	25.0%	13.3%	22.4%	21.7%	21.6%	26.2%
France	36.9%	36.9%	22.8%	36.4%	27.2%	30.2%	23.9%
Germany	30.9%	35.0%	23.3%	35.3%	38.7%	34.9%	24.1%
Greece	29.0%	34.0%	23.5%	34.7%	37.5%	31.0%	35.5%
Hong Kong	16.5%	21.5%	7.0%	15.1%	13.8%	16.6%	15.0%
Hungary	11.0%	16.0%	13.3%	18.0%	14.1%	17.6%	11.5%
Iceland	20.0%	25.0%	11.7%	21.0%	19.2%	22.7%	21.7%
India	34.5%	35.0%	29.7%	40.4%	40.9%	25.5%	27.9%
Indonesia	25.0%	30.0%	23.3%	32.7%	37.7%	25.1%	35.6%
Ireland	12.5%	17.5%	14.4%	19.7%	17.2%	15.9%	25.5%
Israel	24.0%	29.0%	28.9%	36.5%	35.9%	28.9%	26.9%
Italy	26.6%	31.6%	30.6%	38.3%	34.0%	34.3%	45.0%
Japan	30.9%	35.0%	25.1%	36.5%	36.0%	38.3%	32.5%
Jersey	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Lithuania	15.0%	20.0%	9.6%	16.5%	12.6%	10.4%	8.1%
Luxembourg	27.1%	32.1%	2.5%	17.8%	-60.9%	29.2%	22.3%
Mexico	30.0%	35.0%	23.0%	34.8%	38.6%	29.5%	36.5%
Netherlands	25.0%	30.0%	23.7%	31.6%	11.4%	31.3%	56.7%
New Zealand	28.0%	33.0%	25.8%	35.9%	36.9%	35.3%	34.5%
Norway	24.0%	29.0%	19.6%	29.3%	28.9%	29.3%	30.3%
Poland	19.0%	24.0%	16.7%	24.7%	26.7%	25.1%	16.7%
Portugal	24.0%	29.0%	18.3%	27.9%	19.5%	24.2%	30.3%
Romania	16.0%	21.0%	10.3%	17.7%	14.1%	22.0%	15.6%
Russia	20.0%	25.0%	11.7%	21.0%	18.8%	21.3%	26.2%
Saudi Arabia	20.0%	25.0%	17.4%	25.7%	23.8%	24.3%	33.9%
Serbia	15.0%	20.0%	17.9%	23.9%	19.9%	26.8%	26.5%
Singapore	17.0%	22.0%	6.0%	14.7%	11.7%	17.5%	15.3%
Slovakia	21.0%	26.0%	20.2%	28.5%	25.2%	34.5%	18.0%
Slovenia	19.0%	24.0%	12.8%	21.5%	17.6%	23.9%	25.1%
South Africa	28.0%	33.0%	15.2%	27.8%	18.5%	27.7%	46.0%
South Korea	22.0%	27.0%	13.2%	23.0%	15.0%	22.6%	28.3%
Spain	30.6%	35.0%	35.5%	43.9%	35.2%	38.8%	63.0%
Sweden	22.0%	27.0%	11.8%	22.1%	20.7%	24.5%	19.5%
Switzerland	25.3%	30.3%	11.1%	23.3%	23.3%	25.1%	17.6%
Turkey	20.0%	25.0%	18.9%	26.8%	17.6%	27.5%	32.0%
Ukraine	18.0%	23.0%	10.4%	19.0%	16.9%	19.2%	24.1%
United Kingdom	20.0%	25.0%	21.9%	28.8%	26.4%	20.7%	41.3%

Source: Author's calculations.

Notes: EMTR = effective marginal tax rate. The composite EMTR is 41.2 percent buildings, 43.9 percent machinery, and 14.9 percent intangibles. The adjusted rate includes the cost of deferral. We assume all earnings are kept abroad when calculating EMTRs. Country tax rates and parameters reflect laws in 2017.

