AEI ECONOMIC PERSPECTIVES

Effective Tax Rates on Business Investment Under the Tax Cuts and Jobs Act

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May 2018

An important objective of Public Law 115-97, commonly called the Tax Cuts and Jobs Act, was a reduction in the tax burden on investment. We compute marginal effective tax rates under 2017 law and under the Tax Cuts and Jobs Act and find significantly lower marginal effective tax rates under the new law. In addition, the Tax Cuts and Jobs Act narrows disparities in the tax treatment of investment across asset types, organizational form, and type of financing. Finally, we find that the act sharply reduced effective average tax rates as well as marginal effective tax rates.

Given its large consequences on the US economy, Public Law 115-97, known as the Tax Cuts and Jobs Act (TCJA), was passed with relatively little discussion of its effects. Indeed, the hasty legislative process resulted in drafting mistakes in the bill's language. The bill's various provisions will have disparate effects on the tax system. For example, the increased standard deduction is a push toward simplification and will likely reduce compliance costs, but the deduction for qualified business income from pass-through businesses will lead to more complexity and higher compliance costs.[1]

Despite this, the Tax Cuts and Jobs Act is coherent in at least one important respect. From the pass-through business provisions to the lower corporate income tax rate, the TCJA makes significant changes to tax law to stimulate investment activity.[2]

In this article, we use B-Tax, an open-source model, to measure the changes in investment incentives brought about by the TCJA. We find sharp decreases in marginal effective tax rates (METRs) on new investment and in effective average tax rates (EATRs). In addition, the TCJA narrows disparities in the tax treatment of

[1] See Kamin et al. (2017) for an overview of the potential margins through which the legislation may be abused and DeBacker et al. (2018) for an example of the effects of a similar policy in Kansas.

[2] A notable exception are changes related to cost accounting rules for research and experimentation (R&E) expenses. The TCJA generally slows down the cost recovery associated with R&E, eliminating rules that allow for immediate expensing of such costs after 2021. Another exception arises from new restrictions on deductions of net operating losses, which raise the effective tax rate on risky investments.

investment across asset types, organizational form, and type of financing.

We proceed as follows: Section I describes our marginal effective tax rate measure. Section II outlines the major provision of the TCJA, and Section III outlines the model we use to measure the effects of these provisions and the assumptions we must make in doing so. Section IV presents the changes in METRs that result from the TCJA, and Section V relates the changes in EATRs. Section VI concludes.

I. Measuring the Impact of the Tax System on Investment Incentives

METRs summarize the effects of the tax system on investment incentives. The METR on a new investment is defined as the difference between the before-tax rate of return and the after-tax rate of return, divided by the before-tax rate of return. For marginal investments (investments that just break even), the before-tax rate of return is equal to the cost of capital. The Hall and Jorgenson (1967) formulation for the cost of capital is:

$$\rho = \frac{r+\delta-\pi}{1-u}\,(1-uz)-\delta,$$

where ρ is the cost of cost of capital, r the discount rate, δ the rate of economic depreciation, π the rate of inflation, u the statutory corporate income tax rate, and z the net present value of depreciation deductions per dollar of investment. For pass-through businesses, u is the individual tax rate on pass-through business income.

METR is then defined as:

$$METR = \frac{\rho-s}{\rho},$$

where s is the after-tax rate of return required by savers. This after-tax rate of return is net of individual taxes on interest, capital gains, and dividends. Barro and Furman (2018) provide an analysis of the change in the user cost of capital due to the TCJA and its implications for production and the capital-labor ratio. The user-cost approach is useful, but the METR measure used here more fully captures the effects of taxes on investment incentives because it includes all layers of taxation, including those levied on the savers who supply the funds for investments, such as capital gains and dividends taxes.

In what follows, we use METRs to evaluate the investment incentives provided by the tax system as a whole, taking into account the corporate income tax, the tax treatment of depreciable property, and individual income taxes. We use these METRs to show the effects on investment incentives provided by the TCJA.

