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ASSESSING U.S. GLOBAL TAX COMPETITIVENESS AFTER TAX REFORM

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This paper assesses the impacts of the 2017 tax reform act on U.S. competitiveness in terms of changes in incentives for U.S. domestic corporate investment and the taxation of U.S.-headquartered companies and their foreign subsidiaries relative to foreign-headquartered companies.

The reduction of the U.S. statutory tax rate has significantly improved domestic investment incentives as measured by marginal and average effective tax rates, assuming an average use of debt and equity. In addition, the partial adoption of a participation exemption system in some cases can allow U.S. companies now to compete globally on equal tax terms with foreign-headquartered companies. However, a new U.S. global minimum tax imposes current taxation on certain foreign income previously eligible for deferral and, as a result, may disfavor U.S. ownership of high-return foreign assets relative to foreign-headquartered companies.

Average effective tax rates are also reduced by a new domestic incentive for undertaking high-return investments in the United States. Even so, U.S. research incentives continue to lag behind those available in many other major countries, taking into account special deductions, tax credits, and patent box regimes.

Keywords: tax reform, corporate income taxation, multinational corporations

JEL Codes: E22, F23, H25, H32, H73

I. INTRODUCTION

The enactment in 2017 of major tax reform legislation, commonly referred to as the "Tax Cuts and Jobs Act" (the "Act"), marks the most substantial reform to the U.S. corporate income tax system since the Tax Reform Act of 1986 and the greatest overhaul of the code's international tax provisions since 1962.

The Act is intended by Congress to increase U.S. investment and to allow U.S. multinational corporations to be more competitive relative to foreign-based companies.[1]

[1] See, for example, statements from the Senate Finance Committee (2017) explanation of the Senate bill: Describing the corporate rate reduction (p. 109): "The Committee believes that lowering the corporate tax rate is necessary to ensure domestic corporations remain globally competitive with their counterparts domiciled in the United States' largest international competitors." Describing the participation exemption system (p. 353): "The provision would allow U.S. companies to compete on a more level playing field against foreign multinationals when selling products and services abroad by eliminating an additional level of tax."

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Changes in U.S. investment incentives can be assessed through analysis of effective tax rates on domestic investment, while changes in competitiveness relative to foreign-based companies can be examined by changes in the taxation of U.S. investment in foreign countries. Disadvantageous treatment of U.S. investments abroad under the prior law U.S. worldwide system of taxation was seen by some as a disincentive for companies to choose the United States as their tax domicile.[2] By increasing U.S. tax competiveness and other reforms, Congress also intended the Act to reduce tax-motivated acquisitions of U.S. companies and incentives for U.S. multinationals to move their tax domicile to a foreign country through a cross-border merger or "inversion."[3]

In this paper, we analyze the Act's major corporate tax changes and their effect on U.S. tax competitiveness, and we compare features of the U.S. corporate tax system with those of other developed countries.[4] Competitiveness is assessed in terms of, first, the United States as a location for investment by both U.S. and foreign companies and, second, the U.S. tax treatment of foreign investments made by U.S.-headquartered companies. The former measure of competitiveness has direct implications for U.S. gross domestic product, wages, and productivity, and the latter measure can influence the ability of U.S.-based companies to compete globally, which can affect U.S. economic activity by virtue of complementarities between foreign and domestic investment, as noted by Desai, Foley, and Hines (2009).

On many measures, we find the reformed U.S. corporate tax system makes the United States a much more attractive location for investment, both in absolute terms and relative to many other countries. The Act significantly reduces both marginal and average effective tax rates on most types of corporate investment in the United States, especially for equity-financed investments and those using average debt-equity financing ratios.

The Act's participation exemption system — considered apart from other international changes — allows U.S. multinational companies to compete globally on similar tax terms as foreign-based multinational companies. The Act's new global minimum tax, however, can be more expansive than the base protection measures other countries apply to their resident multinational corporations and, in these instances, makes the U.S. international system less competitive than many foreign country international tax systems. As a result, while in many cases the Act reduces the incentives for redomiciliation, foreign tax residency can still remain advantageous.

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[2] Wells (2010) and Knoll (2017) examine provisions disadvantaging U.S.-headquartered companies under prior law. Kleinbard (2014) provides an opposing view of inversion incentives under prior law.

[3] The Senate Finance Committee (2017, p. 391) explanation of the Senate bill states: "[T]he current U.S. international tax system makes foreign ownership of almost any asset or business more attractive than U.S. ownership. This unfairly favors foreign-headquartered companies over U.S.-headquartered companies, creating a tax-driven incentive for foreign takeovers of U.S. firms. Furthermore, it has created significant financial pressures for U.S.-headquartered companies to re-domicile abroad and shift income to low-tax jurisdictions."

[4] The 2017 Act also made substantial changes to the tax treatment of pass-through businesses, including a new 20-percent deduction for qualifying pass-through business income. This paper confines its analysis to corporate business income.

The global tax environment has been anything but stable since the United States last enacted tax reform and it remains to be seen the extent to which global changes intensify in response to the U.S. legislation, including ongoing corporate rate reduction in other countries. It would be expected that these foreign responses will seek to increase the attractiveness of locating investment abroad and, therefore, may diminish some of the competitive advantage to the United States as a location for investments resulting from the Act.

The next section provides a high-level overview of the corporate provisions of the Act. Section III focuses on the statutory corporate tax rate reduction; Section IV examines investment incentives for tangible capital (equipment, structures, and inventory), as represented by the effective marginal and effective average corporate tax rates; Section V looks at international tax changes; and Section VI considers investment incentives for research-based intellectual property (IP) and other intangible investment.

II. OVERVIEW OF CORPORATE PROVISIONS IN THE TAX CUTS AND JOBS ACT

The 2017 Act substantially reforms tax provisions affecting both individuals and businesses. The Joint Committee on Taxation (JCT, 2017) estimates the Act, ignoring macroeconomic feedback effects, will reduce combined individual and corporate income tax collections and outlays by $1.456 trillion dollars over the 10-year budget period 2018–2027.

The JCT does not report the net tax reduction for corporations separately from that of individuals (including pass-through businesses), but based on estimates by the Congressional Budget Office (CBO, 2018), the Act will reduce corporate income tax revenues by less than $400 billion over the 10-year period, or about 10 percent of the CBO's $3.9 trillion prior law corporate income tax baseline.[5] Table 1 reports the major categories of corporate tax provisions in the Act and their estimated revenue effect, adjusted to be roughly consistent with the CBO's aggregate estimate for the Act.

Major business provisions affecting corporations include a reduction in the federal statutory corporate tax rate from 35 to 21 percent, immediate full expensing for investment in equipment through 2022 (and partial expensing from 2023 through 2026), preferential taxation of certain high-return export income ("foreign-derived intangible income," or "FDII"), repeal of the corporate alternative minimum tax (AMT), and international reforms providing for a 100-percent participation exemption ("territorial") tax system for some foreign earnings while greatly expanding prior law anti-deferral rules to subject other active foreign earnings to immediate U.S. taxation by the creation of a global minimum tax ("global intangible low-taxed income," or "GILTI").

[5] The CBO (2018, pp. 93–96) reports that the combined effect of the 2017 Act, the Bipartisan Budget Act of 2018, and the Extension of Continuing Appropriations Act was to reduce corporate revenues by $409 billion, excluding macroeconomic feedback effects and using the same baseline as used by the JCT. The latter two laws in total reduce tax revenues by $34 billion over the 2018–2027 period; we estimate about half of the $34 billion is a reduction in corporate tax revenue.

Table 1
Revenue Estimates of 2017 Act Major Corporate Categories, 2018–2027

Business Tax Category	Estimated Change in Corporate Tax Revenue ($Billions)
21 percent corporate tax rate	–$1,348.5
Repeal corporate AMT	–40.3
Small business reforms	–22.1
Cost recovery, etc.	466.1
Business-related deductions	105.4
Accounting methods	12.6
Business credits	32.6
Banks and financial instruments	18.4
Compensation	9.3
Insurance	39.9
Other	4.2
International	324.4
Total corporate provisions	–$398.0

Notes: Corporate revenue estimates are derived by the authors based on JCT estimates aggregated across all taxpayers and CBO estimates. JCT revenue estimates are not published by type of taxpayer. Each business tax category in the table may contain multiple provisions. For example, the category "Cost recovery, etc." includes revenue losses from 100% expensing as well as revenue increases from limits on net interest deductions, limits on NOLs, and amortization of research expenses. For a comprehensive list of the provisions within each category, see JCT (2017).

On a provision-by-provision basis, more than 75 percent of the 10-year corporate revenue loss from revenue decreasing provisions is offset under the Act by repealing certain prior law tax preferences and enacting new base broadening provisions and other revenue raising provisions applying to corporations.[6] These include repeal of the prior law domestic production deduction (Section 199) and new limitations on interest expense deductions and net operating losses (NOLs). In addition to GILTI, another base protection measure creates a separate new minimum tax that can impose tax on certain otherwise deductible payments to related foreign parties ("base erosion and anti-abuse tax," or "BEAT").

Some base broadening provisions are scheduled to become more restrictive over time or are enacted with a delayed effective date. For example, beginning in 2022 the limitation on net interest expense is scheduled to switch from a limitation based on 30 percent of a broader measure of income (comparable to earnings before interest, tax, depreciation, and amortization, or "EBITDA") to a narrower measure of income (com-

[6] This calculation is based on a more detailed list of provisions than shown in Table 1. The estimate excludes any macroeconomic feedback effects of the provisions.

parable to earnings before interest and tax, or "EBIT"). In addition, beginning in 2022, the deduction for research expenses is scheduled to switch from immediate expensing (as codified under Section 174 since 1954) to five-year amortization.[7]

One-time tax revenue is raised by imposing tax on foreign earnings on which U.S. tax had been deferred. The JCT (2016) estimates that at the end of 2015, such foreign earnings amounted to approximately $2.6 trillion. The one-time tax, which is payable over eight years, is estimated by the JCT to raise $338.8 billion over the 10-year budget period.

While most individual income tax provisions of the Act are scheduled to expire after 2025, the phased-in corporate tax provisions are permanent.

III. CORPORATE TAX RATE REDUCTION

The Act lowers the federal corporate statutory tax rate from 35 to 21 percent, effective for 2018. The prior law graduated rate structure was repealed. Accounting for average state income taxes of 6.1 percent in 2018, the combined federal and state corporate income tax rate is 25.8 percent, a reduction from the 38.9 percent combined rate under prior law (OECD, 2018b).

The average combined corporate statutory tax rate for the other 35 member countries of the OECD is 23.6 percent in 2018 (OECD, 2018b).