TABLE A.6

EATRs on Outbound Foreign Investment with No Profit Shifting

By type of asset, 2020

Country	Foreign statutory rate	Composite EATR	Composite EATR	Effective Average Tax Rate (EATR) by type of asset and method of finance					
			Equity-financed only	Equity-financed			Debt-financed		
				Machines	Building	Intangibles	Machine	Building	Intangibles
Argentina	30.0%	18.5%	21.2%	20.4%	23.2%	18.3%	13.6%	13.7%	12.3%
Australia	30.0%	17.6%	20.2%	18.8%	21.9%	19.5%	12.6%	13.0%	13.4%
Austria	25.0%	16.2%	18.4%	17.3%	20.0%	17.3%	12.0%	12.5%	11.6%
Belgium	29.6%	17.0%	19.4%	19.0%	20.5%	17.8%	12.8%	12.4%	11.9%
Bermuda	0.0%	7.6%	7.6%	7.4%	6.1%	12.2%	7.6%	7.5%	8.4%
Brazil	37.4%	20.6%	23.9%	23.6%	25.8%	19.8%	15.1%	14.4%	13.3%
Bulgaria	10.0%	10.7%	11.5%	10.8%	11.4%	14.1%	9.0%	9.3%	9.5%
Canada	26.1%	19.2%	21.8%	23.9%	20.5%	18.7%	16.4%	12.7%	12.9%
Cayman Islands	0.0%	7.6%	7.6%	7.4%	6.1%	12.2%	7.6%	7.5%	8.4%
Chile	27.0%	17.8%	20.3%	20.4%	21.1%	17.7%	13.9%	12.9%	11.9%
China	25.0%	16.2%	18.3%	18.2%	18.9%	17.3%	12.6%	11.9%	11.6%
Colombia	33.0%	17.8%	20.6%	19.1%	23.0%	18.0%	12.6%	13.3%	11.9%
Croatia	18.0%	12.7%	14.0%	13.2%	14.5%	15.0%	10.0%	10.2%	10.0%
Czech Republic	19.0%	13.6%	15.2%	14.4%	15.8%	15.7%	10.5%	10.8%	10.4%
Denmark	22.0%	14.9%	16.7%	16.0%	17.7%	16.3%	11.4%	11.5%	10.9%
Estonia	21.2%	19.1%	21.4%	23.8%	19.5%	19.7%	16.8%	12.6%	14.3%
Finland	20.0%	14.2%	15.9%	15.2%	16.4%	16.3%	11.0%	11.1%	11.0%
France	32.0%	17.8%	20.4%	19.4%	22.5%	17.9%	12.9%	13.1%	11.8%
Germany	30.9%	18.5%	21.2%	20.8%	23.0%	17.7%	13.8%	13.5%	11.7%
Greece	28.0%	17.4%	19.8%	19.5%	20.8%	17.9%	13.2%	12.6%	12.0%
Hong Kong	16.5%	12.6%	13.9%	13.0%	14.3%	15.1%	10.1%	10.3%	10.1%
Hungary	11.0%	11.4%	12.3%	11.7%	12.4%	14.1%	9.5%	9.8%	9.5%
Iceland	20.0%	14.1%	15.8%	14.9%	16.6%	16.0%	10.9%	11.2%	10.7%
India	29.0%	17.4%	19.9%	20.2%	20.5%	17.6%	13.6%	12.4%	11.7%
