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ifo Schnelldienst

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Suggested Citation: Mintz, Jack (2018) : Global Implications of U.S. Tax Reform, ifo Schnelldienst, ISSN 0018-974X, ifo Institut - Leibniz-Institut für Wirtschaftsforschung an der Universität München, München, Vol. 71, Iss. 07, pp. 22-35

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Global Implications of U.S. Tax Reform

This paper was prepared for a presentation at the Munich Seminar, CESifo, on January 24, 2018.

Tax reform adopted in United States for January 1, 2018 will have a significant impact on the global economy in 2018. The U.S. economy accounts for about one fifth of the world economy so any growth induced by tax reform will have a positive impact on world growth. The ground- breaking corporate tax reform will also substantially affect U.S. tax competitiveness with many provisions drawing both capital and profits to the United States.

The federal corporate income tax rate is reduced from 35% to 21% beginning January 1, 2018. Expensing for machinery and equipment is introduced for 5 years (2018–2022) and phased out thereafter for five years. The corporate alternative minimum tax is eliminated. As shown below, the U.S. marginal effective tax rate (METR) will significantly drop below several regions including Latin America, Europe and Asia.

U.S. companies will also be able to bring dividends from foreign affiliates back to the parent on an exempt basis. Several important tightening measures are introduced, particularly with respect to interest, loss deductions and intangible income. With the sharply lower corporate income tax rate, dividend exemption system and new limitations on deductible interest and other deductions, companies operating in the United States shall push debt and other costs to foreign countries to the extent possible, reducing corporate taxes elsewhere. Under the dividend exemption system, U.S. parent companies can bring money home from abroad without paying additional tax to the U.S. government. The funds could then be used to reduce U.S. debt if interest deductions are constrained. Overall, the U.S. gains corporate tax revenue while foreign countries lose revenue due to financial policy changes.

Further, new tax provisions related to global and foreign-derived intangible income shall encourage research and development in the United States to be sold abroad as well as reduce the incentive for placing intellectual property in foreign jurisdictions.

The United States has joined many countries reducing statutory corporate income tax rates and in some case scaling back tax preferences. The intent is to encourage greater investment and job creation. Lower rates and base broadening counters multinational profit shifting through transfer pricing and financing decisions to help preserve revenues (see Mintz and Weichenrieder 2010).

However, given the budgetary process in the United States, a number of provisions such as expensing are time-limited in order to achieve budgetary balance by 2027. This approach to budgeting tends encourage short-term policy-making, leaving uncertainty to the future as to which reforms shall remain in place. Some provisions are quite complicated such as taxes on intangible income and private entities, which will likely need to be amended. With only the Republicans backing the *Tax Cuts and Jobs Act*, a future Democratic Party-controlled Presidency or Congress could undo various changes. However, the corporate tax reforms, most of which are permanent, are less likely to be undone especially moving towards a dividend exemption system that was supported in the past by both Democrats and Republicans.

This paper is divided as follows. In the first part, key details are outlined with respect to corporate tax reform contained in the U.S. *Tax Cuts and Jobs Act*. This is followed by an assessment of the reform with respect to U.S. investment. We then examine the impacts of interest and loss limitation rules as well as new U.S taxes with respect to intangible income.

U.S. TAX REFORM

The hallmark of U.S. tax reform is with respect to business income taxation. The U.S. *Tax Cuts and Jobs Act* includes a large number of amendments to the U.S. tax code causing a significant shift with respect to cap-

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I appreciate the assistance provided by Phil Bazel in preparing this paper.

ital allocation and international tax planning that is highlighted below.

The key elements of the business tax reform are the following:

i A reduction in the federal corporate income tax rate from 35% to 21% (39.1% to 26% including state income taxes) beginning January 1, 2018.
ii A reduction in percentage deductions for dividends received from other corporations. The general exemption for dividends received from other corporations is being reduced from 70% to 50%. For subsidiaries with at least 20% ownership, the exemption is being reduced from 80% to 65%. Dividends remain fully exempt if the affiliate is part of the group of companies.
iii Expensing of investment in assets with a recovery of less than 20 years (primarily machinery and equipment) except companies not subject to the interest limitation rule (construction, real estate and certain public utilities). This effectively increases bonus depreciation that would have been phased out by 2020 (40% in 2018 and 30% in 2019). Expensing is to be phased out after 2022 by a fifth each year (and therefore no longer available after January 1, 2027).
iv Research and development expenditures incurred in tax years after 2025 will be amortized over a 5-year period (15 years for expenditures attributable to research conducted outside the United States).
v A general limitation on the deductibility of interest expense to be no more than 30% of adjusted profits (public utilities and finance would be largely exempt). The Act limits, until January 1, 2022, the deduction of net interest expense to 30% of the business's adjusted taxable income not taking into account interest, depreciation, amortization, depletion or net operating losses (disallowed amounts may be carried forward five tax years). After 2022, the limit will be based on 30% of the business's adjusted taxable income not taking into account any item of income, gain, deduction, or loss which is not properly allocable to a trade or business, business interest expense or income, the deduction for certain pass-through income, and net operating losses (disallowed amounts may be carried forward indefinitely).
vi Limitation in the use of non-operating losses deductions to be no more than 80% of profits.
vii The elimination of the corporate minimum tax as of January 1, 2018.
viii An exemption for dividends received from foreign affiliates with at least 10% ownership by the U.S. parent according to value (voting shares shall no longer be relevant in determining the ownership test).
ix A new Base Erosion and Tax Avoidance Tax (BEAT) is introduced as a minimum tax on adjusted taxable income of foreign affiliates operating in the United States. Certain payments made to related parties are disallowed as a deduction (such as interest, fees and royalties to be discussed further below).
x New rules for the taxation of global intangible income earned abroad by U.S. companies and on income from foreign derived earning from domestic intangible activities.
xi As a transitional measure, existing foreign earnings accumulated abroad since 1986 would be subject to a mandatory toll (transitional tax) payable over 8 years – 15.5% for earnings held in cash and 8% for the remainder.

The *Tax Cuts and Jobs Act* will also reduce taxes on business income earned by »pass-throughs« including sole proprietorships, partnerships, and S corporations (private corporations owned by U.S. residents). These businesses do not pay corporate income taxes as the income is flowed through to investors and taxed at the personal level. The analysis below does not focus on pass-throughs since it is more relevant to small and medium sized businesses closely held by the owner (for an earlier discussion on small business taxation and U.S. reform see Mintz and Venkatchalam 2017).

BUSINESS DECISION-MAKING IMPACTS

The discussion regarding the impact on investment in the United States and other countries is based on the marginal effective tax rate (METR) analysis for 92 countries (see Bazel and Mintz 2015 for the latest theoretical model). The METR is the annualized value of corporate taxes paid as a percentage of the pre-tax profitability of marginal investments. Marginal investments are those that are incremental to the economy: they earn sufficient profit to be taxable, to attract financing from investors and to cover risk. At the margin, businesses invest in capital until the rate of return on capital, net of taxes and risk, is equal to the cost of financing capital (their interest rate). If the rate of return is more (less) than financing costs, firms will invest more (less) in capital. Thus, if a government increases the tax rate, it will result in businesses rejecting marginal projects that would otherwise be profitable if the tax burden were smaller.

Taxes that impinge on capital investment include central and sub-national corporate income taxes (both the tax rate and tax base), sales taxes on capital purchases (such as retail sales taxes), asset-based taxes (capital taxes and property taxes), and transfer taxes on real estate and financial transactions. In our analysis, we have included most taxes; however, we have not integrated municipal property taxes, as they are difficult to measure due to variation in municipal rates and bases and cannot be compiled by industry sector.

In our analysis, we use similar capital structures to isolate tax differences among 92 countries. The capital structures, reflecting the distribution of assets

among machinery, buildings, inventory and land investments, are based on Canadian data. We include all manufacturing (including forestry that is vertically integrated) and service industries (oil and gas, mining and finance are therefore excluded).[1] Economic depreciation rates for assets are also based on Statistics Canada estimates. Bond interest rates reflect differences in inflation rates across countries (following the purchasing-power-parity assumption that implies interest rates rise one point with each one-point increase in inflation). Equity costs are based on a marginal supplier of finance equating the after-tax rates of return on stocks and bonds (the marginal investor is assumed to be a G7 investor holding an international portfolio of bonds and equities).