As shown in Figure 1, since the enactment of the 1986 tax reform act, there has been little change in the combined U.S. corporate statutory tax rate.[8] In contrast, other OECD countries have embarked on significant ongoing rate reduction since 1986, bringing the average rate down from 48.1 percent in 1985 to 25.0 percent in 2008, an average decline of one percentage point per year. The average OECD corporate tax rate has declined at a much slower rate since 2008, possibly due to fiscal pressures of the global recession, declining at an average rate of less than 0.2 percentage points per year between 2008 and 2017. However, as discussed in more detail below, even before the enactment of the lower U.S. corporate tax rate, other OECD countries had enacted rate reductions to take effect after 2017.

In 2017, the 38.9 percent combined U.S. corporate statutory tax rate was the highest among all OECD countries. The new U.S. combined corporate tax rate of 25.8 percent is 14th highest among the 36 OECD countries in 2018 (Figure 2). Among G7 countries, the U.S. rate is the second lowest, after the United Kingdom's 19 percent; Canada is third lowest in the G7, with a combined rate of 26.8 percent. The countries with the lowest OECD tax rates are Hungary at 9 percent (down from 19 percent in 2016), followed by Ireland at 12.5 percent.

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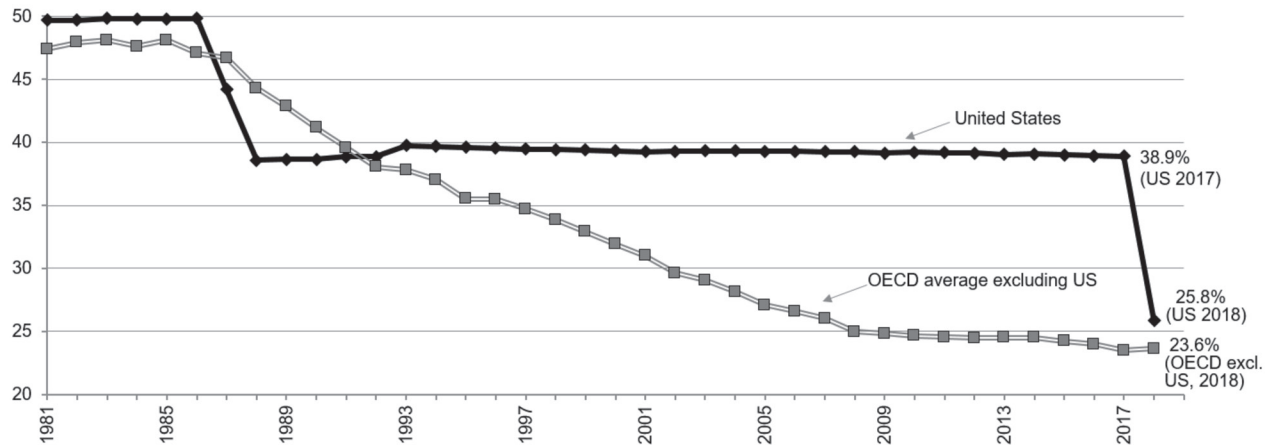
[7] Prior to 1954, expensing of research and experimental expenditures was permitted for tax purposes to the extent they were ordinary and necessary expenses, and capitalized and amortized otherwise (Joint Committee on Internal Revenue Taxation, 1955).

[8] The 1986 tax reform act lowered the top federal corporate tax rate from 46 to 34 percent, phased in with a 40-percent rate applying in 1987. In 1993, the federal corporate tax rate was increased from 34 to 35 percent. Minor other variations in the combined corporate tax rate since 1988 reflect small changes in the average state tax rate, as reported historically by the OECD Tax Database. Data for non-U.S. OECD countries are as reported in the OECD Tax Database and supplemented with additional historical years by the authors where determinable.

Figure 1

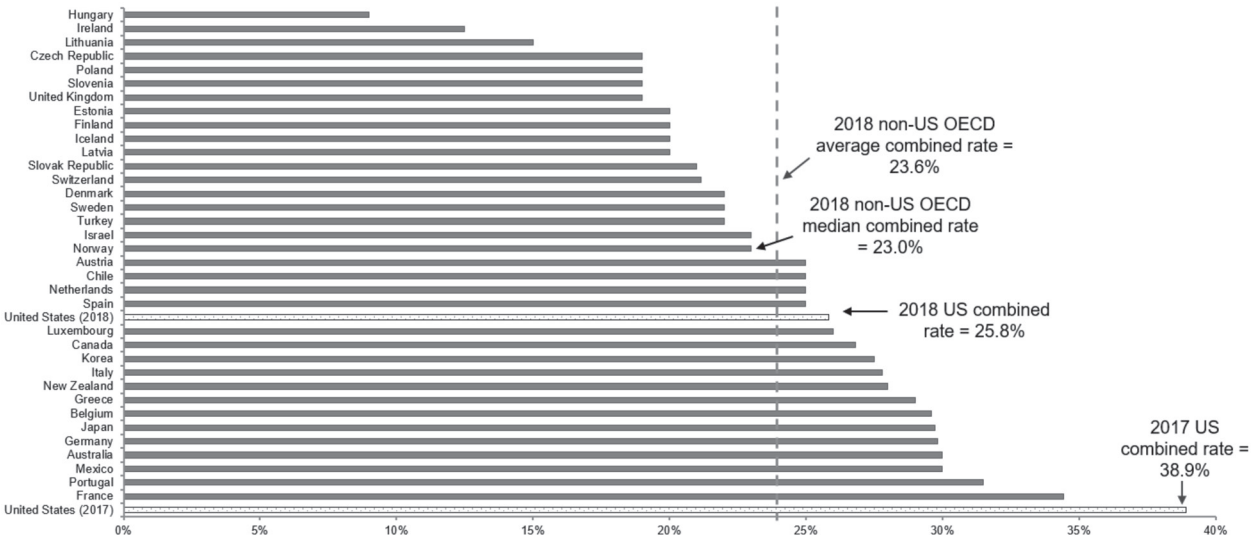
U.S. and Average Non-U.S. OECD Combined (National and Subnational) Statutory Corporate Tax Rates, 1981–2018



Source: OECD Tax Database, with historical rates supplemented by the authors.

Figure 2

OECD Combined (National and Subnational) Statutory Corporate Tax Rates, 2018



Notes: Top combined national and sub-national marginal tax rate of each country, accounting for deductibility of sub-national tax. Estonia's and Latvia's 20 percent tax rate only applies to distributed earnings (with no additional shareholder-level tax); no tax applies to retained earnings.
Source: OECD Tax Database, August 2018.

The statutory corporate tax rate is important for many economic decisions. It is the tax rate that applies to an extra dollar of taxable income. At the new combined U.S. tax rate of 25.8 percent, a U.S. company keeps 21 percent more in after-tax profit on an additional dollar of taxable income than at the former rate of 38.9 percent (i.e., (1 – 0.258)/(1 – 0.389) –1). As discussed by Devereux and Griffith (2003), multinational corporations' decisions on where to locate their high-return investments may be strongly influenced by the statutory tax rate.

Contemporaneous with, or prior to the 2017 enactment of U.S. tax reform, many countries had enacted future (post-2017) corporate tax rate reductions.

As of June 2018, 11 other OECD countries have proposed or enacted corporate tax rate reductions to take effect in 2018 or later years and four OECD countries have enacted rate increases (Table 2). Notably, the two OECD countries with the highest tax rates in 2017 after the United States — Belgium and France — have already enacted rate reductions that will reduce their corporate tax rates to 25 percent when fully phased in.

Collier (2017) suggests that tax competition among countries to attract investment will become more focused in the future around corporate rate reduction as a result of the OECD Base Erosion and Profit Shifting (BEPS) project, which limits the ability of countries to use certain specialized tax preferences and rulings to attract investment.

IV. CAPITAL COST RECOVERY AND INVESTMENT INCENTIVES AS MEASURED BY EFFECTIVE MARGINAL TAX RATES AND EFFECTIVE AVERAGE TAX RATES

In this section, we consider how the 2017 Act changes corporate investment incentives for equipment, structures, and inventory. We assess these by computing effective marginal corporate tax rates (EMTR) and effective average corporate tax rates (EATR), following the methodology of Devereux and Griffith (2003). The EMTR represents the corporate tax burden on an incremental break-even investment, while the EATR represents the corporate tax burden on projects generating economic rents. A number of authors have identified above normal returns to represent a large component of corporate income. Cronin et al. (2013) estimate that 63 percent of corporate income represents supernormal returns, while Power and Frerick (2016) estimate supernormal returns have increased over time and more recently represent 75 percent of corporate income. The EATR may drive the decision of where to place a specific investment when there is locational choice, while the EMTR may influence the scale of the investment.

The effective tax rate calculations in this section take into account the changes in corporate statutory tax rates, the repeal of the Section 199 domestic production deduction, and changes in depreciation allowances. Both equity and debt finance, and mixes of each, are considered. The analysis considers only corporate-level income taxes and does not consider taxes at the level of the shareholder or interest recipient.

A. Changes to Depreciation under the Act

The 2017 Act greatly accelerates capital cost recovery for most equipment by providing for 100-percent expensing for qualifying assets placed in service on or after September

Table 2
Proposed or Enacted OECD Corporate Rate Changes

Country	2017 Rate	2018 or Future Rate	Change	Year in Effect
Countries with Rate Reductions				
Australia*	30.0%	25.0%	–5.0%	Phase in 2024–27
Belgium	34.0%	25.0%	–9.0%	Phase in 2018–20
France	34.4%	25.0%	–9.4%	Phase in 2020–22
Greece	29.0%	26.0%	–3.0%	2019
Israel	24.0%	23.0%	–1.0%	2018
Luxembourg	27.1%	26.0%	–1.1%	2018
Netherlands*	25.0%	20.5%	–4.5%	Phase in 2019–21
Norway	24.0%	23.0%	–1.0%	2018
Sweden	22.0%	20.6%	–1.4%	Phase in 2019–21
Switzerland (Zurich*)	21.1%	18.2%	–2.9%	2019
United Kingdom	19.0%	17.0%	–2.0%	2020
United States	38.9%	25.8%	–13.1%	2018
Countries with Rate Increases				
Korea	24.2%	27.5%	3.3%	2018
Latvia**	15.0%	0%/20.0%	–15.0%/5.0%	2018
Portugal	29.5%	31.5%	2.0%	2018
Turkey	20.0%	22.0%	2.0%	2018

*Proposed but not enacted rate reductions shown for Australia, Netherlands, and Switzerland canton of Zurich.
**Latvia reformed its tax system from a 15% corporate tax rate to a 0% rate for retained earnings and 20% for distributed earnings.
Notes: Rate shown is combined national and sub-national rate. 2018 and future rate changes are those enacted as of June 2018.
Source: OECD Tax Database and PwC.