Indonesia	25.0%	16.5%	18.7%	19.0%	18.9%	17.6%	13.1%	11.9%	12.0%
Ireland	12.5%	11.9%	13.0%	12.5%	12.7%	15.2%	9.9%	9.8%	10.5%
Israel	23.0%	16.0%	18.0%	17.9%	18.7%	16.7%	12.6%	12.0%	11.1%
Italy	26.6%	17.4%	19.7%	18.7%	21.2%	18.7%	12.8%	13.0%	13.2%
Japan	30.7%	18.5%	21.3%	20.2%	23.6%	18.1%	13.5%	13.9%	12.1%
Jersey	0.0%	7.6%	7.6%	7.4%	6.1%	12.2%	7.6%	7.5%	8.4%
Lithuania	15.0%	11.9%	13.0%	12.7%	12.8%	14.5%	9.8%	9.6%	9.7%
Luxembourg	26.0%	14.1%	16.1%	12.4%	19.8%	16.8%	8.5%	12.3%	11.1%
Mexico	30.0%	17.9%	20.5%	20.4%	21.4%	18.3%	13.6%	12.8%	12.3%
Netherlands	25.0%	16.0%	18.0%	15.5%	20.0%	20.0%	11.0%	12.5%	14.3%
New Zealand	28.0%	17.8%	20.3%	19.6%	21.9%	17.9%	13.3%	13.2%	12.0%
Norway	22.0%	15.3%	17.2%	16.4%	18.2%	16.7%	11.7%	11.8%	11.2%
Poland	19.0%	14.3%	16.0%	15.6%	16.7%	15.6%	11.4%	11.3%	10.4%
Portugal	24.4%	15.3%	17.3%	16.2%	18.6%	17.2%	11.4%	11.8%	11.6%
Romania	16.0%	12.9%	14.2%	13.1%	15.0%	15.1%	10.1%	10.7%	10.1%
Russia	20.0%	14.0%	15.7%	14.8%	16.4%	16.3%	10.8%	11.1%	11.0%
Saudi Arabia	20.0%	14.5%	16.3%	15.5%	16.9%	16.9%	11.2%	11.3%	11.6%
Serbia	15.0%	15.7%	17.4%	19.0%	15.6%	17.5%	14.1%	11.1%	12.5%
Singapore	17.0%	12.7%	14.1%	13.2%	14.7%	15.2%	10.0%	10.5%	10.1%
Slovakia	21.0%	15.4%	17.3%	15.9%	19.4%	15.9%	11.4%	12.6%	10.6%
Slovenia	19.0%	13.9%	15.5%	14.4%	16.5%	16.1%	10.6%	11.2%	10.8%
South Africa	28.0%	16.5%	18.7%	17.1%	20.4%	19.0%	11.7%	12.4%	13.1%
South Korea	27.5%	16.1%	18.4%	16.9%	20.2%	17.8%	11.7%	12.3%	12.0%
Spain	30.6%	19.1%	21.9%	20.1%	23.7%	22.1%	13.3%	13.9%	16.0%
Sweden	21.0%	14.4%	16.1%	15.3%	17.2%	16.0%	11.0%	11.4%	10.6%
Switzerland	25.3%	15.6%	17.7%	16.9%	19.0%	16.5%	11.8%	11.9%	10.9%
Turkey	22.0%	15.1%	17.0%	15.4%	18.7%	17.2%	11.0%	12.1%	11.7%
Ukraine	18.0%	13.3%	14.8%	14.0%	15.3%	15.9%	10.4%	10.7%	10.7%
United Kingdom	19.0%	14.2%	15.8%	15.4%	15.8%	17.2%	11.3%	10.8%	12.0%