The appendix provides the theoretical details of the model as well as the 2017 METR calculations for 92 countries and data as of early fall of 2017. We have recently tested the METRs in terms of their impact on investment for manufacturing and service sectors. Due to data limitations, we focussed on investments in fixed assets by manufacturing and service sectors for 30 OECD countries during the years 2005–2015. We explain fixed capital formation by country and sector adjusted for size by measuring investment intensity – the share of investment to value-added in the sector. Since investment depends not just on taxation, we also use as explanatory variables for output demand (GDP lagged by one year and GDP growth rates lagged one year), higher per capita income (GDP per capita and GDP per capita squared both lagged one year), the unemployment rate, country-specific risk (the spread between a country's government bond rate and contemporaneous US treasury bill rate). A non-linear relationship between investment intensity and the METR is found whereby point increase in the METR more heavily affects investment intensity where the METR is low compared to where the METR is high, whether the case of manufacturing or services.[2] For example, taking the case of manufacturing with a METR of 20%, a one-point increase would result in a loss of about 0.19 percentage points of investment intensity. For the service METR of 20%, a one-point increase would reduce investment intensity by roughly .09 points, which is about a quarter of the manufacturing effect.

[1] Much work is needed to analyze taxes in these sectors, so international comparisons have been more limited. For some international comparisons for oil and mining, see Mintz and Chen (2012) and Mintz et al. (2017).

[2] Our results treat the METR as an exogenous variable for investment, which is typical in the literature. Yet, tax policies are a choice made by governments – countries less concerned about investment flows might choose higher tax rates. Further, the tax competition literature suggests that smaller countries tend to choose lower taxes on capital to offset the market and labour pool advantages of large countries to attract capital (see Kanbur and Keen 1993; Wilson 1999; Winner 2005). An increase in the METR for a smaller country would more heavily affect the small country's investment. While we correct for country size and found that a linear relationship between investment intensity and the METR remain negative and statistically significant (and the same at the average METR and investment intensity level), it would be interesting to develop a political model whereby the METR is optimally chosen (requiring two-stage least squares analysis).

Investment

Taking into account the corporate rate and expensing provisions, the impact of the U.S. tax reform is to sharply reduce the longer-run tax burden on investment in the United States. Excluding bonus depreciation for shorter-lived capital (machinery and equipment) that was being phased out after 2019 the METR on capital falls from 34.6% to 18.8%. With 2018 bonus depreciation of 40% and 2019 bonus depreciation of 30%, the 2018 METR falls from 29.7% and 31.0% respectively to 18.8%.[3] Table 1 provides a comparison of U.S. METR by country with the G7 countries.

Figure 1 provides a comparison with regional groupings (simple and GDP-weighted). In general, the reform will lead to a lower METR in the U.S. making the U.S. more attractive for investments. The U.S. METR, at least from 2018–2022, will be sharply lower than GDP-weighted averages of the Americas, Asia-Oceania and Europe (it is higher than the simple-averages for Europe).

Table 2 provides the industry breakdown for METR for the United States. The reform will benefit most industries with METRs falling by more than a half where expensing for machinery has its most intensive impact (manufacturing, construction, transportation and communications). For example, using econometric analysis referred to above, U.S. manufacturing investment in fixed assets ($494 billion in 2016[4]) would rise annually by about $43 billion. At the end of 2022 with 5% nominal growth after 2016, U.S. manufacturing investment could rise to $700 billion, leaving aside any impact of the tax reform on interest rates. The impact on services would be more constrained.

This reduction in capital taxation in the United States is both good and bad news for other trading partners. On the plus side, the corporate income tax reform in the Tax Cuts and Jobs Act is predicted to raise both GDP and wages in the United States. Benzell, Kotlikoff and Lagarda (2017) model the impact of U.S. tax reform using a dynamic model that includes capital flows across 17 regions of the world over 90 years. Using our global METR calculations, they predict that U.S. GDP will rise 4.0% and real wages by 5.2% (low-skilled) and 6% (high-skilled) by 2025, estimates that are larger than those provided by the Joint Committee on Taxation (2017), which uses a closed economy model. They estimate that the average American working household will benefit by $3500 annually. The growth in incomes in the United States should spill over into higher demand for foreign products.

On the other hand, the U.S. tax reform will make it more attractive for businesses to invest in the United States to serve the North American market. With a

[3] Given the underlying debt-asset ratio used in our METR estimates, the interest limitation rule would not be binding in aggregate at least prior to 2022. The effects of the interest limitation rules are further discussed in the next section.

[4] Manufacturing value-added is $2.182 trillion in 2016 and the investment intensity is 22.6% (see https://www.bea.gov/index.html).

Table 1

U.S. Pre- and Post-Reform METRs in Comparison to G7 Countries for Manufacturing and Services (in %)

	Statutory Corporate Income Tax Rate[a]	Manufacturing METR	Services METR	Overall METR
US Current[b]	39.1	32.1	36.0	34.6
US Reform	26.0	16.0	20.2	18.8
Canada	26.6	16.2	22.5	20.9
France	38.0	30.8	28.3	38.5
Germany	29.7	28.5	26.2	26.7
Italy	28.5	6.3	6.0	6.0
Japan	30.9	40.9	41.9	40.9
United Kingdom	19.0	23.0	24.1	24.0

[a] Statutory corporate income tax rate is the general rate inclusive of sub-national rates, surtaxes and other statutory corporate income levies. [b] With bonus depreciation, overall METR for U.S. is 29.7% in 2018 and 31.0% in 2019.

Sources: Author's calculations derived from Finance Canada data and various accounting tax publications.

shift to trade protection through countervailing and anti-dumping actions in the United States, businesses wishing to serve the American market will also look to locate in the United States, which has become more attractive for investments rather than try to export from their own countries.

Taking national averages, however, masks some of the differences in tax burdens by state. The U.S. tax reform will provide a larger business tax advantage for U.S. states with corporate tax rates below the average U.S. rate and less so for states with relatively high corporate income tax rates. The average GDP-weighted top corporate income tax rate 6.3% with the highest rate of 12% in Iowa and six states having no corporate income tax at all (Nevada, Ohio, South Dakota, Texas, Washington and Wyoming[5]). Thus, a German auto company would be more attracted to Ohio compared to California (8.84%) or Illinois (7.75%). With deductible state corporate income taxes, however, the state corporate tax is much smaller in impact compared to the federal tax.

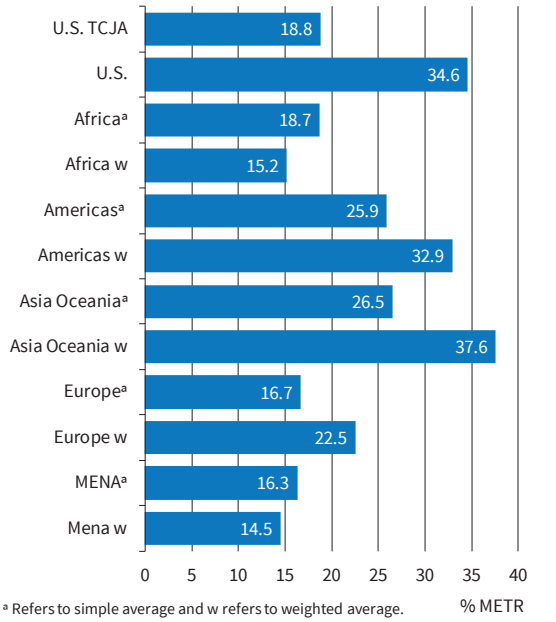
Due to Senate budgetary rules that require balanced budgets after a decade, several amendments are limited in time such as expensing provisions. Further, as mentioned above, bonus depreciation was to be phased out before 2020[6]. In Figure 2 shows that the U.S. tax reform results in a roller coaster effect whereby the METR first declines in 2018 and then eventually rises to 26.7% by 2028, which is about 8 points lower had the previous system continue as legislated.

It is far too difficult to predict expensing provisions in the United States that Congress changes frequently. Bonus depreciation began in 2002 at 30% of qualifying expenditures and eliminated 2004–2007. It was reintroduced at 50% in the 2008 recession, raised to full expensing in 2010, reduced to 50% in 2012 and 40% in 2018, 30% in 2019 and eliminated altogether in 2020. Expensing under the *Tax Cuts and Jobs Act* replaced bonus depreciation but is phased out after 2022 by 20% each year. Many countries regain their business tax advantage by 2025, although it would not be possible to predict corporate tax changes by 2026 either in the U.S. or elsewhere. Nonetheless, the instability of the U.S. reform may blunt some of the tax impact. It will be also partly blunted by certain tax-raising provisions to which I now turn.

[5] Of the six states without a corporate income tax rate, four levy gross receipts taxes with South Dakota and Wyoming imposing neither.

Figure 1

2017 METR by Region in Comparison to U.S. METR
(Pre- and Post-Reform)



[a] Refers to simple average and w refers to weighted average.

Source: Author's calculations derived from Finance Canada data and various accounting tax publications.

Financing

The sharp reduction of 15 points in the corporate income tax rate in the United States will encourage companies to put less debt in the United States to fund their investment[7]. This will also be the case for many U.S. companies, who wish to avoid the new interest and loss limitation rules that could bite over time.

[6] Bonus depreciation allows for the expensing of capital in the first year with the undepreciated capital cost base subject to annual depreciation allowances in following years.