28, 2017 and before January 1, 2023.[9] After 2022 and before 2027, most equipment is eligible for partial expensing, with 80-percent expensing for assets placed in service in 2023, 60-percent in 2024, 40-percent in 2025, and 20-percent in 2026.[10] After 2026, most assets are to be recovered under the modified accelerated cost recovery system (MACRS).

[9] Qualifying property is generally property with a recovery period of 20 years or less. Certain property with longer production periods (generally property with a recovery period of at least 10 years or transportation property) is eligible for full expensing if placed in service on or before December 31, 2023. Property of certain regulated utilities that elect not to have new interest expense limitations apply is not eligible for expensing.
[10] Property with longer production periods is provided an additional year to be placed in service for these partial expensing percentages.

Prior to the Act, most equipment qualified for temporary partial expensing. Partial expensing, also known as "bonus depreciation," was first enacted in 2002 (retroactive to September 11, 2001) as a temporary measure and since then has been in effect at different rates continuously except for the years 2005 through 2007 (Table 3).

A separate expensing provision, Section 179, was expanded to permit the first $1 million of qualified investment to be expensed (up from $500,000), indexed for inflation. The deduction is phased out for qualified investment between $2.5 and $3.5 million (indexed for inflation). This is a permanent provision.

Depreciation rules for residential and non-residential buildings were not changed by the Act, with minor exceptions.[11]

As is well known, under a system of permanent full expensing, no tax is collected in present value at the corporate level on an equity-financed investment that earns the break-even required rate of return — i.e., such an investment has a corporate effective marginal tax rate of zero.

As noted in the investment literature (e.g., Auerbach and Hassett, 1992; Cohen, Hansen, and Hassett, 2002), incentives for marginal investments can be greater under temporary expensing than under permanent expensing because taxpayers benefit by accelerating planned investment from future periods when the investment would no longer qualify for expensing.

B. Provisions of the Act Excluded from the Effective Tax Rate Computations

Our analysis in this section does not consider some significant changes of the Act that may have an effect on the investment incentives of some companies. These include the repeal of the corporate AMT; new limitations on the deductions of NOLs and net interest expense; the deduction for FDII; and the international tax reforms, including the 100-percent participation exemption for some foreign earnings, GILTI, and BEAT.

The effects of these particular provisions on investment incentives depend on many company-specific assumptions, including the company's current and future tax status. In some cases, a change to these provisions may have *opposite* effects on total tax liability and the incentive to undertake additional investment. As a result, it is not appropriate to assume the effects of these provisions on investment incentives can be approximated by the revenue estimate of the provision.

For example, repeal of the corporate AMT necessarily reduces corporate tax payments of companies that would otherwise have been subject to it, but repeal can also result in a higher effective marginal and effective average tax rate on incremental investment.[12]

[11] Taxpayers operating real property businesses that elect not to have new interest expense limitations apply must recover real property using slower alternative depreciation system lives.

[12] As noted by Lyon (1990), under prior law, a company permanently on the corporate AMT had a lower EMTR on equity-financed investment than under the regular tax due to the benefit of the 20-percent AMT rate relative to the slower AMT depreciation rules. A company could also have had a lower EATR on the AMT, as profits from a high-return investment would have been subject to the lower 20-percent AMT rate. Impacts of the AMT varied depending on the initial tax status of the firm (AMT or regular tax), the length of time in each tax status, and the source of finance.

Table 3

Partial Expensing Rates, as Enacted and Superseded by Subsequent Legislation

Legislation	Start Date	End Date*	Expensing Percentage
Job Creation and Worker Assistance Act of 2002	9/11/2001	9/10/2004	30%
Jobs and Growth Tax Relief Reconciliation Act of 2003**	5/6/2003	12/31/2004	50%
	[not in effect: 2005–2007]		
Economic Stimulus Act of 2008	1/1/2008	12/31/2008	50%
American Recovery and Reinvestment Act of 2009	1/1/2009	12/31/2009	50%
Small Business Jobs Act of 2010	1/1/2010	12/31/2010	50%
Tax Relief, Unemployment Compensation Reauthorization, and Jobs Creation Act of 2010**	9/9/2010	12/31/2011	100%
	1/1/2012	12/31/2012	50%
American Taxpayer Relief Act of 2012	1/1/2013	12/31/2013	50%
Tax Increase Prevention Act of 2014	1/1/2014	12/31/2014	50%
Protecting Americans from Tax Hikes Act of 2015	1/1/2015	12/31/2017	50%
	1/1/2018	12/31/2018	40%
	1/1/2019	12/31/2019	30%
Tax Cuts and Jobs Act of 2017**	9/28/2017	12/31/2022	100%
	1/1/2023	12/31/2023	80%
	1/1/2024	12/31/2024	60%
	1/1/2025	12/31/2025	40%
	1/1/2026	12/31/2026	20%

*Certain property with a longer production period is provided an additional year by which it was required to be placed in service.
**Supersedes prior legislation.
Source: Authors.

As another example, the new interest expense limitation disallows net interest expense that exceeds 30 percent of adjusted taxable income, which is measured in a manner similar to EBITDA from 2018 to 2021 and EBIT from 2022 onward. Disallowed interest expense is carried forward indefinitely. A company that envisions itself permanently with excess interest expense could be viewed as facing a marginal tax rate on incremental profits of 14.7 percent (70 percent of the federal statutory 21 percent tax rate), since each additional dollar of profit will allow it to claim 30 cents of suspended interest deductions. This could have the effect of providing an increased incentive to undertake equity-financed investment than in the absence of the limitation. Note, however, when adjusted taxable income is defined as EBIT and the limitation is binding, investment in an asset with first-year tax depreciation that exceeds the asset's gross earnings is discouraged, as additional investment causes EBIT to decline in the year of the investment and, thereby, causes a loss of interest deductions (even if the marginal investment is entirely equity financed).

Similarly, the new limitation on NOLs allows NOLs to offset only 80 percent of taxable income in a given year and no carryback is permitted. If taxable income is less than 125 percent of the NOL, the limitation is binding. Unused NOLs may be carried forward indefinitely. In a year in which the 80-percent loss limitation is binding, incremental profits accelerate the ability to use NOLs that would otherwise be carried forward, reducing the marginal tax rate below the 21 percent federal statutory tax rate. However, when the limitation is binding, investment in an asset with first-year tax depreciation that exceeds the asset's gross earnings is discouraged, as additional investment causes taxable income (before NOL) to decline, causing some NOLs to be carried forward that would otherwise have been utilized.[13]

C. Effective Tax Rates: Comparisons with Prior Law

Effective tax rates are calculated under prior law and new law. As noted above, under prior law, 50-percent expensing (bonus depreciation) for equipment was scheduled to phase down in 2018 and 2019, and under the Act, expensing is scheduled to phase down between 2023 and 2026. The calculations below provide two alternative assumptions under prior law, alternatively assuming 50-percent expensing is permanent or assuming no expensing for equipment. Two alternative assumptions are also provided under the Act, alternatively assuming 100-percent expensing is permanent or no expensing is permitted for equipment.

The calculations under prior law are based on the 2017 combined U.S. federal and state corporate tax rate after adjusting for the average domestic production deduction, resulting in a 37.58 percent combined tax rate. Under 2018 law, we hold the average

[13] Under prior law, NOLs could be carried back two years and carried forward 20 years and could offset 100 percent of taxable income. For a consideration of the impact of NOLs on investment incentives under prior law, see Auerbach and Poterba (1987) and Altshuler et al. (2009).

state corporate income tax rate constant at its 2017 value and compute the U.S. combined statutory tax rate to be 25.75 percent. The Appendix provides further detail on assumptions used in the effective tax rate calculations.

Table 4 provides calculations of the EMTR for equity-financed investments earning the break-even return. Under the Act, full expensing results in an EMTR of zero for equipment, a reduction from the prior law 13.1-percent rate assuming 50-percent expensing. The effect of the reduction in the corporate statutory tax rate under the Act (and, hence, the decline in the combined federal and state corporate tax rate) can be seen by comparing the EMTR for equipment without expensing under prior law to that of equipment without expensing under new law. Similarly, large reductions in the EMTR for structures and inventory reflect the reduction in the corporate statutory tax rate under the Act (after accounting for the repeal of the domestic production deduction). The EMTR for structures exceeds the combined statutory corporate tax rate, signifying that tax depreciation is less accelerated than economic depreciation. The EMTR for inventory is equal to the combined statutory corporate tax rate under the assumed last-in, first-out (LIFO) method of inventory accounting. The composite category of total corporate capital, reflecting an aggregate of equipment, structures, and inventory, shows substantial declines in the EMTR.

Table 5 provides calculations of the EATR for equity-financed investment generating economic rents. A pre-tax return of 20 percent is assumed. Since the investment yields profits greater than the break-even return, full expensing under the Act is not sufficient to offset all tax on the equipment investment. EATRs across asset categories decline by 10–12 percentage points under the Act, driven by the decline in the combined federal and state corporate tax rate net of the repeal of the domestic production deduction.

Table 4

Effective Marginal Corporate Tax Rate for Equity-Financed Investment

Asset Type	Prior Law EMTR		New Law EMTR	
	Assumption:		Assumption:	
Equipment	With 50% expensing	13.1%	With 100% expensing	0.0%
	Without expensing	23.2%	Without expensing	14.8%
Structures		38.9%		26.8%
Inventory		37.6%		25.7%
Total	With 50% expensing	32.7%	With 100% expensing	20.2%
	Without expensing	34.7%	Without expensing	23.4%

Notes: See Appendix for assumptions. Tax rates include federal and state corporate income tax rates (and assume full conformity for depreciation and expensing) and exclude all other taxes. Inventory is assumed to use LIFO. Total capital is a composite of equipment (30.15%), structures (58.40%), and inventory (11.45%).

Table 6 shows calculations of the EMTR for debt-financed break-even investments. Because interest on debt is deducted at the corporate level (including the component of interest reflecting inflation) and no tax on interest recipients is included in the effective tax rate calculation, break-even investments are all subsidized under both prior law and the Act and EMTRs are all negative. The reduction in the corporate statutory tax rate under the Act has the effect of reducing the subsidy to marginal debt-financed investment, raising the EMTR (resulting in a less negative EMTR).

Table 7 shows calculations of the EATR rate for debt-financed investment generating economic rents. The EATRs are all positive under both prior law and the Act. Despite the subsidy to marginal break-even debt-financed investments, for investments with

Table 5

Effective Average Corporate Tax Rate for Equity-Financed Investment

Asset Type	Prior Law EATR		New Law EATR	
	Assumption:		Assumption:	
Equipment	With 50% expensing	30.5%	With 100% expensing	19.3%
	Without expensing	32.9%	Without expensing	22.5%
Structures		38.1%		26.1%
Inventory		37.6%		25.7%
Total	With 50% expensing	35.8%	With 100% expensing	24.0%
	Without expensing	36.5%	Without expensing	25.0%

Notes: See Appendix for assumptions. Tax rates include federal and state corporate income tax rates and exclude all other taxes.