Source: Author's calculations.

Notes: EATR = effective average tax rates; GILTI = global intangible low-tax income. The composite EATR is 41.2 percent buildings, 43.9 percent machinery, and 14.9 percent intangibles. We assume all foreign tax credits are used (80 percent of foreign taxes are allowed as foreign tax credits). The reported EATRs are the combination of GILTI liability and residual foreign taxes (20 percent of foreign tax liability). Country tax rates and parameters reflect laws in 2020.

TABLE A.7

EMTRs on Outbound Foreign Investment with No Profit Shifting

By type of asset, 2020

Country	Foreign statutory rate	Composite EMTR	Composite EMTR	Effective Marginal Tax Rate (EMTR) by type of as and method of finance		
			Equity-financed only	Equity-financed		
				Machines	Building	Intangibles
Argentina	30.0%	9.5%	15.5%	14.2%	14.3%	22.2%
Australia	30.0%	5.5%	11.2%	7.6%	8.6%	25.4%
Austria	25.0%	5.6%	10.6%	7.8%	9.2%	21.2%
Belgium	29.6%	3.2%	8.7%	9.1%	2.8%	20.9%
Bermuda	0.0%	-1.2%	-1.4%	-2.3%	-8.6%	16.2%
Brazil	37.4%	9.9%	17.0%	18.1%	13.0%	23.6%
Bulgaria	10.0%	-0.2%	1.7%	-0.6%	-3.0%	17.6%
Canada	26.1%	16.0%	21.2%	28.9%	9.4%	24.7%
Cayman Islands	0.0%	-1.2%	-1.4%	-2.3%	-8.6%	16.2%
Chile	27.0%	10.0%	15.5%	17.5%	10.6%	21.6%
China	25.0%	5.3%	10.2%	11.5%	3.8%	21.2%
Colombia	33.0%	2.6%	8.9%	5.2%	8.1%	20.1%
Croatia	18.0%	-2.0%	1.1%	-1.1%	-3.7%	17.2%
Czech Republic	19.0%	1.2%	4.9%	3.0%	0.8%	18.7%
Denmark	22.0%	3.2%	7.5%	6.0%	3.9%	19.5%
Estonia	21.2%	20.0%	24.6%	31.6%	13.1%	28.8%
Finland	20.0%	2.7%	6.5%	5.2%	1.9%	20.2%
France	32.0%	3.6%	9.7%	7.8%	7.5%	20.0%
Germany	30.9%	8.2%	14.4%	14.7%	11.8%	19.8%
Greece	28.0%	6.8%	12.3%	13.1%	7.4%	21.8%
Hong Kong	16.5%	-0.2%	2.6%	0.1%	-1.6%	18.1%
Hungary	11.0%	1.6%	3.8%	1.8%	0.0%	17.5%
Iceland	20.0%	2.2%	6.1%	3.8%	2.8%	19.3%
India	29.0%	6.0%	11.5%	14.7%	3.8%	20.4%
Indonesia	25.0%	6.9%	11.7%	14.4%	3.8%	22.1%
Ireland	12.5%	2.0%	4.5%	3.4%	-1.5%	20.1%
Israel	23.0%	6.9%	11.6%	12.8%	6.6%	20.1%
Italy	26.6%	8.6%	13.8%	11.7%	11.5%	24.6%
Japan	30.7%	8.9%	15.0%	12.8%	14.8%	21.4%
Jersey	0.0%	-1.2%	-1.4%	-2.3%	-8.6%	16.2%
Lithuania	15.0%	-1.6%	1.0%	0.7%	-6.2%	17.0%
Luxembourg	26.0%	-6.5%	-1.7%	-22.1%	6.3%	19.2%
Mexico	30.0%	6.8%	12.6%	14.2%	6.5%	22.2%
Netherlands	25.0%	4.3%	9.0%	-0.5%	9.2%	28.4%
New Zealand	28.0%	8.7%	14.2%	13.4%	12.1%	21.8%
Norway	22.0%	5.0%	9.4%	8.0%	6.3%	20.6%
Poland	19.0%	4.7%	8.6%	8.2%	5.0%	18.4%
Portugal	24.4%	2.1%	6.7%	3.7%	3.5%	21.0%
Romania	16.0%	1.8%	4.9%	1.5%	2.8%	18.2%
Russia	20.0%	1.9%	5.8%	3.7%	1.6%	20.2%
Saudi Arabia	20.0%	4.3%	8.2%	6.4%	4.1%	21.9%
Serbia	15.0%	14.4%	17.9%	23.7%	7.1%	25.4%
Singapore	17.0%	-0.2%	2.9%	0.2%	-1.0%	18.2%
Slovakia	21.0%	6.9%	11.4%	7.1%	12.9%	18.6%
Slovenia	19.0%	2.6%	6.4%	3.1%	3.9%	20.0%
South Africa	28.0%	2.7%	7.8%	2.7%	5.4%	24.8%
South Korea	27.5%	1.9%	7.0%	2.5%	5.2%	21.7%
Spain	30.6%	11.1%	16.9%	12.3%	15.2%	31.6%
Sweden	21.0%	2.3%	6.3%	4.1%	3.3%	18.8%
Switzerland	25.3%	2.2%	7.1%	5.5%	3.8%	18.6%
Turkey	22.0%	4.3%	8.7%	3.5%	8.3%	22.0%
Ukraine	18.0%	1.4%	4.8%	2.8%	0.3%	19.8%

Source: Author's calculations.