[7] De Mooij (2011) meta-analysis estimates that a 10% decrease in the corporate income tax rate (e.g. 25% to 22.5% would reduce the debt financing as a share of investment by 6.5%). However, there is a large standard deviation around such estimates. In Mintz and Weichenrieder (2010), internal debt finance by German companies of foreign subsidiaries is found to be sensitive to corporate tax rate shifts. See also Heckemeyer and Overesch (2013) on profit-shifting.

Table 2

Current and Tax Pre- and Post-Reform METRs by Industry in the United States (in %)

	Current	Reform
Forestry	29.8	11.6
Manufacturing	32.1	16.0
Construction	34.4	19.7
Utilities	27.8	17.2
Transportation	27.8	10.9
Communications	39.3	18.5
Wholesale Trade	37.0	22.3
Retail Trade	36.8	23.5
Other Services	40.4	26.2
Oil and Gas	36.1	30.2
Aggregate excluding Oil and Gas	34.6	18.8

Sources: Author's calculations derived from Finance Canada data and various accounting tax publications.

The interest limitation is an earnings-stripping rule whereby interest deductions in excess of 30% adjusted earnings will not be deductible in the current year (unused interest deductions can be carried forward indefinitely). Small businesses with less than $25 in gross revenues, certain public utilities and finance companies are exempt. Until 2022, adjusted income is without regard to deductions for interest, taxes, depreciation, amortization and depletion (ie: EBITDA similar to Germany) while beginning in 2022 earnings will be net of depreciation, depletion and amortization costs (ie: EBIT similar to Sweden's new rule). Unlike the previous earnings-stripping rule for interest expense incurred by affiliates of foreign persons, there is no »safe harbour« such as a maximum debt/equity ratio that would exempt companies from the interest limitation. Thus, even companies with relatively little leverage will be affected by the earning-stripping rule if there is a period of poor profitability. Thus, those companies especially affected by cyclical profits and higher leverage would reduce reliance on debt since they lose the present value of their interest deductions delayed to future years.

The impact on investment depends on the type of earnings-stripping rule in place. While the earnings-stripping rule increases the cost of capital, as borrowed interest is not fully deducted, it also provides an additional kick to investment as income generated at the margin enables the firm to deduct more interest. In the case of short-lived capital and an EBIDTA-based earnings-stripping rule, the METR can be lower and even negative than the case when interest deductions are not binding. Assuming no carry forward of unused interest deductions as a particular case, an earnings-stripping rules based on EBITDA can results in a lower METR since new investment in machinery creates substantial room for additional interest deductions (Table 3 and Appendix A for formulas).

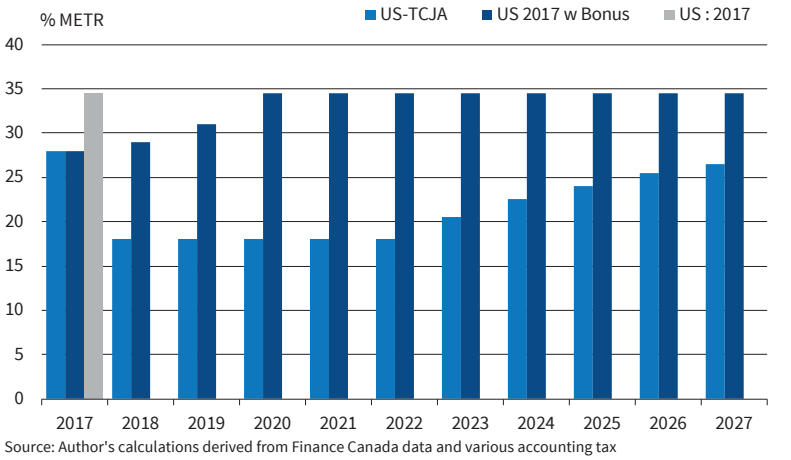
The new U.S. law will also limit loss deductions to 80% of profits earned in a year. This will encourage U.S. companies to shift costs including interest to foreign affiliates to make better use of loss deductions. Countries with a more liberal treatment of losses are likely to bear these costs.

As U.S. parents will be able to repatriate dividends without additional payment of tax, they will be able use foreign profits to retire such debt. In a recent poll, 65% of companies listed debt reduction as a priority for repatriated profits.[8] However, to replace undistributed foreign profits in other countries, multinationals could have their affiliates take on more debt from the parent or third parties, subject to the effectiveness of thin-capitalization rules in the foreign jurisdiction. In other words, foreign governments will lose corporate tax revenues to the U.S. government with new financial structures.

Other provisions in U.S. tax reform will impact Canada-U.S. financing structures such as the use of hybrids structures to achieve double-dip interest deductions for investments (see Mintz and Weichenrieder 2010). As discussed below, debt will also be discouraged to the extent that new anti-abuse rules are effective in discouraging debt placement in the United States.

Figure 2

METR by Year in the United States Accounting for Shifts in Expensing Provisions



Source: Author's calculations derived from Finance Canada data and various accounting tax publications.

Intangible Income

The U.S. rules likely will have significant impacts on the

[8] See https://www.cnbc.com/2017/07/13/companies-have-big-plans-foroverseas-cash--if-tax-reform-ever-happens.html.

Table 3

Marginal Effective Tax Rates when the Earning-Stripping Rule is Binding (and no Interest Deduction Carry Forwards): Manufacturing and All Industries (in Percentages)

	EBITDA-based		EBIT-based	
	Manufacturing	All industries	Manufacturing	All industries
Structures	28.1	23.7	34.9	29.6
Machinery	– 73.8	– 41.2	9.9	20.8
Land	17.2	16.7	17.0	16.7
Inventories	16.9	16.9	16.8	16.9
Aggregate	0.9	0.4	18.7	22.4

Sources: Author' calculations derived from Finance Canada data and various accounting tax publications.

incentives for intellectual property, marketing and other intangibles within multinational groups. Two particularly important provisions include new anti-abuse rules and new tax provisions related to on global intangible low-taxed income (GILTI) earned by U.S. multinationals abroad and U.S. income from the sale of foreign-derived intangible income (FDII).

Base Erosion and Anti-Avoidance Tax

New anti-abuse rules shall limit deductions for cetrain payments (e.g. interest, royalties and management fees) to related foreign parties when companies have gross receipts in excess of $500 million. The intent of these rules is to make it more difficult for foreign companies operating in the United States to shift profits to low-tax countries by using techniques such as licensing arrangements with Irish subsidiaries. The base erosion and anti-abuse tax (BEAT) applies to certain base erosion deductions[9] when higher than 3% of total deductions. The cost of goods sold and certain service cost deductions (such as those subject to no mark-up values) are not disallowed as a deduction. The BEAT is a minimum tax of 10% (later to be 12.5% beginning January 1, 2026) on taxable income gross of base erosion payments (a one-point higher tax rate applies to registered security dealers).

BEAT is paid if the amount is greater than regular corporate income tax paid at the rate of 21% on income paid by the U.S. subsidiary (tax liabilities are also reduced by 20% of Section 38 business tax credits). This will arise if the tax value of denied deductions are large enough. Let Y be regular taxable income taxed at the corporate rate u, X be business tax credits, t equal to the BEAT tax rate and B equal to base erosion payments. BEAT is paid if:

$$t\,(Y + B) - .8X > uY - X \text{ or } tB > (u - t)Y - .2X.$$

A corporate income tax rate of 21% and BEAT tax of 10% would result in BEAT being paid when $B > 1.1\,Y - 2X$. At a BEAT tax of 12.5% from 2026 onwards, BEAT is paid if $B > .68Y - 1.6X$.

[9] The new rules do not apply to a regulated corporations or a real estate investment trust. See Explanation of the *Tax Act and Jobs Act*, p. 532.

The effect of the BEAT is to reduce the incentive to pay disregarded payments from U.S. affiliates. To the extent the BEAT is paid, it also erodes the value of investment tax credits provided by the U.S. government for various investments, many but not all of which are related to energy investments.

Potentially the BEAT would impact cross-border investments and technology transfers with the United States for foreign investors ultimately resulting in lower reported profits abroad to avoid the BEAT. However, either by increasing taxable income in the United States (Y) or reducing base erosion payments (B), companies can beat the BEAT. As in the case of financing, the BEAT shall not payable if taxable income is sufficiently high by shifting debt interest, general administrative costs to other countries. Base erosion payments could be reduced by shifting intangible benefits into the price of goods as permitted under transfer pricing rules. The BEAT may also be avoid cost-sharing if profit-sharing contracts between parents and subsidiaries are used instead of transactional payments.

BEAT may be subject to challenge under existing tax treaties as being contrary to the arm's length principle by which a multinational should be able to deduct expenses if similar to those taken between two unrelated companies. BEAT operates as a minimum tax, which is not consistent with the arm's length principle. However, it has certain characteristics similar to existing earning-stripping rules whereby interest is not deductible in excess of a certain lever of adjusted profits, which as shown above, is also the case.