II. The Tax Cuts and Jobs Act

Among the provisions that are relevant to effective tax rates on investment, the Tax Cuts and Jobs Act:

- Reduces the marginal income tax rate schedule, which directly reduces the tax rates on interest income for most filers through 2025. Although the 20 percent top tax rate on qualified dividends and long-term capital gains was not changed, the lower marginal tax rates indirectly lower capital gains and dividend tax rates for some taxpayers who are not subject to the 20 percent top rate.
- Permanently cuts the top corporate income tax rate from 35 percent to 21 percent.
- Allows 100 percent expensing on new investments in assets with less than 20-year depreciable life through 2022 (reduced by 20 percentage points per year starting in 2023).
- Limits interest deduction to 30 percent of "adjusted taxable income."
- Defines adjusted taxable income for 2018 through 2021 as the taxable income of the taxpayer before depreciation, amortization, and depletion. After 2021, the limit is tighter because it is based on taxable income net of depreciation, amortization, and depletion.
- Repeals the corporate alternative minimum tax.
- Provides a 20 percent deduction for pass-through entity income, with limitations for high-income filers, through 2025.

In the computation of METRs, the TCJA's lower corporate income tax rate and a higher net present value of depreciation deductions lower

the cost of capital and therefore METRs. The limitation on the interest deduction, for businesses on which this provision is binding, would increase the cost of capital and the METR. The provision of the TCJA providing a deduction to individuals receiving pass-through business income will lower the cost of capital and the METR for pass-through business entities. The lower individual income tax rates from the TCJA will affect the tax rates on dividends, long-term capital gains, and interest income, increasing the after-tax rate of return and thereby lowering METRs.

III. B-Tax

To compute METRs across industries, assets, and tax treatment, we need to know economic and tax depreciation rates by type of asset and the proportions of different types of assets held by businesses in each industry and tax treatment (corporate versus noncorporate). To make these calculations, we use an open-source model called B-Tax.[3] B-Tax follows a methodology similar to that outlined in Ozanne and Burnham (2006) for computing METRs.

The underlying data for these calculations come primarily from the US Bureau of Economic Analysis (BEA) and the IRS Statistics of Income (SOI). For example, rates of economic depreciation come from BEA estimates, and the share of new investment in each type of asset is assumed to be done in proportion to the stock of those assets held in each industry according to the BEA's detailed fixed asset tables. SOI data inform the breakdown of asset ownership across business entity type.

For each asset and each type of business entity tax treatment, B-Tax computes the net present value of depreciation deductions per dollar of investment, z, and the cost of capital, ρ, given the entity level tax rate. In these computations we assume a nominal interest rate on business debt of 6.8 percent, an inflation rate of 2 percent, and a real return on corporate equity of 5.8 percent. We assume that the business and individual tax changes leave these rates unaffected. Individual tax reductions therefore increase savers' after-tax returns while business tax reductions lower the cost of capital. Both types of tax reductions lower the effective marginal tax rate, which is the gap between the cost of capital and savers' after-tax returns, expressed as a fraction of the cost of capital.[4]

To compute the required after-tax rate of return of savings, we need to know individual income tax rates on the representative investor. B-Tax assumes that the representative investor can be represented by a weighted average of all tax filers, where each filer is weighted by income. Weighted averages of marginal tax rates are computed by using Tax-Calculator, an open-source microsimulation model of the internal revenue code, and the 2011 IRS Public Use File.[5] Tax-Calculator computes marginal tax rates on each source of income, and B-Tax then computes weighted average marginal tax rates on interest income, long-term and short-term capital gains income, dividends, and pass-through business income under tax policy specified by the user.

Table 1 summarizes changes in these weighted average marginal tax rates from Tax-Calculator. The TCJA lowered taxes across all income sources. The decline in marginal tax rates is especially large for income from pass-through businesses.

IV. Changes in METRs Under the Tax Cuts and Jobs Act

The lower individual income tax rates on investment income shown in Table 1 will increase the after-tax rate of return on savings and lower the METRs. The lower corporate income tax rate, lower marginal

[3] B-Tax can be installed by downloading the source code at https://github.com/open-source-economics/B-Tax. The Cost of Capital Calculator, at https://www.ospc.org/ccc/, provides a web application through which users can use some features of the B-Tax model.

[4] Alternative equilibrium assumptions, such as a fixed after-tax rate of return, could be made but would be less plausible on balance. In any event, the pattern of changes in the effective marginal tax rates would be similar under the different possible assumptions.

[5] We use Tax-Calculator release 0.17.0 with the 2011 Public Use File and the 2017_law.json file to specify 2017 law.