Notes: EMTR = effective marginal tax rates; GILTI = global intangible low-tax income; TCJA = Tax Cuts and Jobs Act of 2017. The composite EMTR is 41.2 percent buildings, 43.9 percent machinery, and 14.9 percent intangibles. We assume all foreign tax credits are used (80 percent of foreign taxes are allowed as foreign tax credits). The reported EMTRs are the combination of GILTI liability and residual foreign taxes (20 percent of foreign tax liability). Country tax rates and parameters reflect laws in 2020.

GILTI EXPENSE ALLOCATIONS AND PROFIT SHIFTING

Here, we extend the International Investment and Capital Model (IICM)to incorporate the role of expense allocations in determining GILTI liability. One specificity of calculating the GILTI inclusion and FTCs is expense allocation. US multinationals must allocate some domestic expenses, such as interest expenses, to foreign-earned income, which reduces the value of the QBAI deduction. We can include the role of expense allocation as

$$R^{intang} = -\frac{r+\delta}{1+r}\left(1-\tilde{A}\right)+\frac{p+\delta}{1+r}(1-\tau^{F}-\tau^{GILTI})+\frac{e}{1+r}\tau^{GILTI}+\frac{p+\delta-\boldsymbol{e}}{1+r}(0.8\tau^{F})+\hat{F}$$

And for tangibles as

$$R^{tang} = -\frac{r+\delta}{1+r}\left(1-\tilde{A}\right)+\frac{p+\delta}{1+r}(1-\tau^{F}-\tau^{GILTI})+\frac{0.1-\hat{f}+e}{1+r}\tau^{GILTI}+\frac{p+\delta-\boldsymbol{e}}{1+r}0.8*x*\tau^{F}+\hat{F}\,, \qquad (7)$$

where e is the fraction of expenses allocated to the CFC for a given investment, and $0.8*x$ is the fraction of foreign taxes allowed as foreign tax credits. We can use the relevant ETRs to show how changes in the treatment of expense allocation change effective tax rates, or which countries may trigger GILTI liability even though their statutory tax rate is higher than 13.125 percent.

Under these assumptions, it follows that rents from new investments are

$$R_{PS}^{intang} = -\frac{r+\delta}{1+r}(1-A^{G}-0.2A^{HT})+\frac{p+\delta}{1+r}(1-\tilde{\tau}-\tau^{GILTI})+\frac{e}{1+r}\tau^{GILTI}+\frac{p+\delta-e}{1+r}(0.8\,\tilde{\tau}) -\frac{\eta}{1+r}+F$$

and for tangible investments are

$$R_{PS}^{tang} = -\frac{r+\delta}{1+r}\left(1-\tilde{A}\right)+\frac{p+\delta}{1+r}(1-\tilde{\tau}-\tau^{G})+\frac{0.1-\hat{f}+e}{1+r}\tau^{GILTI} +\frac{p+\delta-e}{1+r}\left((1-\zeta)*0.8x*\tau^{HT}+0.8*\zeta\tau^{LT}\right)-\frac{\eta}{1+r}+F,$$

where $\tilde{A}=\hat{A}^{G}+A^{F}(1-0.8*x)$, the composite tax rate is 1-$\tilde{\tau}=\zeta(1-\tau^{LT})+(1-\zeta)(1-\ \tau^{HT})$, the fraction of allowed FTCs in the high tax country is $0.8x$, and shifting costs are captured by η.

ADDITIONAL RESULTS

Tables A.8 and A.9 compare effective tax rates after versus before TCJA.