GILTI and FDII

The other important provisions are related to intangible income. The intent of these rules is to discourage multinationals from shifting mobile tangible income to foreign low-taxed jurisdictions, such as in the case of intellectual property and to provide a »patent-box«-like incentive for intangible income earned on exports from the United States. In a decade, the write-offs for research and development expenditures in the United States will be amortized rather than expensed.

A U.S. parent of controlled-foreign corporation includes GILTI in the parent's income similar to Sub-Part F passive income and therefore fully taxed as the income is accrued (unlike the previous regime when the income is when remitted to the United States). GILTI is the excess of income over a deemed tangible income, the latter measured as a 10% return on tangible depreciable, excluding Sub-Part F income, foreign oil and gas income and certain related party payments. GILTI is taxed at a rate of 10.5% until January 1,

2026 when it becomes 13.125% thereafter. A tax credit is given for 80% of foreign taxes without a carry back or forward to other years.

Under the previous system, a U.S. multinational would not be taxed on intangible income so long as the income was not repatriated to the United States. The GILTI tax, on the other hand, is an accrual tax that will claw back incentives in foreign jurisdictions, whether income is repatriated or not, similar to passive income rules. A U.S. multinational would be liable for tax on intangible income in a foreign jurisdiction if 80% of foreign taxes were less than 10.5% (or 13.125% after 2025) of GILTI, which could arise in the case with research and development tax credits or patent-boxes.

While much of the impact of the GILTI tax will be on intangible income from intellectual property, it will also affect intangible income from marketing, foreign mining and other intangibles (oil and gas is exempt).

The GILTI will also encourage U.S. companies to hold depreciable assets in foreign jurisdictions. Indeed, for each dollar invested in tangible assets, the U.S. company earns a present value of exempt intangible income equal to the exempt rate of return divided by the nominal discount rate plus the equivalent economic depreciation on the asset. Thus, for example, a dollar of investment in machinery with a 10% declining-balance depreciation rate and a 5% nominal discount rate generates a present value of deductions relief is two-thirds of the expenditure (.1/(.10+.05)). As I have noted in earlier work on resource companies, exempt return can result in a negative METR for investments due to capital base-broadening (see Mintz 2016).

Further, the new U.S. tax provides domestic corporations a reduced tax rate on foreign-derived intangible income (FDII) by providing a deduction equal to 37.5% of FDII prior to January 1, 2026 and 21.875% thereafter. The effective tax rates on FDII will therefore be equal to 13.125% prior to January 1, 2026 and 16.406% thereafter.[10] Intangible income is measured by taking the difference between eligible income and 10% of qualified business assets. This provision provides a concessionary rate of tax on intangible income for property sold to unrelated foreign persons for foreign use or services provided for use outside of the United States based on the share of foreign-derived income to domestic and foreign-derived income. FDII also excludes oil and gas income but not mining (therefore providing an incentive for mining investments in the United States to the extent output is exported). FDII creates an incentive for businesses to shift not only intellectual property to the United States but also marketing sales forces and other inputs associated with intangible income.

The FDII could be challenged as an export subsidy given that it concessionary rate is only provided for foreign-derived income. Opposite to the GILTI tax, companies will also have an incentive to invest less in tangible property in the United States to increase the concessionary rate for exported intangible income.

[10] FDII does not include Sub-Part F income, GILTI, financial services income, dividends received from controlled-foreign corporation, domestic oil and gas extraction income from a domestic corporation and foreign branch income. See the Explanation of the *Tax Cuts and Jobs Act*, page 495.

HOW WILL OTHER COUNTRIES RESPOND?

Given the size of the U.S. economy and the implications of U.S. tax reforms, many countries throughout the world are already examining their own policies. As we have noted for 2017, corporate tax reform has been limited to minor reforms in many countries except for a few cases in the past few years (see Bazel and Mintz 2016). However, I would expect that 2018 corporate tax policy should be quite active as countries decide upon their reaction to U.S. tax reform.

The U.S. corporate tax reform leads to a fundamental reshaping of tax planning by U.S. corporations, moving from a inward-looking to outward-looking tax planning. In the past, The U.S. tax on investments was viewed as less favourable compared to many other countries. Now the U.S. has a more attractive corporate tax system. Instead of shifting profits out of the United States, companies operating in the United States will shift profits to the United States. Overall, U.S. tax reform affects not only investment decisions but also the distribution of profits among countries and therefore, corporate taxes.

I would argue that three particular issues would be at play for most countries.

- Along with recent deregulation, the U.S. tax reform will make the U.S. a more appealing location for investments. While many factors influence investment decisions by corporations other than corporate taxation, the fundamental U.S. changes has shifted taxation from being a disadvantage to an advantage as a factor influencing investment compared to most regions of the world.
- The sharp reduction in the U.S. corporate income tax rate as well as the adoption of an exemption for dividends results a significant change in tax planning by corporations with U.S. operations. As discussed above, companies with U.S. operations will have an incentive to shift debt interest and other costs out of the United States to other countries and increase taxable profits in the United States. This would lead to a loss of corporate tax revenues elsewhere in favour of the United States.
- With new provisions affecting intangible income, companies with U.S. operations will have more incentive to shift intangible income to the United States. U.S. corporations could license less intellectual property to affiliates abroad. Host countries will need

to evaluate their research and development policies.

As remarked above, the U.S. tax system is unstable as provisions such as expensing are eventually scaled back. Also, some rules such as interest limitations are quite harsh and I expect will be adjusted at a later time. New non-neutralities are created such as the tax treatment of pass-through and personal income or mining versus oil and gas that are difficult to explain. Further, some World Trade Organization challenges could result in new policies at a later time. And there are eventual changes in political control of the Presidency and Congress at a later time, which could lead to significant shifts as this current reform received only Republican support. Nonetheless, many provisions, especially those related to corporate taxation, will likely stick especially the dividend exemption system and various anti-tax avoidance rules.

The U.S. will undoubtedly improve its productivity growth from the reform, leading to macroeconomic adjustments to rising interest rates and an appreciating U.S. dollar. These adjustments will blunt some of the competitiveness impacts of the U.S. tax reform but yield income gains to households.

I would expect many countries, looking to maintain their business tax advantages and corporate revenues, would likely undertake several types of reforms themselves in light of dramatic U.S. reform.

Business tax advantages could include reductions in corporate income tax rates especially in high-rate countries. Already, France announced last September a reduction in its general corporate income tax rate from 33.33% to 25% by 2022. Belgium, in December 2017, announced a corporate tax rate reduction from 33.99% to 25% by 2020. Government may introduce temporary tax credits and accelerated depreciation to counter short-term expensing provisions provided by the U.S. although it might be better to use grants rather than tax relief for research and development. An important issue is whether government continue to pursue neutrality among businesses activities, which is better achieved by corporate rate reductions compared to selective investment tax credits. Certainly, U.S. reform with its heavy incentives for machinery investments is far from being »neutral«, thereby giving up some potential productivity gains.

Many countries will be concerned with base-erosion to the extent costs are shifted to them from the United States. Corporate rate reductions help counter base-erosion so this would be particularly important to countries with high corporate income tax rates. Countries will also assess their interest limitation, tax loss and transfer pricing rules in light of a U.S. reform that takes a fairly restrictive provision on debt, losses and intangible income.

Countries will of course respond depending on their own economic and political circumstances. Whatever happens, 2018 will be a very busy year especially for tax accountants and lawyers!

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THEORETICAL APPENDIX

Description of Theory

The marginal-effective-tax-rate analysis is based on a model of a firm maximizing its market value of cash flows discounted by a weighted average cost of finance, determined by an optimal financial policy. All values are in certainty-equivalent terms with the firm using any marginal tax losses and tax credits to reduce tax liabilities. Capital decisions are determined at a point where the return on capital net of depreciation and income-risk premium is equal to the cost of finance. The cost of finance is the weighted average of the after-cost of debt and equity, trading-off the tax benefits of issuing debt with bankruptcy and agency costs. An optimal dividend-payout policy determining the cost of equity finance is based on information conveyed to the market.[11] The model incorporates corporate income tax provisions, capital taxes based on gross or net assets, sales taxes on capital purchases and transfer taxes.