Table 6

Effective Marginal Corporate Tax Rate for Debt-Financed Investment

Asset Type	Prior Law EMTR		New Law EMTR	
	Assumption:		Assumption:	
Equipment	With 50% expensing	–219.3%	With 100% expensing	–93.3%
	Without expensing	–115.4%	Without expensing	–44.6%
Structures		–25.4%		–13.2%
Inventory		–30.9%		–15.7%
Total	With 50% expensing	–54.4%	With 100% expensing	–29.7%
	Without expensing	–44.2%	Without expensing	–21.5%

Notes: See Appendix for assumptions. Tax rates include federal and state corporate income tax rates and exclude all other taxes.

Table 7

Effective Average Corporate Tax Rate for Debt-Financed Investment

Asset Type	Prior Law EATR		New Law EATR	
	Assumption:		Assumption:	
Equipment	With 50% expensing	17.5%	With 100% expensing	10.3%
	Without expensing	19.8%	Without expensing	13.6%
Structures		25.0%		17.1%
Inventory		24.5%		16.8%
Total	With 50% expensing	22.7%	With 100% expensing	15.1%
	Without expensing	23.4%	Without expensing	15.5%

Notes: See Appendix for assumptions. Tax rates include federal and state corporate income tax rates and exclude all other taxes.

profits sufficiently greater than the break-even return, positive amounts of tax are paid. The Act reduces the EATR by 6 to 8 percentage points across asset categories, somewhat less than found for equity-financed investments.

Table 8 provides calculations of the EMTR for investment financed with a mix of equity (68 percent) and debt (32 percent).[14] The Act reduces effective marginal tax rates for all assets but by slightly less than found for entirely equity-financed investments.

Finally, Table 9 provides calculations of the EATR for investment financed with a mix of equity and debt. The Act reduces effective average tax rates for all assets by about 10 percentage points.

D. Effective Tax Rates: Comparisons with Other Countries

In this section, we compare the EMTR and EATR for 47 countries: the United States and 46 other developed and emerging economies for which the necessary data are available.[15] Calculations for the United States are under both prior law and the Act (with and without 50-percent expensing under prior law and with and without 100-percent expensing under the Act), while tax parameters for all other countries are for 2017.

Figure 3 compares EMTRs for the composite category of total corporate capital, reflecting an aggregate of equipment, structures, and inventory, assuming a mix of 68 percent equity finance and 32 percent debt finance.

[14] We use the same financing ratio as assumed by the CBO (2014, p. 46).

[15] The 47 countries are 34 OECD countries (all except Latvia and Lithuania); all G20 countries, which adds eight non-OECD countries: the BRICS (Brazil, Russia, India, China, and South Africa) and Argentina, Indonesia, and Saudi Arabia; three EU countries not in the OECD (Bulgaria, Croatia, and Romania); and Serbia and the Ukraine.

Table 8

Effective Marginal Corporate Tax Rate for Debt/Equity Mix-Financed Investment

Asset Type	Prior Law EATR		New Law EATR	
	Assumption:		Assumption:	
Equipment	With 50% expensing	–13.2%	With 100% expensing	–18.3%
	Without expensing	3.3%	Without expensing	1.9%
Structures		26.9%		17.5%
Inventory		25.0%		16.1%
Total	With 50% expensing	17.9%	With 100% expensing	9.0%
	Without expensing	20.8%	Without expensing	13.2%

Notes: See Appendix for assumptions. Tax rates include federal and state corporate income tax rates and exclude all other taxes.

Table 9

Effective Average Corporate Tax Rate for Debt/Equity Mix-Financed Investment

Asset Type	Prior Law EATR		New Law EATR	
	Assumption:		Assumption:	
Equipment	With 50% expensing	26.4%	With 100% expensing	16.4%
	Without expensing	28.7%	Without expensing	19.7%
Structures		33.9%		23.2%
Inventory		33.4%		22.9%
Total	With 50% expensing	31.6%	With 100% expensing	21.1%
	Without expensing	32.3%	Without expensing	22.1%

Notes: See Appendix for assumptions. Tax rates include federal and state corporate income tax rates and exclude all other taxes.

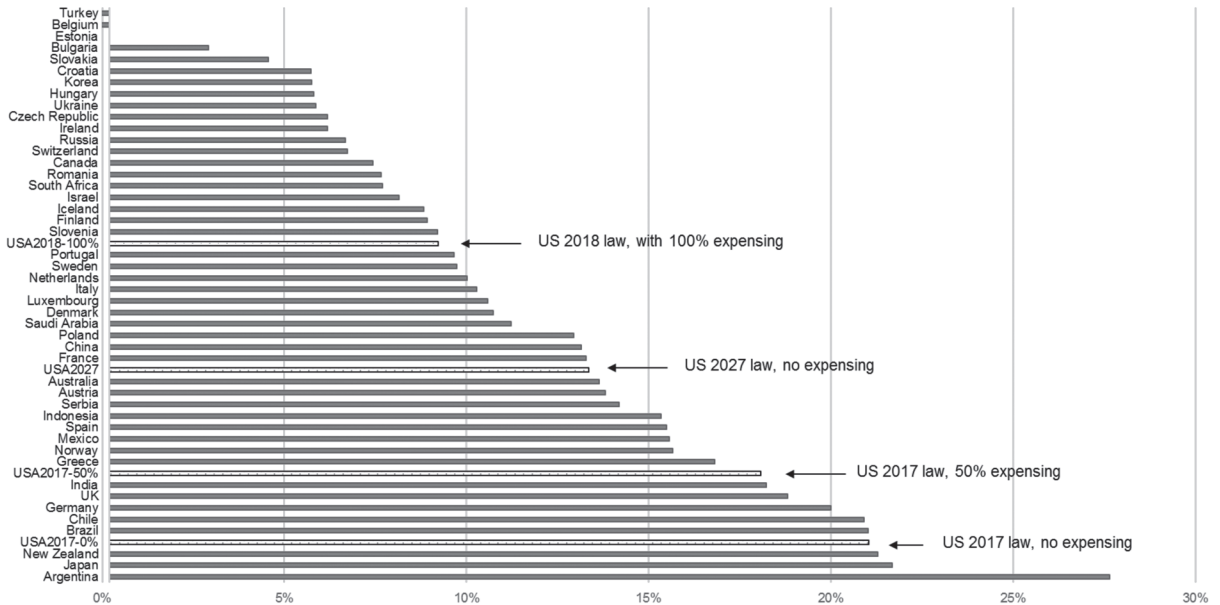
Under prior law, the U.S. EMTR of 17.9 percent (shown in Table 8, assuming 50-percent expensing for equipment) ranked ninth highest of the 47 countries. Without expensing, the U.S. EMTR of 20.8 percent under prior law ranked fourth highest of all 47 countries.

Under the Act, with 100-percent expensing for equipment, the U.S. EMTR of 9 percent ranks 27th highest of the 47 countries. Among the 33 other OECD countries included in the calculations, 13 countries have lower EMTRs and 20 have higher rates. The unweighted average of the other 46 countries' EMTR is 10.6 percent.

In 2027, after expensing is scheduled to be phased out, the U.S. EMTR of 13.2 percent ranks 17th highest of the 47 countries (assuming 2017 rates for all other countries).

Figure 3

Cross-Country Comparison of Effective Marginal Corporate Tax Rates



Notes: EMTR for a composite investment in equipment, structures, and inventory, financed with 68 percent equity and 32 percent debt. Includes only corporate-level income taxes (combined federal and sub-federal). Estonia EMTR is zero. Negative EMTRs for Turkey (–17.7 percent) and Belgium (–0.4 percent) are a result of the allowance for corporate equity and an assumed 2 percent rate of inflation. 2017 tax parameters are used for all countries other than the United States under the Act.

Figure 4 compares the EATRs for the composite category of total corporate capital, assuming a mix of 68 percent equity finance and 32 percent debt finance.

Under prior law, the U.S. EATR of 31.6 percent (assuming 50-percent expensing) ranked second highest of the 47 countries, exceeded only by Argentina.[16] Without expensing, the U.S. EATR of 32.3 percent under prior law also ranked second highest of the 47 countries. The unweighted average of the other 46 countries' EATR is 19.8 percent.

Under the Act, with 100-percent expensing, the U.S. EATR of 21.1 percent ranks 23rd highest of the 47 countries, placing it close to both the mean and the median EATR of the other countries. Among the 33 other OECD countries included in the calculations, 17 countries have lower EATRs and 16 have higher rates.

In 2027, after expensing is scheduled to be phased out, the U.S. EATR of 22.1 percent ranks 18th highest of the 47 countries.

In summary, the calculations in this section show that the Act enhances the relative attractiveness of representative corporate investments in the United States, bringing U.S. effective tax rates from among the highest to below the average and median EMTR and near the average and median for the EATR.

Future reforms by other countries will likely diminish the relative U.S. advantage. For example, based on France's 25-percent corporate tax rate to take effect in 2022, its EATR will decline from 28.3 to 20.5 percent, even lower than the current U.S. composite EATR of 21.1 percent (22.1 percent after 2026).