TABLE A.8

Average Effect of the Tax Cuts and Jobs Act on Outbound Effective Average Tax Rate

By type of asset, all foreign tax credits used

Machinery – equity financed				
Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	-4.5%	1.5%	6.0%	7.2%
Deferral cost of 5 percent	-9.3%	-3.4%	1.1%	2.2%
Deferral cost of 10 percent	-13.0%	-7.6%	-3.5%	-2.8%
Buildings – equity financed				
Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	-3.3%	-0.5%	2.4%	5.2%
Deferral cost of 5 percent	-8.1%	-5.3%	-2.5%	0.2%
Deferral cost of 10 percent	-11.8%	-9.4%	-6.9%	-4.4%
Intangibles – equity financed				
Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	-6.1%	1.5%	9.1%	12.2%
Deferral cost of 5 percent	-11.0%	-3.3%	4.2%	7.2%
Deferral cost of 10 percent	-14.7%	-7.4%	-0.1%	2.2%

Source: Author's calculations.
Notes: EATR = effective average tax rate; GILTI = global intangible low-tax income; TCJA = Tax Cuts and Jobs Act of 2017. The average EATR is weighted by total (unadjusted) foreign direct investment in 2019 in each foreign country of investment. The reported EATRs are the combination of GILTI liability and residual foreign taxes (20 percent of foreign tax liability). Country tax rates and parameters reflect laws in 2020.

TABLE A.9

Average Effect of the Tax Cuts and Jobs Act on Outbound Effective Average Tax Rate

By type of asset, excess foreign tax credits allowed

Machinery – equity financed				
Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	0.6%	2.5%	6.2%	7.2%
Deferral cost of 5 percent	-4.2%	-2.4%	1.2%	2.2%
Deferral cost of 10 percent	-7.9%	-6.6%	-3.4%	-2.8%
Buildings – equity financed				
Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	0.5%	0.7%	1.7%	5.2%
Deferral cost of 5 percent	-4.3%	-4.2%	-3.2%	0.2%
Deferral cost of 10 percent	-8.0%	-8.2%	-7.6%	-4.4%
Intangibles – equity financed				
Cost of deferral	Amount of profit shifted			
	0 percent	25 percent	50 percent	75 percent
No deferral costs	0.9%	2.6%	9.1%	12.2%
Deferral cost of 5 percent	-3.9%	-2.3%	4.2%	7.2%
Deferral cost of 10 percent	-7.6%	-6.3%	-0.1%	2.2%

Source: Author's calculations.
Notes: EATR = effective average tax rate; GILTI = global intangible low-tax income; TCJA = Tax Cuts and Jobs Act of 2017. The average EATR is weighted by total (unadjusted) foreign direct investment in 2019 in each foreign country of investment. The reported EATRs are the combination of GILTI liability and residual foreign taxes (20 percent of foreign tax liability). Country tax rates and parameters reflect laws in 2020.

NOTES

1 TPC's Investment and Capital Model (ICM) evaluates tax incentives on domestic investments. The International Investment and Capital Model (IICM) estimates tax incentives on inbound US investment from foreign corporations (Matheson 2021).

2 Our current data include foreign tax rates and parameters up to 2020, but we can derive forward-looking rates for present and future years.

3 Classical effective tax rate models, such as those used by the Tax Policy Center and other large economic organizations, typically estimate effective tax rates by type of asset (e.g., machines or structure, or an intangible asset), using a specific method of financing (equity, debt, or retained earnings) in a specific country. Average rates can be estimated using weighted averages of investment data by type of asset and financing.

4 Brosy and Matheson (2023) evaluate the impact of FDII on effective tax rates in the US. Some of the effect of the Base Erosion and Anti-Abuse Tax (BEAT) can also be incorporated into TPC's current model by adjusting allowed deductible interest expenses for debt-financed investments.

5 Michael Smolyansky, Gustavo Suarez, and Alexandra Tabova, "US Corporations' Repatriation of Offshore Profits: Evidence from 2018," *FEDS Notes*, August 6, 2019, https://www.federalreserve.gov/econres/notes/feds-notes/us-corporations-repatriation-of-offshore-profits-20190806.html.

6 We choose 2019 as a reference year for descriptive statistics to mitigate the potential effects of the COVID-19 pandemic on the data.

7 "Corporate Tax Haven Index—2021 Results," Tax Justice Network, accessed April 15th, 2024 https://cthi.taxjustice.net/en/.

8 British Caribbean Islands classified as tax havens include the British Virgin Islands, the Cayman Islands, Montserrat, and Turks and Caicos Islands.