Basic Model

The METR includes the following taxes and their provisions:

- Corporate income tax:
  - Tax rate (u).
  - Present value of tax savings from tax depreciation: (uZ) discounted by Rf. If declining-balance depreciation: $Z = \alpha/(\alpha + Rf)$.
  - Initial allowance (IA) or investment tax credit: $IA = \phi/(1 - u)$ to convert tax credits into initial allowances or vice versa.
  - Inventory deduction (FIFO, LIFO, replacement cost or average cost).
  - Interest deduction (which can be limited, such as with indexation).
  - Nominal cost of finance is the weighted average of debt and equity finance, with the simplest form being: $Rf = Bi\,(1 - u) + (1 - B)\,\rho$ with $\rho/(1 - \tau)$ with $\tau = atd + (1 - a)c$ (weighted average of the cost of equity and debt finance paid under the personal income tax).
  - Real cost of finance (nominal cost less inflation): $rf = Rf - \pi$.
  - The capital-related income risk premium, which could vary by industry and asset, is reduced by the corporate income tax rate assuming the firm is »fully taxpaying«: $H(1 - u)$.
- Capital taxes are treated in the model as the present value of capital tax (wealth tax, tax on fixed assets (excluding inventories), gross asset tax) at rate tc. Usually the capital tax is discounted by the nominal cost of finance, Rf, and declines as capital depreciates. Capital taxes are typically deductible from corporate income (we adjust for cases in which they are not deductible) and are paid *annually*, so the formula is: $(1 - \xi B)\,tc/(Rf + \delta)$, with $\xi = 1$ being the case where the capital tax applies to net assets, and $\xi = 0$ being the case when it is applied to gross assets.
- Capital taxes apply to the book value of assets (where the economic depreciation rate is relevant) or the tax value of assets (based on economic depreciation). Unless provided, there is no indexation for inflation. If the tax value of assets is used, one depreciates by α instead of δ, and reduces the asset base by any investment allowances (or investment tax credits).
- Sales taxes on capital purchases raise the price of purchasing capital from q to $q(1 + t)$, t = sales tax rate. Treating $q = 1$, the increase in capital cost is $(1 + t)$.
- Gross-receipts taxes that do not allow for the deduction of capital costs are applied at the rate k (if they are deductible from the corporate income base the effective rate is $k(1 - u)$.
- Distribution taxes at rate z on dividends paid to all types of shareholders, whether resident or non-resident, increase the cost of financing. The share of profits paid out as dividends is equal to a.
- Transfer taxes apply to real estate (land and buildings), land only (land taxes) and/or property (real estate and other fixed assets). Rarely do transfer taxes apply to inventories. The rate is included in t for sales taxes on capital goods. Transfer taxes are typically not deductible, but they increase the purchase cost of the asset and are therefore depreciated.
- Transfer taxes on securities raise the cost of purchasing financial assets, much like a sales tax. They include stamp duties and registration taxes for securities. They are deductible similar to other expenses when incurred. The nominal cost of finance Rf is increased by $(1 + \Upsilon\eta(1 - u))$, with Υ being the transfer tax rate. They can be on bonds only (B), new equity issues $(1 - B)$a or both $(B + (1 - B)a)$ implying that η is the following:

  $\eta = B$ for transfer taxes on debt.
  $\eta = (1 - B)$a for new equity only.
  $\eta = B + Ba$ for debt and new equity issues.

- Financial transactions are annual payments on financial securities (they differ from capital taxes that apply to real assets). The tax rate paid *annually* is σ, which is applied to debt, equity or both. Financial-transaction taxes increase the cost of finance each year in Rf.

[11] For further elaboration, see Mintz (1995).

With these various taxes, the formulas for the user cost of capital are as follows:

1. $F'/q = (1 + t)(\delta + rf)(1 - A)/(1 - u - k(1 - \omega u)) + H$.
2. $Rf = [B\{i + \sigma](1 - u) + \rho/(1 - az)](1 + \Upsilon\!\!\!\!\backslash(1 - u))$.
3. $Rf = Rf - \pi$.
4. $A = u[A + (1 - IA)Z] - (1 - \xi B)\, tc\, (1 - u)/(Rf + \delta)$.

As for inventories, $\delta = 0$, but we add on the tax on inflation depending on FIFO, average cost, or LIFO.

Gross return on capital is $Rg = F'/q - \delta - H$. The net return is the gross return with all corporate (not personal) tax parameters equal to zero: $Rn = Bi + (1 - B)\rho - \pi$.

The METR is defined as $T = (Rg - Rn)/Rg$.

Earnings Stripping Rules

Let $F[k_t]$ be earnings of a firm depending on capital investment, k_t, i be the nominal bond interest rate, ρ the nominal imputed cost of equity finance and γ, the debt-capital ratio, which we treat as fixed. Let δ be the economic depreciation rate on capital (declining balance rate). Let uA be the present value of tax savings from annual capital cost allowances. $A = \alpha/(\alpha + R_f)$is the present value of the stream of annual capital cost allowances at the rate α discounted by the nominal interest rate, R_f, that reduces the effective purchase cost of capital investments. The real cost of finance is $R_f - \pi$ with $r_f = \gamma i + (1 - \gamma)\rho - \pi$. Let ς be the percentage of earnings against which interest expense may be deducted for tax purposes. Thus, $i\gamma k \leq \varsigma(1 + \pi)t\ F[k_t]$ for the case of the EBITDA-based constraint and $i\gamma k \leq \varsigma (1 + \pi)t\ F[k]$ for the case of EBIT-based constraint. We will therefore denote both earnings stripping rules when debt deductions are at the limit as $i\gamma k \leq \varsigma Y_t$ with $Y_t = (1 + \pi)t\, F[k_t]$ or $Y_t = (1 + \pi)t\, (F[k_t] - \alpha Z_t)$

Ignoring personal taxes, discounted shareholder profits earned by the firm would be the following:

$$V = {}_{t=0}\Sigma^{t=\infty}\, (1 + \rho)^{-t}\{(1 - u)\{(1 + \pi)^t\, F[k_t] - \alpha Z_t - i\gamma(k_t + 1 - k_t + \delta k_t)\} + u\varsigma Y_t.$$

With $Z_t = {}_{s=0}\Sigma^{s=t}\, (1+\pi)^s F(k_s + 1 - k_s + \delta k_s)(1-\alpha)^s$ (the undepreciated cost base of assets at time t).

The choice of k_t yields the following user cost of capital, adjusted for taxes, for the EBIDTA-based constraint:

$$F'[k] = (\delta + r_f)(1 - uA)/(1 - u(1 - \varsigma))$$

With $r_f = \gamma(i - \pi) + (1 - \gamma)\rho - \pi$.

If the earnings-stripping rule is based on EBIT, the cost of capital becomes:

$$F'[k] = (\delta + r_f)(1 - u(1 - \varsigma)A)/(1 - u(1 - \varsigma))$$

With $r_f = \gamma(i - \pi) + (1 - \gamma)\rho - \pi$.

While the interest limitation raises the cost of capital by making marginal debt finance more expensive, it reduces the cost of capital by reducing the tax on net revenues, and in the case of the EBIDTA-related earnings-stripping rule, tax depreciation allowances.

APPENDIX B: ALL-IN METRS

Table A.1: Marginal effective tax rates by country for manufacturing and services for 2010, 2015, 2016 and 2017