V. INTERNATIONAL TAX

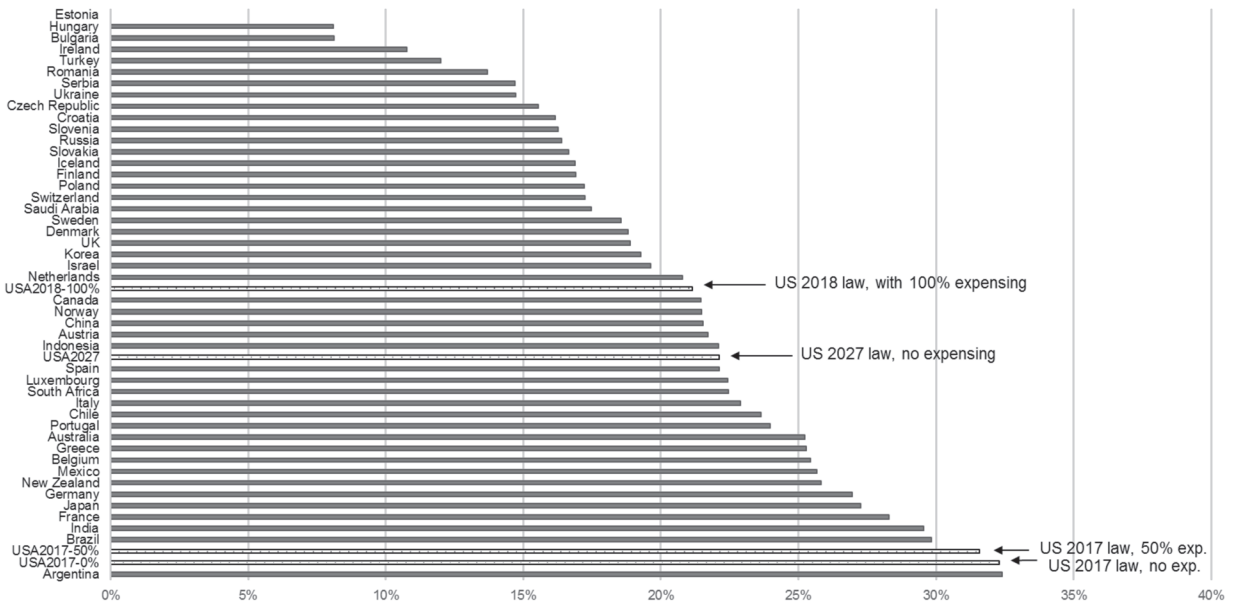
The Act's international changes are the most significant reforms of the U.S. international tax system since 1962. While providing for a new 100-percent participation exemption system (territorial) for *some* foreign earnings to replace the prior worldwide tax system with deferral, the Act also adopts a new global minimum tax on foreign earnings (GILTI), which is paid without deferral and applies to high-return active foreign income. An additional minimum tax, BEAT, is imposed on otherwise deductible cross-border payments to related parties. Also, as part of a transition to the new participation exemption system, a tax at a reduced rate is imposed on deferred foreign earnings, payable over eight years.

The new international tax rules bring the United States both closer to and further from the international rules adopted by most other developed countries. Participation exemption systems are common in most developed countries. The new global minimum tax, GILTI, however, is a more expansive base protection measure than used by other developed countries, which generally limit such measures to passive income and certain specified forms of easily moveable income. As such, it may counteract some of the benefits of the new participation exemption system by imposing current U.S. tax on active foreign earnings.

[16] In 2017, Argentina's statutory corporate tax rate was 35 percent. Argentina has enacted a rate reduction to 30 percent for 2018 and 2019, and 25 percent after 2019.

Figure 4

Cross-Country Comparison of Effective Average Corporate Tax Rates



Notes: EATR for a composite investment in equipment, structures, and inventory, financed with 68 percent equity and 32 percent debt. Includes only corporate-level income taxes (combined federal and sub-federal). Estonia EATR is zero. 2017 tax parameters are used for all countries other than the United States under the Act.

A. Participation Exemption

Within the OECD, 30 other countries provide a participation exemption system, with most countries offering a 100-percent exemption (Table 10). Only five OECD countries have worldwide systems.

The participation exemption is intended to allow a U.S. multinational corporation to serve foreign markets on the same tax terms as non-U.S. companies in those markets (in particular, foreign-based multinational companies headquartered in other territorial countries, local-based foreign companies, and foreign-based multinational companies headquartered in worldwide countries with tax rates below the rate in the specific foreign market). Under the prior worldwide tax system, a U.S. multinational corporation in many cases would have to defer repatriation of its foreign earnings to compete on the same tax terms as a foreign-based company.

The JCT (2016) estimates that at the end of 2015, $2.6 trillion of foreign earnings had been deferred by U.S. companies. Analysis of financial statements indicates that indefinitely reinvested foreign earnings of U.S. companies in the Russell 1000 index grew from $1.1 trillion in 2008 to $2.6 trillion in 2016, with the 50 top companies accounting for 70 percent of the 2016 accumulation.[17]

Table 10
International Tax Systems of Other OECD Countries

Method of Taxation	OECD Countries (excluding United States)	Dividend Exemption Percentage
Participation exemption systems	Australia, Austria, Canada, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Poland, Portugal, Slovak Republic, Spain, Sweden, Turkey, United Kingdom	100% exemption
	Norway	97% exemption
	Belgium, France, Germany, Italy, Japan, Slovenia, Switzerland	95% exemption
Worldwide tax systems	Chile, Ireland, Israel, Korea, Mexico	0% exemption

Source: PwC, Worldwide Tax Summaries (2018).

[17] Audit Analytics, 2017. Indefinitely reinvested foreign earnings differ from deferred foreign earnings for tax purposes in that some companies may defer repatriation of foreign earnings but not assert it is indefinitely reinvested for accounting purposes.

On its own, adoption of a participation exemption system might be thought to favor investment abroad relative to U.S. investment, particularly for U.S. companies for whom the implicit cost of deferring foreign earnings from U.S. taxation under prior law was high. U.S. statutory rate reduction, domestic expensing incentives, and FDII, however, also result in large reductions in the tax rate on domestic investment. Additionally, the potential impact of increased competitiveness of U.S. companies in foreign markets through these tax reductions and complementarities between a company's foreign and domestic activities may further increase U.S. investment.

The competitive disadvantage of a worldwide tax system is supported by research finding that cross-border mergers and acquisitions (M&A) are influenced by whether the target and acquirer are located in participation exemption or worldwide tax systems. Feld et al. (2013) estimates that U.S. adoption of a participation exemption system would increase the number of cross-border mergers in which the U.S. company is the acquirer by 17 percent. The CBO (2017) cites the competitive disadvantage of the former U.S. worldwide tax system as one reason for the increase in cross-border redomiciliation transactions prior to the Act.

Lower tax rates on U.S. companies can potentially expand the scope of their investments both in the United States and abroad. Desai, Foley, and Hines (2009) find significant complementarities between increased foreign activity by the foreign subsidiaries of U.S. companies and the domestic activity of the U.S. parent company. For example, they find the following complementary relationships: 10 percent greater foreign investment by U.S. foreign subsidiaries is associated with 2.6 percent greater domestic investment; 10 percent greater foreign labor compensation is associated with 3.7 percent greater domestic labor compensation; and 10 percent greater foreign employment is associated with 6.5 percent greater domestic employment.

The benefit of the participation exemption system for U.S. companies, however, is limited by GILTI, as described below.

B. Global Minimum Tax

The intent behind GILTI is to discourage income shifting that might occur under the participation exemption system by imposing U.S. tax on high-return income of controlled foreign corporations (CFCs) in excess of a "normal" return when the foreign effective tax rate measured on an aggregated basis across all CFCs is less than 13.125 percent (from 2018 through 2025) or below 16.4 percent (after 2025). However, due to the potential that expense allocation rules that determine the foreign tax credit limitation may apply to GILTI, all high-return foreign income is potentially subject to tax even where the foreign effective tax rate exceeds these thresholds. The minimum tax is applied on a current basis whether or not foreign earnings are repatriated, resulting in a potentially higher U.S. tax burden on foreign earnings than under prior law.

The computation of the minimum tax requires several steps. A simplified description follows. First, "net CFC tested income" is calculated. This is a measure similar to aggregate net CFC income (net of foreign tax) and excludes subpart F income, certain

other foreign income, and foreign oil and gas income. Second, "net deemed tangible income return" is determined as a 10-percent return on qualified business asset investment (the adjusted basis on tangible depreciable property, determined by applying the alternative depreciation system) less interest expense allocable to net CFC tested income. Third, GILTI is determined by subtracting net deemed tangible income return from net CFC tested income:[18]

$$GILTI = Net\ CFC\ Tested\ Income - [0.10 \times Qualified\ Business\ Asset\ Investment - Interest\ Expense]$$

As can be seen by the definition, GILTI is not limited to low-taxed income, nor is it strictly related to high-return intangible income, as it can be generated from non-depreciable tangible property (land and inventory) and foreign interest expense is effectively assumed to finance only qualified business asset investment.

Using Bureau of Economic Analysis and Internal Revenue Service data, Sullivan (2018) provides an upper-bound estimate that net deemed tangible income (the normal return to tangible capital) represents only 15–26 percent of before tax income of CFCs. As a result, at least 74–85 percent of CFC income is potentially subject to current U.S. taxation.

GILTI is added to taxable income but becomes a minimum tax by providing for a partial deduction of the amount included in income and allowing for a foreign tax credit equal to 80 percent of foreign taxes paid allocable to this income (subject to a foreign tax credit limitation). A 50-percent deduction of GILTI is provided from 2018 through 2025, reduced to 37.5 percent after 2025.

The 50-percent deduction results in a 10.5-percent tax rate on GILTI. Assuming positive taxable income before GILTI and ignoring potential interactions with other tax provisions, the net additional U.S. tax arising from the provision is

$$(0.21)(0.5)\frac{GILTI}{1-\tau} - FTC,$$

where τ is the average foreign rate of tax on GILTI (used here to reflect the Section 78 gross-up to claim the foreign tax credit) and FTC is the allowed foreign tax credit.

Ignoring expense allocation rules that may limit the foreign tax credit and assuming positive taxable income before GILTI, provided foreign taxes of at least 13.125 percent have been paid, a foreign tax credit of 80 percent of foreign taxes will eliminate any incremental U.S. tax on GILTI (since $10.5 = 0.80 \times 13.125$). This characterization of GILTI is how the tax is explained in the Conference Report to the Act:

> At foreign tax rates greater than or equal to 13.125 percent, there is no residual U.S. tax owed on GILTI, so that the combined foreign and U.S. tax rate on GILTI equals the foreign tax rate.[19]

[18] GILTI is calculated at the U.S. shareholder level by combining CFC tested income and deemed tangible income for all CFCs.

[19] House Report No. 115–466, at 627 (2017).

After 2025, by the same logic, the smaller 37.5-percent deduction results in a tax rate of 13.125 percent on GILTI, which requires foreign taxes of at least 16.40625 percent to eliminate any additional tax under GILTI.

However, because GILTI has its own foreign tax credit basket, the calculation of the foreign tax credit may need to take into account expense allocation rules that could result in the allocation and apportionment of certain U.S. expenses (such as interest, research, and G&A) to GILTI.[20]

Representing any allocated expenses as E, the allowable foreign tax credit for years in which the 50-percent deduction for GILTI applies is the lesser of (1) the foreign tax credit limitation (the non-negative amount of U.S. tax that would be owed on GILTI, net of the 50-percent deduction and after allocating domestic expenses to GILTI) or (2) 80 percent of foreign taxes paid on GILTI:

$$FTC = max\left\{0, min\left[(0.21)\left((0.5)\frac{GILTI}{1-\tau} - E\right), 0.8\tau\frac{GILTI}{1-\tau}\right]\right\}.$$

For foreign tax rates of 13.125 percent or higher, these expressions can be simplified, and the net additional U.S. tax on GILTI after allowable foreign tax credits is

$$min\left(0.105\frac{GILTI}{1-\tau}, 0.21E\right).$$

This expression shows that even high-taxed GILTI income (income bearing an average tax rate in excess of 13.125 percent or higher) creates an additional U.S. tax burden equal to 21 percent of allocated expenses (until such expenses exceed 50 percent of pre-tax GILTI income).