9 "What Is a Territorial Tax and Does the United States Have One Now?," *Briefing Book*, Urban-Brookings Tax Policy Center, updated May 2020, https://www.taxpolicycenter.org/briefing-book/what-territorial-tax-and-does-united-states-have-one-now.

10 Net operating losses were fully deductible, and unused losses could be carried back 2 years and carried forward 20 years.

11 "Figure 1: Repatriation of Overseas Earnings," in Smolyansky, Suarez, and Tabova, "US Corporations' Repatriation," accessed April 15th, 2024, https://www.federalreserve.gov/econres/notes/feds-notes/us-corporations-repatriation-of-offshore-profits-accessible-20190806.htm#fig1.

12 A full list of countries used is available in appendix tables A.2–A.7.

13 "What Is Global Intangible Low-Taxed Income and How Is It Taxed under the TCJA?," *Briefing Book*, Urban-Brookings Tax Policy Center, updated May 2020, https://www.taxpolicycenter.org/briefing-book/what-global-intangible-low-taxed-income-and-how-it-taxed-under-tcja.

14 "What Is the TCJA Base Erosion and Anti-Abuse Tax and How Does It Work?," *Briefing Book*, Urban-Brookings Tax Policy Center, updated May 2020, https://www.taxpolicycenter.org/briefing-book/what-tcja-base-erosion-and-anti-abuse-tax-and-how-does-it-work.

15 A patent box, also called an IP regime, allows income generated from intangible assets to be taxed at a lower rate. For a list of examples, see "Intellectual Property Regimes," Organisation for Economic Co-operation and Development, accessed February 2, 2023, https://qdd.oecd.org/data/IP_Regimes.

16 The impact of FDII on effective tax rate is described in Brosy and Matheson (2023)

17 "26 U.S. Code § 250: Foreign-derived intangible income and global intangible low-taxed income," Legal Information Institute at Cornell Law School, accessed February 2, 2023, https://www.law.cornell.edu/uscode/text/26/250.

[18] 21% * (1 − 0.375) = 13.125%, and 21% * (1 − 0.21875) = 16.4%

[19] Multinationals often have multilayered structures whereby CFCs of a US multinational own other CFCs. For example, consider a US parent company that owns an Irish subsidiary, which itself owns a French subsidiary. Blouin and Robinson (2020) argue that companies completing BEA surveys report profits where they originate in their CFCs—where sales occur (the French CFC in this example)—and in the CFC that receives them as dividends (the Irish CFC), which leads to double counting. This would overestimate profit shifting, as profit reported in Ireland may be assumed to be profit shifted when it is actually dividends received by a subsidiary.

[20] "CBT Tax Database: Data Description," Oxford University Centre for Business Taxation, January 2017, https://oxfordtax.sbs.ox.ac.uk/cbt-tax-database.

[21] Some countries allow deductions for local taxes to determine income taxed at the national level. The final applicable tax rate is evaluated after considering the deductibility of local taxes.

[22] The CBT and ZEW datasets do not include the taxation of research and development (R&D). They include a category for inventories, which we exclude as it is not relevant to determine incentives for US firms to invest abroad.

[23] We use the same economic depreciation as reported by Oxford CBT and the IMF.

[24] "Intellectual Property Regimes," Organisation for Economic Co-operation and Development, accessed February 12th, 2024, https://qdd.oecd.org/data/IP_Regimes.

[25] The countries with special rates and the relevant rate applied under the IP box regime are listed in appendix table A.1.

[26] We can also estimate effective tax rate with new equity in the model, but we do not discuss these results. Most foreign investment is financed with retained earnings or debt.

[27] We follow the shares used by the Oxford Centre for Business Taxation database without including tax rates for inventories in the composite.

[28] EMTRs on intangibles with and without patent boxes are shown in appendix A.

[29] For this estimation, we use the statutory tax rates without adding the cost of deferral.

[30] Internal Revenue Service, "How to Depreciate Property: Section 179 Deduction, Special Depreciation Allowance, MACRS, Listed Property," Publication 946, 2023, https://www.irs.gov/publications/p946#en_US_2022_publink1000107510.