	Overall	Manufacturing	Service	Difference	Overall	Manufacturing	Service	Difference	Overall	Manufacturing	Service	Difference	Overall	Manufacturing	Service	Difference	Ranking Competitiveness Overall METR	
	2017				2016				2015				2010				2017	2010
Australia	28.7	29.9	28.6	1.3	28.7	29.9	28.6	1.3	28.7	29.9	28.6	1.3	28.7	29.9	28.6	1.3	75	77
Austria	26.0	25.7	26.1	0.4	26.0	25.7	26.1	0.4	26.0	25.7	26.1	0.4	26.0	25.7	26.0	0.3	70	70
Belgium	29.1	28.1	29.3	1.2	25.0	24.0	25.2	1.2	16.5	15.8	16.7	0.9	13.4	12.8	13.5	0.7	76	24
Canada	20.9	16.2	22.5	6.3	20.9	15.7	22.7	7.0	21.1	15.7	22.9	7.2	20.8	15.0	24.1	9.1	51	55
Chile	8.2	9.0	8.0	1.0	7.8	8.5	7.6	0.9	7.1	7.8	6.9	0.9	5.2	5.7	5.1	0.6	9	3
Czech Republic	15.0	14.9	15.1	0.2	15.0	14.9	15.1	0.2	15.0	14.9	15.1	0.2	14.3	14.2	14.3	0.1	28	28
Denmark	15.7	17.1	15.5	1.6	15.7	17.1	15.5	1.6	16.8	18.3	16.6	1.7	18.0	19.5	17.7	1.8	31	40
Estonia	9.5	9.5	9.5	0.0	9.5	9.5	9.5	0.0	9.5	9.5	9.5	0.0	10.1	10.1	10.1	0.0	11	15
Finland	11.2	16.9	9.5	7.4	11.2	16.9	9.5	7.4	15.7	16.9	15.3	1.6	19.6	21.0	19.2	1.8	17	50
France	38.5	39.8	38.3	1.5	38.5	39.8	38.3	1.5	38.5	39.8	38.3	1.5	36.2	37.4	36.0	1.4	87	85
Germany	26.7	28.5	26.2	2.3	26.7	28.5	26.2	2.3	26.7	28.5	26.2	2.3	27.2	29.0	26.6	2.4	71	73
Greece	11.9	10.4	12.0	1.6	11.9	10.4	12.0	1.6	11.9	10.4	12.0	1.6	9.5	8.3	9.6	1.3	20	12
Hungary	15.0	15.7	14.8	0.9	15.0	15.7	14.8	0.9	15.0	15.7	14.8	0.9	14.3	14.9	14.1	0.8	29	27
Iceland	13.3	9.2	14.0	4.8	13.3	9.2	14.0	4.8	13.3	9.2	14.0	4.8	11.1	7.4	11.7	4.3	22	16
Ireland	13.0	12.2	13.3	1.1	13.0	12.2	13.3	1.1	13.0	12.2	13.3	1.1	16.0	15.1	16.3	1.2	21	33
Israel	20.4	18.7	20.7	2.0	21.0	19.2	21.3	2.1	21.9	20.0	22.2	2.2	17.7	15.9	18.0	2.1	49	38
Italy	6.0	6.3	6.0	0.3	6.0	6.3	6.0	0.3	6.0	6.3	6.0	0.3	26.7	24.7	27.1	2.4	5	71
Japan	40.9	40.3	41.1	0.8	40.9	40.3	41.1	0.8	42.2	41.6	42.3	0.7	46.0	45.6	46.1	0.5	89	91
Korea S.	30.0	31.7	29.2	2.5	30.0	31.7	29.2	2.5	30.0	31.7	29.2	2.5	30.0	31.7	29.2	2.5	77	79
Luxembourg	15.4	18.0	15.3	2.7	17.4	18.0	17.4	0.6	17.9	18.5	17.9	0.6	17.0	17.5	17.0	0.5	30	36
Mexico	19.7	21.0	19.4	1.6	19.7	21.0	19.4	1.6	19.7	21.0	19.4	1.6	19.8	21.1	19.4	1.7	47	51
Netherlands	21.1	19.9	21.3	1.4	21.1	19.9	21.3	1.4	21.1	19.9	21.3	1.4	21.5	20.2	21.7	1.5	53	56
New Zealand	20.5	20.9	20.4	0.5	20.5	20.9	20.4	0.5	20.5	20.9	20.4	0.5	17.7	15.5	18.0	2.5	50	37
Norway	21.9	20.5	22.1	1.6	22.8	21.3	23.0	1.7	24.5	23.0	24.7	1.7	23.8	22.4	24.0	1.6	56	61
Poland	11.6	10.4	12.0	1.6	11.6	10.4	12.0	1.6	11.6	10.4	12.0	1.6	11.6	10.4	12.0	1.6	19	18
Portugal	25.5	23.1	25.9	2.8	25.5	23.1	25.9	2.8	25.5	23.1	25.9	2.8	25.2	22.8	25.6	2.8	68	67
Slovak Republic	13.9	18.3	11.9	6.4	13.9	18.3	11.9	6.4	15.5	19.1	13.9	5.2	13.4	16.6	11.9	4.7	24	23
Slovenia	6.3	5.9	6.4	0.5	5.5	5.1	5.6	0.5	5.5	5.1	5.6	0.5	6.7	6.3	6.9	0.6	6	6
Spain	20.0	18.8	20.2	1.4	20.0	18.8	20.2	1.4	22.5	21.2	22.7	1.5	24.3	23.0	24.6	1.6	48	62
Sweden	17.9	16.4	18.2	1.8	17.9	16.4	18.2	1.8	17.9	16.4	18.2	1.8	20.1	18.5	20.5	2.0	38	53
Switzerland	10.0	9.2	10.3	1.1	10.0	9.2	10.3	1.1	10.0	9.2	10.3	1.1	15.4	14.5	15.7	1.2	14	30
Turkey	7.4	6.6	7.6	1.0	7.4	6.6	7.6	1.0	7.3	6.4	7.6	1.2	7.3	6.4	7.5	1.1	7	7
United Kingdom	24.0	23.0	24.1	1.1	25.0	24.0	25.1	1.1	25.0	24.0	25.1	1.1	30.2	27.9	30.4	2.5	65	80
United States	34.6	32.1	36.0	3.9	34.6	39.9	43.8	3.9	34.6	32.1	36.0	3.9	34.6	32.1	36.0	3.9	83	84
Brazil	42.6	20.1	47.3	27.2	42.6	20.1	47.3	27.2	42.6	20.1	47.3	27.2	43.7	22.2	48.2	26.0	90	90
China	23.2	26.0	21.2	4.8	23.2	26.0	21.2	4.8	25.4	27.9	23.5	4.4	25.4	27.9	23.5	4.4	61	66
India	52.1	44.6	54.4	9.8	60.2	44.6	65.0	20.4	60.5	44.6	65.5	20.9	61.7	51.0	65.1	14.1	92	92
Russia	27.9	31.2	27.0	4.2	27.9	31.2	27.0	4.2	27.9	31.2	27.0	4.2	27.8	31.1	27.0	4.1	73	75
Argentina	38.9	44.8	37.0	7.8	38.9	44.8	37.0	7.8	30.7	37.7	28.4	9.3	29.9	34.6	28.4	6.2	88	78
Bolivia	25.2	32.0	23.7	8.3	25.2	32.0	23.7	8.3	24.6	31.5	22.9	8.6	24.6	31.4	23.0	8.4	67	63
Botswana	18.2	18.1	18.2	0.1	18.2	18.1	18.2	0.1	27.5	24.1	27.8	3.7	19.1	13.5	19.7	6.2	39	46
Bulgaria	8.3	7.9	8.3	0.4	8.3	7.9	8.3	0.4	8.3	7.9	8.3	0.4	6.3	6.3	6.2	0.1	10	5
Chad	34.0	37.8	33.3	4.5	34.0	37.8	33.3	4.5	36.3	39.9	35.7	4.2	42.8	46.0	42.2	3.8	81	89
Colombia	23.7	27.4	23.0	4.4	23.7	27.4	23.0	4.4	20.0	23.3	19.4	3.9	13.0	15.9	12.4	3.5	64	22
Costa Rica	25.7	31.0	24.7	6.3	25.7	31.0	24.7	6.3	25.7	31.0	24.7	6.3	25.7	31.0	24.7	6.3	69	69
Croatia	17.0	19.6	16.5	3.1	17.0	19.6	16.5	3.1	17.0	19.6	16.5	3.1	12.9	14.9	12.6	2.3	36	21
Dominican Republic	30.7	33.3	30.1	3.2	30.7	33.3	30.1	3.2	30.7	33.3	30.1	3.2	30.9	31.7	30.7	1.0	79	81
Ecuador	35.1	36.5	34.8	1.7	35.1	36.5	34.8	1.7	35.1	36.5	34.8	1.7	40.2	41.7	39.9	1.8	86	87
Egypt	35.0	39.5	33.7	5.8	35.0	39.5	33.7	5.8	35.0	39.5	33.7	5.8	34.4	38.5	33.2	5.3	85	83
Ethiopia	16.2	29.1	15.0	14.1	16.2	29.1	15.0	14.1	16.2	29.1	15.0	14.1	18.0	30.2	16.8	13.4	32	39
Fiji	13.5	16.5	12.9	3.6	13.5	16.5	12.9	3.6	12.7	16.5	12.0	4.5	18.5	22.5	17.9	4.6	23	43
Georgia	23.2	24.1	23.1	1.0	23.2	24.1	23.1	1.0	23.2	24.1	23.1	1.0	19.1	20.8	18.8	2.0	60	47
Ghana	10.0	15.1	9.3	5.8	10.0	15.1	9.3	5.8	10.0	15.1	9.3	5.8	9.6	14.7	8.9	5.8	13	13
Guyana	34.3	28.1	35.0	6.9	34.3	28.1	35.0	6.9	34.3	28.1	35.0	6.9	34.3	28.1	35.0	6.9	82	82
Hong Kong	5.5	2.5	5.6	3.1	5.5	2.5	5.6	3.1	5.5	2.5	5.6	3.1	4.9	1.9	4.9	3.0	4	2
Indonesia	23.1	26.2	22.0	4.2	23.1	26.2	22.0	4.2	23.1	26.2	22.0	4.2	23.0	26.1	21.8	4.3	59	59
Iran	16.6	29.4	13.7	15.7	16.6	29.4	13.7	15.7	16.6	29.4	13.7	15.7	16.3	28.9	13.4	15.5	35	35
Jamaica	34.7	37.7	34.4	3.3	34.7	37.7	34.4	3.3	34.7	37.7	34.4	3.3	27.5	19.5	28.1	8.6	84	74
Jordan	17.0	15.8	17.3	1.5	17.0	15.8	17.3	1.5	17.0	15.8	17.3	1.5	12.8	14.1	12.5	1.6	37	20
Kazakhstan	27.4	29.7	27.0	2.7	27.4	29.7	27.0	2.7	26.2	20.8	27.0	6.2	21.7	25.3	21.1	4.2	72	57
Kenya	19.0	-3.1	23.4	26.5	19.0	-3.1	23.4	26.5	19.0	-3.1	23.4	26.5	19.0	-2.8	23.4	26.2	44	44