The GILTI tax is not designed to account for timing differences between U.S. and foreign taxes, and volatile income flows can give rise to tax. For example, no foreign tax credit carryforward or carryback is permitted for years in which foreign taxes exceed those needed to eliminate GILTI tax, nor can a net foreign loss in one year offset positive foreign income in another year. For a U.S. company with current domestic losses, the inclusion of GILTI can cause a loss in what would have been future NOL deductions without preserving the foreign tax credits attributable to the GILTI inclusion.

Each of these design flaws results in GILTI imposing additional U.S. tax on foreign earnings that have borne tax above a specified minimum rate. Even a better designed global minimum tax, however, imposes a potential additional tax on U.S.-headquartered companies not borne by a foreign-headquartered company. A global minimum tax moves the international tax system in the direction of a worldwide tax system and, unlike the prior U.S. worldwide tax system, imposes tax on a current basis on active foreign income without deferral.

[20] There is currently some ambiguity if expense allocation rules apply to GILTI. This is expected to be clarified through Treasury guidance.

As a result, GILTI reduces the ability of U.S. companies to compete on equal tax terms in foreign markets with their foreign-based competitors, offsetting at least in part the benefits of the participation exemption system. GILTI can penalize U.S. companies that have acquired high-return assets through cross-border M&A and will discourage future M&A in which the U.S. parent is the acquirer rather than the target.

C. Base Erosion and Anti-Abuse Tax

BEAT is an additional minimum tax imposed on certain outbound payments of a U.S. taxpayer to a related foreign party. BEAT requires a separate tax calculation based on a modified definition of taxable income, generally equal to regular taxable income without regard to any deductions for "base erosion payments." A tax rate of 10 percent is applied to modified taxable income (5 percent in 2018 and 12.5 percent after 2025). This tentative tax is reduced by regular tax liability, research tax credits (before 2026), and 80 percent of certain other specified general business tax credits (before 2026), yielding the additional minimum tax amount.[21] Foreign tax credits are not permitted to reduce this tax.

Base erosion payments are generally defined as deductible payments (other than those on which U.S. withholding tax is imposed) made to a related foreign party. Only taxpayers with average gross receipts of at least $500 million are subject to BEAT, and only when base erosion payments exceed 3 percent (2 percent for certain banks and security dealers) of all deductible payments. The 3 percent threshold is a cliff — once exceeded, all base erosion payments are subject to BEAT, not simply those in excess of the threshold.

Generally, base erosion payments do not include payments for the cost of goods sold, since these are treated as a reduction in gross receipts rather than a deduction from income for tax purposes. As a result, payments for most imported goods, such as raw materials, supplies, and goods for resale, would be excluded from the computation. Payments for royalties and services not related to inventory would generally not be treated as cost of goods sold and, therefore, would constitute a base erosion payment. An exception is provided for certain service payments made at cost.[22]

While the intent of the provision is to prevent base erosion, it applies without any determination that the payment exceeds an arm's length transfer price; indeed, the provision can apply even where an existing advance pricing agreement or prior audit has agreed to the transfer price established. It can also apply when the payment is made to a taxpayer in a jurisdiction with a tax rate equal to or higher than the U.S. rate.

As a minimum tax, it can apply whenever the deductible payments are large relative to taxes paid, provided the gross receipts and base erosion payment threshold tests are

[21] Before 2026, research credits and 80 percent of certain other specified general business credits (the low-income housing tax credit and certain energy credits) are permitted to offset tentative tax.

[22] There is presently ambiguity as to whether the exception (service cost method) applies to the cost component if the payment also includes a mark-up component.

met. This can occur when transitory fluctuations cause income to be low, profit margins are generally low, or the taxpayer has regular tax liability reduced by general business tax credits and foreign tax credits. There is no carryback or carryforward provision in years in which regular tax exceeds minimum tax, unlike the prior law corporate AMT.

The BEAT does not expressly provide for the netting of cross-border payments; for example, a taxpayer could be subject to BEAT on its outbound interest payments even though it has a similar amount of inbound interest income.

A lack of coordination among tax provisions can cause what would constitute a deductible payment for regular tax purposes to be subject to tax in the foreign jurisdiction, included in the U.S. tax return as GILTI or subpart F income, and included in modified taxable income for purposes of the BEAT both as an add-back to taxable income and through its initial inclusion in taxable income. Further, the BEAT calculation does not permit any credit for foreign tax imposed on this payment.

The provision applies to both U.S.-headquartered companies and foreign-headquartered companies with U.S. operations, but Congress emphasized its impact on foreign-headquartered companies as a way to level the playing field with U.S.-headquartered companies.[23] The BEAT can clearly be seen to discourage payments structured for certain activities through a related foreign affiliate (or parent) of a U.S. company. How this affects U.S. activities and U.S. competitiveness after accounting for behavioral reaction is uncertain.

While BEAT could encourage the onshoring of some foreign activities, it could also encourage the offshoring of U.S. activities. For example, a BEAT payment might be avoided if the portion of the U.S. operation making the payment is moved offshore. BEAT can also be avoided by hiring an unrelated foreign party to undertake the activity formerly undertaken by a related foreign party.

The tax seems out of the norm of traditional tax policy. Grinberg (2017), while not disagreeing, argues that the provision can help the United States in international negotiations to counter aggressive actions by other countries toward U.S. multinational corporations, including European Union (EU) "state aid" claims, proposals for new digital taxes on sales revenue, and the diverted profits tax enacted by the United Kingdom and Australia. Successful negotiations, he argues, could lead to a scaling back of the BEAT by treaty, with similar concessions made by the foreign country with respect to U.S. companies.

The EU has asked the OECD to review whether the BEAT is consistent with OECD tax principles (Kirwin, 2018).

[23] The Senate Finance Committee (2017, p. 391) explanation of the Senate bill states: "Foreign-owned U.S. subsidiaries are able to reduce their U.S. tax liability by making deductible payments to a foreign parent or foreign affiliates. This can erode the U.S. tax base if the payments are subject to little or no U.S. withholding tax. Foreign corporations often take advantage of deductions from taxable liability in their U.S. affiliates with payments of interest, royalties, management fees, or reinsurance payments. This provision aims to tax payments of this kind… This provision aims to level the playing field between U.S. and foreign-owned multinational corporations in an administrable way."

VI. INCENTIVES FOR RESEARCH-BASED IP AND OTHER INTANGIBLE INVESTMENTS

In this section, we examine the effect of the Act on incentives for research and development (R&D) investments and other intangible investments.

Investments in R&D are noted as a key contributor to economic growth. While private returns to these investments are often high, the social returns to these investments are estimated to be substantially greater, often two to three times greater. This is because it is difficult to confine the know-how gained by R&D investments to the company undertaking the investment, resulting in spillover benefits to other companies and consumers. For example, based on a survey of economic research, Okubo et al. (2006) conclude that the private return to R&D investments averages 26 percent but the social return averages 66 percent.[24] Sveikauskas (2007) draws similar conclusions.

We consider changes in R&D investment incentives under the Act on both "marginal" break-even R&D investments and R&D investments generating rents. As with the effective tax rate calculations for tangible capital in Section IV, income generated by the R&D investments is assumed to be taxed at the combined federal and state statutory corporate tax rate.[25]

We also explore a new special tax regime provided under the Act, the deduction for FDII, and compare it to patent box regimes available in some other countries that tax qualified IP income at preferential tax rates.

A. Marginal Investment Incentives for R&D

In these calculations, we consider a stylized R&D investment project and assess the tax incentives provided for a "break-even" project. Wages and supplies constitute 90 percent of the investment expenditure (in present value), and it is assumed these expenditures are qualified research expenses for purposes of the research credit.[26] Depreciable equipment and structures each constitute 5 percent of the cost of the investment project (in present value).

The initial impact of the Act on investment incentives is from the reduction in the statutory corporate tax rate and, for 5 percent of the project expenditure, expensing provided for equipment. Starting in 2022, the Act requires the amortization of research expenditures over a five-year period. Amortization applies to both the 90 percent of the costs of the stylized investment project that would otherwise be expensed and the depreciation allowances for property used in connection with research and experimentation. In the latter case, the depreciation allowance that would otherwise be taken must be further amortized over five years.

[24] These measures are gross of depreciation.

[25] The U.S. federal statutory tax rate under 2017 law is adjusted for the average domestic production deduction.

[26] We assume an average effective research credit rate of 7.6 percent (before basis adjustment). The credit rate is similar to that calculated by the U.S. Department of the Treasury (2016).

The OECD has used the "B-index," a transformation of the Hall–Jorgenson cost of capital, as a measure for comparing the degree to which R&D investments are tax subsidized. The standard formula for the cost of capital net of depreciation is

$$\rho = [r + \delta]\frac{1 - k - \alpha u Z}{1 - u} - \delta,$$

where r is the discount rate, δ is the rate of economic depreciation, k is the research tax credit, α is the basis adjustment for the tax credit, u is the statutory corporate tax rate, and Z is the present value of expensing or amortization and depreciation allowances.

The B-index is simply the portion of the cost of capital formula representing the after-tax acquisition cost of the asset (net of investment tax credits and depreciation allowances) over the net of tax return on a dollar of pre-tax profit:

$$\frac{1 - k - \alpha u Z}{1 - u}$$

This also can be interpreted as the after-tax acquisition cost of the asset relative to that of an asset that may be expensed.

When B is equal to 1, for example, with expensing and no tax credit, the cost of capital net of depreciation is simply the discount rate and the EMTR is equal to zero. For B less than 1 (as occurs with expensing and a tax credit), the cost of capital is less than the discount rate, indicating a marginal investment is tax subsidized (EMTR is negative).

The generosity of incentives can be measured by 1 minus the B-index, where a value of 1 indicates the tax subsidy at the margin is equal in present value to the cost of the investment (full government subsidy), a value of zero corresponds to a zero EMTR, and a negative value corresponds to tax treatment less generous than expensing.