[31] Jose Murillo, Craig Hillier, Allen Stenger, Martin Milner, and Megan Hickman, "GILTI Regime Guidance Answers Many Questions," Tax Adviser, January 1, 2019, https://www.thetaxadviser.com/issues/2019/jan/gilti-regime-guidance-answers-many-questions.html.

[32] A US person is a US shareholder and can be a business or an individual.

[33] "Effectively Connected Income (ECI)," Internal Revenue Service, accessed June 4th, 2024, https://www.irs.gov/individuals/international-taxpayers/effectively-connected-income-eci.

[34] A related person is a corporation organized in the same country as the CFC that uses a substantial part of its assets in a trade or business in that same country. See Internal Revenue Service, "Receipt of Dividends or Interest from a Related CFC," presentation, March 22, 2021, https://www.irs.gov/pub/irs-utl/receipt_dividends_interest.pdf.

[35] "26 CFR § 1.78-1: Gross Up for Deemed Paid Foreign Tax Credit," Legal Information Institute at Cornell Law School, accessed June 4th, 2024, https://www.law.cornell.edu/cfr/text/26/1.78-1.

[36] The marginal cost of capital simply would be $\tilde{p}^{INTANG} = \frac{1}{(1-\tau^{GILTI})}\left[\left(1-\hat{A}\right)*(r+\delta)\right]-\delta$

[37] This assumes a profit rate of 20 percent, a real rate of 5 percent, and an inflation rate of 2 percent.

[38] GILTI Section 78 estimates the amount of paid taxes for FTC purposes using the inclusion percentage. The inclusion percentage is derived by removing the QBAI deduction from tested income. Without any other deductions, the inclusion percentage in our case is 90 percent, and the FTC applies to returns minus the 10 percent deduction.

[39] We assume inflation $\pi = 2\%$ and the real interest rate $r = 5\%$, $i \cong r(1+\pi) + \pi = 7.1\%$). For foreign-owned US corporations, τ^{int} is the greater of the bilateral withholding tax on interest payments or the foreign parent's home country corporate tax rate. For details, see Matheson (2021).

[40] Where τ^{div} is the investor-level tax on dividends and τ^{CG} is the investor-level tax on capital gains. The IICM assumes corporations are buy-and-hold investors, so that τ^{CG} equals zero. For foreign-owned corporations, τ^{div} is the bilateral withholding tax on participating dividends.

[41] A 15 percent economic depreciation is traditionally assumed for a large fraction of assets, although it has been found to be a conservative estimate (Li and Hall 2020). For R&D, we use asset-specific depreciation rates from the BEA, which are either 15 or 20 percent.

[42] Tax rates are somewhat sensitive to inflation. A higher inflation rate leads to a higher effective tax rate on equity-financed investment because firms discount future income with the nominal interest rate. Conversely, higher inflation may make debt-financed tax rates lower, as firms get to deduct nominal interest payments against income. Our qualitative comparison between R&D capitalization and R&D expensing or between tangible and intangible assets is nevertheless similar when we use an inflation rate slightly higher (e.g., 5 or 8 percent).

[43] Specifically, dB_t is $(1 - \phi\tau)$, where ϕ is the first-year depreciation allowance.

[44] $R^* = (p - r) / (1 + r)$

[45] An intuitive way to grasp the value of the EATR is as a weighted average of the EMTR and the statutory tax rate: The less profitable an investment (that is, the lower the value of $\tilde{p}$), the closer the EATR gets to the EMTR, and the more profitable an investment, the closer the EATR gets to the statutory tax rate. See equation (9) in Matheson (2021).

[46] The average subnational tax rate is provided by the IMF and not calculated by the author.

[47] The Oxford University CBT Tax Database (https://oxfordtax.sbs.ox.ac.uk/cbt-tax-database) and IMF dataset we use to derive effective tax rates do not publish effective tax rate by source of financing or individual assets. However, they describe the weights of each asset to determine the average tax rate and the fraction of debt finance (35 percent). We were able to replicate their findings at the average EATR/EMTR level following the specific weighting indicated.

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