	Overall	Manufacturing	Service	Difference	Overall	Manufacturing	Service	Difference	Overall	Manufacturing	Service	Difference	Overall	Manufacturing	Service	Difference	Ranking Competitiveness Overall METR	
	2017				2016				2015				2010				2017	2010
Kuwait	9.7	10.5	9.6	0.9	9.7	10.5	9.6	0.9	9.7	10.5	9.6	0.9	9.8	10.5	9.7	0.8	12	14
Latvia	19.1	17.5	19.3	1.8	19.1	17.5	19.3	1.8	19.1	17.5	19.3	1.8	8.0	8.7	7.9	0.8	45	9
Lesotho	24.6	12.3	27.0	14.7	24.6	12.3	27.0	14.7	24.6	12.3	27.0	14.7	24.6	12.3	27.0	14.7	66	64
Madagascar	16.6	20.1	15.8	4.3	16.6	20.1	15.8	4.3	16.6	20.1	15.8	4.3	19.4	23.2	18.5	4.7	34	49
Malaysia	22.4	24.1	21.6	2.5	22.4	24.1	21.6	2.5	23.1	24.8	22.3	2.5	23.1	24.8	22.3	2.5	57	60
Morocco	16.4	20.2	15.4	4.8	16.4	20.2	15.4	4.8	16.7	20.5	15.7	4.8	16.0	19.7	15.0	4.7	33	34
Nigeria	14.1	20.7	13.3	7.4	14.1	20.7	13.3	7.4	14.1	20.7	13.3	7.4	13.8	20.3	12.9	7.4	25	26
Pakistan	33.2	32.3	33.4	1.1	33.6	32.6	33.8	1.2	34.0	33.0	34.3	1.3	41.6	43.8	41.1	2.7	80	88
Panama	18.6	19.4	18.5	0.9	18.6	19.4	18.5	0.9	18.6	19.4	18.5	0.9	20.6	21.4	20.5	0.9	42	54
Paraguay	7.8	10.3	7.3	3.0	7.8	10.3	7.3	3.0	7.8	10.3	7.3	3.0	8.7	10.3	8.4	1.9	8	11
Peru	23.0	24.0	22.7	1.3	23.0	24.0	22.7	1.3	23.6	24.0	23.5	0.5	24.8	31.6	23.2	8.4	58	65
Philippines	28.0	28.9	27.7	1.2	28.0	28.9	27.7	1.2	28.0	28.9	27.7	1.2	28.0	28.9	27.7	1.2	74	76
Qatar	5.4	7.8	5.0	2.8	5.4	7.8	5.0	2.8	5.4	7.8	5.0	2.8	5.4	7.8	5.0	2.8	3	4
Romania	4.2	5.2	3.9	1.3	4.2	5.2	3.9	1.3	4.2	5.2	3.9	1.3	4.2	5.3	3.9	1.4	2	1
Rwanda	18.3	25.3	17.6	7.7	18.3	25.3	17.6	7.7	18.3	25.3	17.6	7.7	18.3	25.4	17.7	7.7	40	42
Saudi Arabia	18.6	17.4	18.9	1.5	18.6	17.4	18.9	1.5	18.6	17.4	18.9	1.5	19.9	17.4	20.4	3.0	43	52
Serbia	10.9	12.1	10.6	1.5	10.9	12.1	10.6	1.5	10.9	12.1	10.6	1.5	8.0	8.9	7.8	1.1	16	10
Sierra Leone	18.5	13.1	18.8	5.7	18.5	13.1	18.8	5.7	18.5	13.1	18.8	5.7	22.9	17.1	23.3	6.2	41	58
Singapore	11.5	9.2	12.4	3.2	11.5	9.2	12.4	3.2	11.5	9.1	12.3	3.2	11.5	9.2	12.3	3.1	18	17
South Africa	14.3	15.6	14.0	1.6	14.3	15.6	14.0	1.6	14.3	15.6	14.0	1.6	14.3	15.6	14.1	1.5	26	29
Tanzania	21.4	17.0	22.0	5.0	21.4	17.0	22.0	5.0	21.4	17.0	22.0	5.0	19.1	14.4	19.7	5.3	55	45
Thailand	30.4	32.1	29.5	2.6	30.4	32.1	29.5	2.6	30.4	32.1	29.5	2.6	15.6	19.2	13.8	5.4	78	32
Trinidad and Tobago	21.0	15.0	24.0	9.0	21.0	15.0	24.0	9.0	20.2	14.1	23.3	9.2	19.2	13.0	22.3	9.3	52	48
Tunisia	19.6	21.0	19.4	1.6	19.6	21.0	19.4	1.6	19.6	21.0	19.4	1.6	25.1	27.6	24.6	3.0	46	66
Uganda	21.1	26.7	20.4	6.3	21.1	26.7	20.4	6.3	21.1	26.7	20.4	6.3	15.6	10.9	16.2	5.3	54	31
Ukraine	3.8	9.6	2.2	7.4	3.8	9.6	2.2	7.4	3.8	9.6	2.2	7.4	7.5	15.3	5.3	10.0	1	8
Uruguay	23.6	21.9	24.0	2.1	23.6	21.9	24.0	2.1	23.6	21.9	24.0	2.1	26.7	28.6	26.4	2.2	63	72
Uzbekistan	49.4	50.2	49.2	1.0	49.4	50.2	49.2	1.0	49.4	50.2	49.2	1.0	38.2	40.7	37.6	3.1	91	86
Venezuela	23.4	19.6	24.4	4.8	23.4	19.6	24.4	4.8	19.9	19.6	20.0	0.4	18.2	18.4	18.2	0.2	62	41
Vietnam	10.5	16.0	8.8	7.2	11.7	17.7	9.9	7.8	11.7	17.7	9.9	7.8	13.8	20.4	11.7	8.7	15	25
Zambia	14.5	19.1	13.9	5.2	14.5	19.1	13.9	5.2	20.2	24.5	19.7	4.8	12.2	16.9	11.6	5.3	27	19
G7*	27.4				27.5				27.7				31.7					
G7 w	32.2				32.3				32.5				34.6					
BRIC*	36.5				38.5				39.1				39.6					
BRIC w	30.7				32.0				33.4				33.7					
G20*	27.3				27.8				27.5				29.1					
G20 w	30.9				31.2				31.6				33.1					
OECD*	19.1				19.1				19.2				20.0					
OECD w	29.2				29.3				29.5				31.1					
Africa *	18.7				18.7				19.8				19.6					
Africa w	15.2				15.2				15.5				15.4					
Americas*	25.9				25.9				25.0				24.6					
Americas w	32.9				32.9				32.8				24.6					
Asia Oceana*	26.5				27.1				27.2				26.4					
Asia Oceana w	37.6				39.6				40.0				40.9					
Europe *	16.4				16.4				16.5				24.6					
Europe w	22.5				22.5				22.6				24.6					
MENA*	17.0				17.0				17.2				24.6					
MENA w	14.6				14.7				14.7				24.6					
92 Country*	20.7				20.8				20.9				20.6					
92 Country W	28.7				28.9				29.2				30.4					