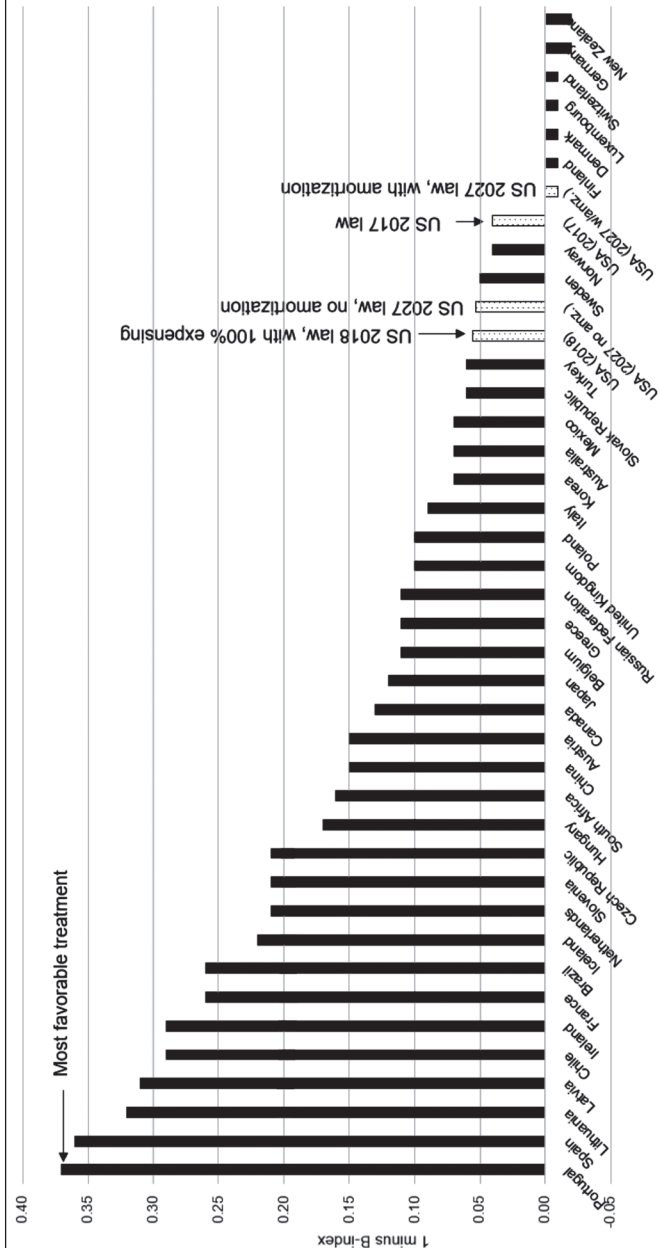
Figure 5 compares this measure (1 minus B-index) for the United States and 37 other major countries.[27] We compute measures for the United States under three alternative assumptions: the 2018 law (100-percent expensing of current research expenditures and equipment), the 2027 law (five-year amortization of research expenditures), and a hypothetical 2027 law that assumes the expensing for current research expenses (wages and supplies) is maintained but the expensing of equipment expires as scheduled under current law.

As computed by the OECD, the United States ranked 32nd out of the 38 countries in 2017 in terms of the generosity of R&D tax incentives, with a subsidy rate of less than 5 percent. The countries with the most generous incentives, Portugal and Spain, subsidize more than 35 percent of the cost of R&D investments. The mean subsidy rate of the 37 countries, excluding the United States, is 14 percent.

Under the 2018 law, the U.S. rank improves slightly to 30th. Under the 2027 law, providing for five-year amortization of research expenses, the U.S. rank declines back

[27] The non-U.S. values are as reported by the OECD (2017). Further details are available from the OECD (2018a). The U.S. values are computed by the authors. The value we compute for the United States under the 2017 law is slightly more generous than that computed by the OECD.

Figure 5
Cross-Country Comparison of R&D Tax Incentives, 1 Minus B-Index, 2017
(For Large, Profit-Making Companies)



Sources: OECD (2018) for all non-U.S. measures and author calculations for U.S. measures.

to 32nd of the 38 countries and the measure turns negative, indicating that the combined incentive provided by the research credit, amortization, and depreciation is less generous than immediate expensing of all research costs. The other 37 countries all provide for expensing of current research costs (wages and supplies). None of the other six countries with a negative measure provide a research tax credit for profit-making companies.[28]

Finally, under the hypothetical 2027 law, under which the expensing of research expenses is maintained but the expensing for equipment expires, the U.S. rank is 30th, just slightly less generous than found under the 2018 law.

B. Effective Average Tax Rates for R&D Investments

The B-index calculations provide a measure of investment incentives for marginal break-even R&D investments. They do not, however, provide an adequate measure of the incentive to locate a high-return research project in one country versus another. Given the high private rate of return to R&D investments observed in prior economic studies, and the significant amount of R&D conducted by multinational corporations, the EATR for these projects may be very important in companies' locational decisions for R&D projects.[29]

EATRs for the United States are shown in Table 11 for the 2017 law, 2018 law (100-percent expensing of research expenditures and equipment), 2027 law (five-year amortization of research expenditures), and the hypothetical 2027 law that assumes the expensing of research expenses is not replaced with five-year amortization and the expensing of equipment expires as scheduled under current law. The project is assumed to be financed with a mix of equity (68 percent) and debt (32 percent).[30] As before, the R&D project is assumed to consist of expenditures on wages and supplies that are qualified research expenses for purposes of the research credit (90 percent), equipment (5 percent), and structures (5 percent).

The EATR assumes the combined federal and state corporate tax rate and does not account for the new law deduction for FDII.[31]

Under the Act, the EATR for R&D projects financed with an average mix of equity and debt declines from 20.7 percent in 2017 to 11.7 percent in 2018. Virtually the entire reduction in the EATR in 2018 is due to the reduced federal corporate tax rate (as opposed to the expensing provided for equipment).

If research expenditures must be amortized (as scheduled to take effect beginning in 2022) and no expensing is provided for equipment investment (as occurs after the

[28] Denmark and New Zealand provide a research tax credit for companies in a loss position (OECD, 2018a).

[29] Data from the Bureau of Economic Analysis (2017) and the National Science Foundation (2017) show that U.S. parent companies of U.S.-headquartered multinational corporations accounted for 80 percent of U.S. business R&D in 2015.

[30] As in the effective tax rate calculations for tangible capital in Section IV, it is assumed that the limitation on net interest expense is not binding.

[31] The U.S. federal statutory tax rate under the 2017 law is adjusted for the average domestic production deduction.

Table 11
Effective Average Corporate Tax Rate
for Debt/Equity Mix-Financed R&D Investment

Asset Type	Prior Law EATR		New Law EATR	
	Assumption:		Assumption:	
R&D project	With 50% expensing	20.7%	With 100% expensing for research expenditures and equipment (2018 law)	11.7%
	Without expensing	20.8%	With five-year amortization and without expensing for equipment (2027 law)	15.8%
			With 100% expensing for research expenditures and no expensing for equipment (hypothetical 2027 law)	11.8%

phaseout is compete in 2027), the EATR is 15.8 percent, about 5 percentage points less than under the 2017 law. The requirement of five-year amortization for R&D is roughly equivalent to raising the U.S. federal corporate tax rate from 21 to 27 percent (raising the combined corporate statutory tax rate to over 31 percent).

As can be seen by the comparison to the EATR for the hypothetical 2027 law (under which expensing is maintained for research expenditures but no expensing is provided for equipment), nearly all of the incentive provided under the 2018 law can be maintained by not requiring five-year amortization of R&D investments.

C. Foreign-Derived Intangible Income

The Act provides a lower tax rate for FDII, achieved by a special deduction. The lower tax rate for this income has some similarities, but also differences, to patent box regimes offered by some other countries for certain IP income. The FDII deduction is intended by Congress to compete with these patent box regimes.[32]

[32] The Senate Finance Committee (2017, p. 370) explanation of the Senate bill states: "[T]he Committee recognizes that many countries in the OECD have preferential tax regimes for income related to certain forms of intellectual property. These regimes, sometimes referred to as patent box or intellectual property regimes, put the United States at a competitive tax disadvantage. The Committee believes that establishing a deduction for foreign-derived intangible income earned by domestic corporations helps the United States compete with countries that offer preferential rates for intellectual property."

The basic concept of the FDII deduction is to encourage undertaking IP and other high-return investments in the United States by offering a lower tax rate on the portion of the income derived from these investments on products and services provided to foreign customers. This might constitute a class of highly mobile investments that otherwise could be attracted abroad by much lower foreign tax rates.

The calculation of the FDII deduction requires several steps. First, "deemed intangible income" is determined by subtracting a 10-percent return on qualified business asset investment (the adjusted basis on tangible depreciable property, determined by applying the alternative depreciation system) from "deduction eligible income," a concept similar to taxable income but excluding certain foreign income and domestic oil and gas income. Next, FDII is the product of deemed intangible income and the fraction "foreign-derived deduction eligible income" (defined as deduction eligible income derived from the sale of products or services to foreign customers) over deduction eligible income:

$$FDII = Deemed\ Intangible\ Income \times \frac{Foreign\text{-}Derived\ Deduction\ Eligible\ Income}{Deduction\ Eligible\ Income}$$

Finally, the FDII deduction is 37.5 percent of this amount in 2018–2025; the deduction is reduced to 21.875 percent after 2025.

Applying this deduction against the 21-percent federal corporate tax rate yields an effective federal tax rate of 13.125 percent in 2018–2025 and 16.40625 percent after 2025.

Unless states adopt the FDII deduction, such income will remain fully taxable at an average state tax rate of approximately 6 percent, resulting in a combined tax rate (after accounting for the deduction of state taxes against FDII) of 18.3 percent in 2018–2025 and 21.4 percent after 2025.[33] Thus, compared to the combined regular corporate statutory tax rate of 25.8 percent, the FDII deduction is approximately equal to a 7 percentage point reduction in the combined rate through 2025 and a 4 percentage point reduction after 2025.

The impact of the FDII deduction on investment incentives depends in part on the alternatives. For example, a U.S.-headquartered company could alternatively make such investments abroad. As discussed in Section V, in some cases, such foreign income could qualify for the new 100-percent participation exemption and not be subject to U.S. taxation. This alternative would be attractive if the foreign rate of tax in the investment location were less than the effective tax rate on FDII. Locating the investment abroad might also be attractive if the investments generated income from sales to U.S. customers. Provided such income qualified for the participation exemption, investment abroad would be favored whenever the foreign rate of tax is below the U.S. combined rate of 25.8 percent. However, as also discussed in Section V, certain foreign income can also be subject to GILTI, which can result in the combined U.S. and foreign tax being roughly comparable to tax paid on FDII.

[33] This is calculated as 0.13125 + (1 – 0.13125)(0.06) and 0.1641 + (1 – 0.1641)(0.06).

While the FDII deduction may not eliminate incentives of U.S. companies to earn high-return income abroad, compared to prior law, the deduction is likely to provide an increased incentive to locate such investments in the United States. Whether this incentive is strong enough to offset the incentive for investing abroad to benefit from the participation exemption also requires a comparison to prior law. Under prior law, U.S. taxation of foreign-earned income could be postponed indefinitely through deferral. For companies that were not cash constrained (and, thus, could defer repatriation of foreign earnings under prior law), the participation exemption may not increase the incentive to undertake foreign investment; in addition, the GILTI provision can reduce the incentive to undertake high-return foreign investment. Therefore, for many companies, the net effect of these interactions is to increase the incentive to undertake high-return investments in the United States relative to prior law.