* Simple average w Weighted average

APPENDIX C: DATA PARAMETERS

	Effective CIT Rate		Inflation	Tax Depreciation Range	Inventory Accounting	Asset	Capital Input Sale	Capital Transfer	Financial Transfer
	2017	2010	2017	2017		Model Parameters - Average Tax Rates			
Australia	30.0	30.0	2.3%	2.6% - 22.1%	Optional			5.6%	
Austria	25.0	25.0	2.1%	3.1% - 10.6%	Optional			4.6%	
Belgium	34.0	34.0	1.7%	7.0% - 32.9%	LIFO				
Canada	26.6	29.4	2.0%	4.0% - 55.0%	FIFO		1.5%		
Chile	25.0	17.0	3.4%	7.5% - 39.7%	LIFO				▶
Czech Republic	19.0	19.0	1.5%	3.1% - 20.8%	Optional			4.0%	
Denmark	22.0	25.0	1.4%	5.1% - 22.7%	FIFO			0.6%	
Estonia	16.0	21.0	2.2%	9.9% - 21.6%	LIFO				
Finland	20.0	26.0	1.7%	8.2% - 28.7%	FIFO			4.0%	▶
France	38.0	34.4	1.1%	3.1% - 26.5%	Optional			5.1%	▶
Germany	29.7	30.2	1.3%	3.1% - 14.4%	LIFO			5.1%	
Greece	29.0	24.0	0.2%	5.3% - 39.2%	LIFO				▶
Hungary	19.0	19.0	2.2%	3.3% - 48.1%	Optional				
Iceland	20.0	18.0	3.3%	3.3% - 30.5%	FIFO			1.6%	
Ireland	12.5	12.5	0.9%	2.0% - 12.4%	FIFO			2.0%	▶
Israel	24.0	25.0	1.3%	4.2% - 29.8%	Optional			10.0%	
Italy	28.5	31.3	1.5%	5.1% - 15.3%	LIFO				▶
Japan	30.9	39.5	0.7%	2.0% - 21.3%	Optional	1.6%			
Korea S.	24.2	24.2	1.9%	2.6% - 20.1%	LIFO			3.5%	▶
Luxembourg	26.2	28.6	1.8%	4.1% - 21.0%	Optional			7.0%	
Mexico	30.0	30.0	3.6%	5.1% - 15.4%	LIFO			3.5%	
Netherlands	25.0	25.5	1.8%	2.9% - 20.9%	Optional			6.0%	
New Zealand	28.0	30.0	1.5%	6.5% - 22.1%	Optional				
Norway	24.0	28.0	1.7%	3.6% - 24.5%	FIFO			2.5%	
Poland	19.0	19.0	1.6%	2.6% - 25.8%	LIFO				▶
Portugal	29.5	29.0	1.4%	2.2% - 19.8%	Optional			7.3%	▶
Slovak Republic	21.6	21.0	1.7%	5.0% - 17.3%	Optional				
Slovenia	19.0	20.0	1.2%	3.5% - 21.6%	Optional				
Spain	25.0	30.0	1.3%	2.1% - 29.2%	Optional			1.1%	
Sweden	22.0	26.3	0.7%	3.2% - 19.5%	FIFO			4.3%	
Switzerland	17.9	21.2	-0.4%	5.7% - 31.9%	LIFO				▶
Turkey	20.0	20.0	7.9%	12.5% - 48.8%	Optional				▶
United Kingdom	19.0	28.0	2.3%	1.4% - 17.7%	FIFO			4.0%	▶
United States	39.1	39.2	2.0%	4.0% - 55.0%	Optional				
Brazil	34.0	34.0	6.7%	4.1% - 11.7%	Optional		12.5%	4.0%	▶
China	25.0	25.0	2.8%	7.0% - 14.6%	Optional		1.0%	4.0%	
India	34.6	33.2	8.3%	5.1% - 35.0%	Optional	0.6%		6.0%	▶
Russia	20.0	20.0	8.7%	3.1% - 20.8%	Optional	1.3%			
Argentina	35.0	35.0	17.2%	4.1% - 11.7%	LIFO	0.3%			▶
Bolivia	25.0	25.0	6.0%	2.6% - 16.9%	FIFO			3.0%	▶
Botswana	22.0	24.1	5.9%	2.5% - 24.5%	Optional			5.0%	
Bulgaria	10.0	10.0	1.3%	4.0% - 30.2%	Optional	0.2%		1.6%	
Chad	40.0	40.0	2.4%	5.1% - 16.2%	Optional			10.0%	▶
Colombia	40.0	33.0	3.3%	5.0% - 19.4%	LIFO	0.7%			▶
Costa Rica	30.0	30.0	4.0%	2.1% - 14.0%	LIFO			1.5%	
Croatia	30.0	22.0	1.4%	5.0% - 29.8%	Optional			5.0%	
Dominican Republic	27.0	25.0	4.2%	6.8% - 17.7%	LIFO	0.5%		3.0%	
Ecuador	12.0	15.0	4.0%	5.0% - 15.0%	LIFO	0.1%		4.0%	
Egypt	17.4	20.0	9.4%	5.1% - 26.8%	Optional		10.0%		▶
Ethiopia	30.0	30.0	16.3%	5.0% - 21.0%	Optional				▶
Fiji	20.0	28.0	3.1%	5.0% - 17.8%	FIFO				▶
Georgia	15.0	15.0	2.8%	7.0% - 21.8%	Optional	1.0%			
Ghana	25.0	25.0	12.4%	10.0% - 29.6%	Optional			0.6%	▶
Guyana	39.0	39.0	2.0%	2.8% - 35.1%	Optional	0.5%			
Hong Kong	16.5	16.5	4.2%	3.6% - 92.9%	Optional			5.0%	
Indonesia	25.0	25.0	5.8%	5.1% - 14.0%	Optional			5.3%	
Iran	25.0	25.0	23.6%	5.0% - 10.4%	Optional			10.0%	▶
Jamaica	27.9	33.3	7.1%	3.8% - 12.8%	Optional	2.0%		9.0%	▶

	Effective CIT Rate		Inflation	Tax Depreciation Range	Inventory Acounting	Asset	capital input Sale	Capital Transfer	Financal Tansfer
	2017	2010	2017	2017		Model Parameters - Average Tax Rates			
Jamaica	27.9	33.3	7.1%	3.8% - 12.8%	Optional	2.0%		9.0%	⚑
Jordan	19.1	14.9	3.3%	4.0% - 23.9%	Optional			9.0%	
Kazakhstan	32.0	32.0	5.2%	10.0% - 26.0%	Optional	1.5%			
Kenya	30.0	30.0	8.5%	2.5% - 28.5%	Optional			4.8%	⚑
Kuwait	17.0	15.0	3.4%	4.2% - 20.4%	Optional				
Latvia	15.0	15.0	1.5%	10.0% - 40.8%	Optional	1.5%		2.0%	
Lesotho	22.5	22.5	4.9%	5.0% - 20.0%	FIFO				
Madagascar	20.0	23.0	7.0%	5.0% - 16.5%	Optional			5.0%	
Malaysia	24.0	25.0	2.4%	2.8% - 16.7%	FIFO			2.0%	⚑
Morocco	31.0	30.0	1.2%	7.6% - 33.1%	Optional			3.5%	⚑
Nigeria	32.0	32.0	9.7%	10.0% - 24.8%	FIFO				⚑
Pakistan	31.0	35.0	7.8%	10.0% - 25.2%	Optional	1.5%		2.5%	
Panama	25.0	27.5	3.7%	6.5% - 22.1%	LIFO			2.0%	
Paraguay	10.0	10.0	4.6%	3.3% - 15.9%	Optional				
Peru	27.2	30.0	3.3%	4.6% - 20.0%	Optional			3.0%	
Philippines	30.0	30.0	3.3%	6.5% - 22.1%	Optional				⚑
Qatar	10.0	10.0	2.4%	5.0% - 19.4%	Optional				
Romania	16.0	16.0	2.7%	3.4% - 24.7%	LIFO				
Rwanda	30.0	30.0	4.8%	4.1% - 19.7%	Optional				
Saudi Arabia	20.0	20.0	3.4%	5.0% - 24.3%	Optional				
Serbia	15.0	10.0	5.9%	2.5% - 14.8%	Optional			2.5%	
Sierra Leone	30.0	35.0	10.9%	11.0% - 37.1%	Optional				
Singapore	17.0	17.0	2.5%	3.1% - 24.6%	FIFO			3.0%	⚑
South Africa	28.0	28.0	5.4%	5.0% - 25.0%	Optional				⚑
Tanzania	30.0	30.0	9.7%	5.0% - 25.3%	Optional				⚑
Thailand	20.0	30.0	2.0%	5.0% - 21.0%	Optional				⚑
Trinidad and Tobago	25.0	25.0	6.0%	10.0% - 24.9%	Optional			7.0%	⚑
Tunisia	26.2	30.0	4.9%	5.0% - 20.3%	Optional			5.0%	
Uganda	30.0	30.0	9.5%	5.0% - 29.7%	Optional			1.0%	⚑
Ukraine	18.0	25.0	13.8%	8.0% - 37.2%	Optional			1.0%	
Uruguay	25.0	25.0	8.5%	2.8% - 10.0%	LIFO	0.3%		4.0%	
Uzbekistan	14.9	16.3	3.7%	5.0% - 18.7%	Optional	4.0%			
Venezuela	34.5	34.0	54.3%	6.5% - 22.1%	LIFO				⚑
Vietnam	20.0	25.0	7.8%	3.4% - 25.1%	Optional			0.5%	
Zambia	35.0	35.0	7.6%	5.1% - 47.3%	Optional			5.0%	⚑
G7*	30.2	33.1							
G7 w	33.9	36.2							
BRIC*	28.4	28.1							
BRIC w	27.1	26.9							
G20*	28.3	29.3							
G20 w	31.9	33.5							
OECD*	24.7	25.9							
OECD w	31.7	33.7							
Africa *	28.7	29.6							
Africa w	29.5	29.8							
Americas*	28.3	28.2							
Americas w	37.2	37.3							
Asia Oceana*	24.9	27.2							
Asia Oceana w	29.1	31.5							
Europe *	22.1	23.0							
Europe w	26.1	28.2							
MENA*	19.8	19.5							
MENA w	20.8	20.9							
92 Country*	24.7	25.6							
92 Country W	30.4	32.0							

*Simple average
w Weighted average