An example can illustrate these effects. Consider a company able to have certain foreign intangible income on sales to foreign customers taxed at a foreign rate of τ_F, assumed to be below the U.S. tax rate. Under prior law, U.S. tax on this income could be deferred. Let us assume the implicit cost of deferral as a percent of the foreign income was d. Alternatively, if this intangible income were earned in the United States, it would have been subject to a combined state and federal tax rate of τ_{US} (37.6 percent including the adjustment for the average domestic production deduction). The net tax advantage to the foreign location under prior law as a percent of foreign income is

$$\tau_{US} - \tau_F - d.$$

Assuming this value is positive, the taxpayer will elect to defer U.S. tax on this income by retaining it abroad.

Under the new law, assuming such income if earned abroad is fully eligible for the new participation exemption system, there is no residual U.S. taxation and no longer a cost from deferring repatriation. If the income is earned in the United States under the new law and fully eligible for the FDII deduction at the margin (assuming for simplicity no change in the amount of qualified business asset investment), it will be subject to a combined federal and state tax rate of τ_{FDII} (18.3 percent between 2018 and 2025). The net advantage to the foreign location under the new law as a percent of foreign income is

$$\tau_{FDII} - \tau_F.$$

The advantage to the foreign location relative to the U.S. location is reduced provided

$\tau_{US} - \tau_F - d > \tau_{FDII} - \tau_F$, or equivalently,

$$\tau_{US} - d > \tau_{FDII}.$$

That is, the advantage to the foreign location relative to the U.S. location is reduced under the new law for FDII eligible income provided the prior law deferred U.S. rate of tax less the implicit cost of deferral d exceeds the FDII tax rate on this income. Given the

actual values of τ_{US} and τ_{FDII}, this will be the case provided the implicit cost of deferral was less than 19.3 percent (37.6 – 18.3).[34] As can be seen, this result is independent of the foreign rate of tax. The advantage to the foreign location under the new law can be further discouraged if it results in taxation under GILTI.

D. Comparison of FDII and Patent Box Regimes

The FDII deduction, while providing a reduced tax rate for certain deemed intangible income, differs from the patent boxes available in other countries.

Under OECD rules adopted as part of the BEPS project, patent boxes must follow a "modified nexus" approach, under which the taxpayer must incur the developmental costs generating the IP income.[35] In general, qualifying IP assets include inventions protected under patents or software protected by copyright. Market-related IP assets, such as trademarks, are not eligible. Patent box regimes do not distinguish between income derived from foreign and domestic sales.

FDII is both broader and narrower than income qualifying for patent box treatment. It is broader in that FDII has no explicit nexus requirement and can include income from market-related IP. It is narrower in that FDII excludes income from domestic sales.

Because of the broader coverage of FDII, the EU has asked the OECD to review whether the FDII deduction complies with OECD BEPS agreements or could be considered a harmful tax practice (Kirwin, 2018). Treatment as a harmful tax practice could affect the deductibility of payments made in other countries.[36] In addition, because the FDII deduction excludes income from domestic sales, it is possible that the deduction will be challenged in the World Trade Organization as a prohibited export subsidy. Until there is greater certainty with respect to these issues, the incentive effects of the FDII deduction may be dampened.

Patent box tax rates in other countries are shown in Table 12. As seen in the table, many patent box tax rates are 10 percent or less. For income that qualifies for the patent box and would not be subject to GILTI (as the case for foreign-headquartered companies and

[34] A more general assessment might consider that only a portion of the income would be eligible for FDII if production of the income requires an increase in qualified business asset investment. Analysis of this case results in similar expressions, except effective average tax rates for the relevant investment should replace the combined statutory tax rate under prior law and new law.

[35] Pre-existing patent boxes not complying with the modified nexus approach are subject to a limited grandfathering period but must be abolished by June 30, 2021 (OECD, 2015).

[36] For example, Germany limits the deductibility of a royalty payment to a related party taxed under a special tax regime that does not conform to the modified nexus approach. As a result, the loss in deductibility against German tax can exceed the benefit of the preferential regime. Deductibility is limited in the same proportion as the foreign tax rate is less than 25 percent. If FDII were determined to be a non-conforming special tax regime, a royalty payment from Germany to the United States would be only 52.5 percent deductible (13.125/25). Given Germany's tax rate of approximately 30 percent, this would result in an increase in German tax of $14.25 per $100 of royalty. The U.S. federal tax savings from FDII would be only $7.88 per $100 of royalty (i.e., the difference between tax at 21 and 13.125 percent). In such a case, the loss of the deduction in Germany would exceed the U.S. tax savings.

Table 12
Patent Box Tax Rates and the U.S. Deduction for FDII

Country	Rate	Country	Rate
Belgium	5.1%	Malta	0–6.25%
Cyprus	2.5%	Netherlands	7.0%
France	15–15.5%	Portugal	11.5%
Hungary	4.5–9.5%	Spain	10.0%
Ireland	6.25%	Switzerland	8.8% (Nidwalden)
Israel	9%/16% (vary by region)	Turkey	10.0%
Italy	13.9%	United Kingdom	10.0%
Korea	5–16.5%	United States* (2018–2025)	18.3%
Luxembourg	5.2%	United States* (2026–)	21.4%

Sources: Foreign country rates from PwC, "Global Research and Development Incentives Group," 2017, and PwC, "Worldwide Tax Summaries," 2018.
*U.S. tax rate is for FDII, derived as an effective federal tax rate of 13.125% (2018–2025) and 16.406% (after 2025). Including the average state tax rate, the combined federal and state tax rate for FDII is 18.3% (2018–2025) and 21.4% (after 2025).

potentially U.S. companies with higher average foreign effective tax rates), these regimes may be much preferred to undertaking the investment in the United States to benefit from the FDII deduction. In addition to the lower tax rate offered by these patent boxes, income generated on sales to the United States would also qualify, unlike under FDII.

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APPENDIX: EFFECTIVE TAX RATE METHODOLOGY

We calculate corporate EMTRs and EATRs by country for 2017 according to the Devereux–Griffith methodology used by the European Commission (Spengel et al., 2016), including national and subnational corporate income taxes and allowances for corporate equity (in the case of Belgium, Italy, and Turkey). We exclude all other taxes, such as shareholder taxes and property taxes.

Data for corporate income tax rates and allowances for corporate equity are from the OECD database, the European Commission report, the database maintained by Oxford University's Center for Business Taxation (CBT), and PwC, Worldwide Tax Summaries.[37]

In the case of the U.S. corporate tax rate under 2017 law, we reduce the federal corporate income tax rate to account for the domestic production deduction (Section 199), according to the loss of federal revenue attributable to it. Specifically, according to the U.S. Treasury Department's tax expenditure estimates and corporate tax receipts for fiscal 2017, the domestic production deduction reduced corporate tax revenue by 4.0 percent in 2017, amounting to a 1.4 percentage point reduction in the federal corporate tax rate (reducing it from 35 to 33.6 percent). The U.S.

[37] The OECD database is available at http://www.oecd.org/tax/tax-policy/tax-database.htm; the Oxford University database is available at https://www.sbs.ox.ac.uk/faculty-research/tax/publications/data; and the PwC worldwide tax summaries are available at http://taxsummaries.pwc.com/ID/tax-summaries-home.

combined statutory tax rate for 2017 (after adjusting for the domestic production deduction), assuming an average state corporate income tax rate of 6.01 percent, is calculated to be 37.58 percent. Under 2018 law, we hold the average state corporate income tax rate constant at its 2017 value and compute the U.S. combined statutory tax rate to be 25.75 percent.

For purposes of the EMTR and EATR cross-country comparisons and in accordance with other studies utilizing the Devereux–Griffith methodology (including Bilicka and Devereux, 2012), we analyze equipment deemed to have a useful life of seven years (economic depreciation rate of 17.5 percent) and structures deemed to have a useful life of 25 years (economic depreciation rate of 3.1 percent). For the United States, this corresponds to equipment with a five-year MACRS recovery period (double declining balance with a switch to straight line) and structures recovered over 39 years, each with a half-year convention for the year placed in service; we account for bonus depreciation and expensing where applicable (equipment). We assume states conform to federal depreciation rules, including bonus depreciation and expensing. Inventories in the United States are assumed to use the LIFO accounting method. For other countries' depreciation allowances for equipment and structures, and for the treatment of inventory, we rely on the CBT database, the Canada Revenue Agency (CRA), and analysis by Bazel, Mintz, and Thompson (2018).[38]

For the tangible capital effective tax rate calculations, we assume a real interest rate of 5 percent, inflation of 2 percent, and, for EATR calculations, a pre-tax rate of return of 20 percent.

For weighted calculations of total corporate capital, we assume asset weights for equipment (30.15 percent), structures (58.40 percent), and inventory (11.45 percent) based on CBO (2014) weights for corporate tangible capital, excluding land.[39] When a mix of equity and debt is used to finance investment, we also follow the CBO in assuming a financing mix of 68 percent equity and 32 percent debt.[40]

For B-index and EMTR calculations of R&D projects, we follow the OECD (2018a) in assuming 90 percent of project costs are for current expenditures (labor and supplies), 5 percent for equipment, and 5 percent for structures. For the United States, equipment has a five-year MACRS recovery period (double declining balance with a switch to straight line) and structures are recovered over 39 years, each with a half-year convention for the year placed in service; we account for bonus depreciation and expensing where applicable (equipment), as well as five-year amortization under the Act beginning in 2022. For other countries, the B-index values are as reported by the OECD (2017). To be consistent with the OECD computations for other countries, we compute the B index for the United States using a nominal discount rate of 10 percent for depreciation allowances and amortization deductions. We assume states conform to federal depreciation and amortization rules for R&D investments. For EMTR calculations, we follow the same assumptions as for tangible capital (a real interest rate of 5 percent and inflation of 2 percent). We assume the economic depreciation rate for the composite R&D project is 17.5 percent.

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[38] For Canada, we use the allowances as published by the CRA (Class 53 for manufacturing and processing equipment and Class 1 for manufacturing and processing buildings, each with a half-year convention), available at https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/sole-proprietorships-partnerships/report-business-income-expenses/claiming-capital-cost-allowance/classes-depreciable-property.html. For the treatment of inventories in Canada, we assume first-in, first-out, in accordance with Bazel, Mintz, and Thompson (2018).

[39] Congressional Budget Office, 2014, Table A-1, p. 32.

[40] Congressional Budget Office, 2014, p. 46.