Table 1. Marginal Tax Rates by Income Source, Tax Year 2018

	2017 Law	TCJA	Difference
Wages and Salaries	0.24	0.21	–0.03
Interest Income	0.33	0.31	–0.02
Pass-Through Income	0.32	0.22	–0.10
Short-Term Capital Gains	0.36	0.33	–0.02
Long-Term Capital Gains	0.22	0.21	–0.01
Dividends	0.19	0.18	–0.01

tax rates on pass-through income, and the switch from 50 percent bonus depreciation to 100 percent expensing for assets with lives of 20 years or less are also important.

Many of the individual income tax proposals—such as lower rates on ordinary income, the 20 percent deduction for qualified business income, and 100 percent expensing of certain investments—are temporary. In our calculations of the Hall and Jorgenson (1967) cost of capital, we make the assumption that 2018 law is permanent. However, the expiration of those provisions would raise the cost of capital, not only for investments made after those provisions expire but also for investments made previous to the expiration if they continue to provide income after the provisions expire. If firms actually expect the temporary provisions to expire, the assumption that the provisions will be made permanent therefore overstates the change in METRs on long-lived investments made under the TCJA.

We similarly assume that the 50 percent bonus depreciation in place in 2017 would have been made permanent if the TCJA had not been adopted.

As further discussed below, we also assume that the new interest deduction limitation is not binding. We do not model the effects of the Research and Experimentation Credit, which would otherwise reduce effective tax rates on certain qualifying investment expenses. The corporate alternative minimum tax is assumed to not be binding in the prior-law computations.

Table 2 provides estimates of METRs under prior law and under the TCJA for all investments.[6] METRs across all types of investments are computed by finding the cost of capital for each type of asset

Table 2. Marginal Effective Tax Rates on Investment

	2017 Law	TCJA	Difference
All Corporate Investments			
Typically Financed	0.28	0.19	–0.09
Debt Financed	–0.09	0.07	0.16
Equity Financed	0.35	0.22	–0.12
All Noncorporate Investments			
Typically Financed	0.27	0.20	–0.07
Debt Financed	0.19	0.25	0.06
Equity Financed	0.29	0.19	–0.10

[6] We will refer to prior law as "2017 Law." The term is imprecise because the TCJA had some retroactive provisions, such as the extension of 100 percent bonus expensing to investments placed in service on or after September 27, 2017.

Table 3. METRs on Typically Financed Investment by Type of Investment, Tax Year 2018

	2017 Law	TCJA	Difference
All Corporate Investments	**0.28**	**0.19**	**–0.09**
Equipment	0.18	0.08	–0.10
Structures	0.28	0.20	–0.08
Intellectual Property	0.10	0.08	–0.01
Inventories	0.42	0.31	–0.11
Land	0.37	0.27	–0.10
All Noncorporate Investments	**0.27**	**0.20**	**–0.07**
Equipment	0.12	0.01	–0.10
Structures	0.26	0.19	–0.07
Intellectual Property	0.03	0.01	–0.01
Inventories	0.35	0.27	–0.09

and then computing a weighted average cost of capital across all asset types. Weights are given by the ratio of investment in that asset type to all investment. This weighted average cost of capital is then used together with the after-tax rate of return to compute the METR across all investment types. Included in all investment are investments in equipment, structures, intellectual property, inventories, and land. METRs are shown separately according to the method of financing used for the investment. Typically financed investments assume the historical mix of debt and equity, namely 32 percent debt for corporate entities and 29 percent debt for noncorporate entities. The TCJA act lowers METRs on typically financed corporate investments by 9 percentage points, a reduction of almost one-third. The METRs on typically financed investments by noncorporate businesses decline by 7 percentage points under the TCJA.

Because of the decline in the top corporate income tax rate and the marginal tax rate on pass-through income, the value of the interest paid deduction falls, increasing the METR on debt-financed investments for both corporate and noncorporate entities. The METR on debt-financed investment for corporate businesses increases by 16 percentage points. This same METR increases 6 percentage points for noncorporate businesses. Note that, as mentioned above, these METRs do not include the limitation on interest deductibility that may apply to some businesses. If the business paid interest in excess of 30 percent of adjusted taxable income, the excess cannot be deducted. Incorporating that limitation would further increase the METRs on debt-financed investment.

Ideally, a tax system does not favor one type of financing over another. In fact, the bias toward debt financing has been cited as one of the most significant distortions of the corporate income tax system (see De Mooij 2012). In this regard, the TCJA narrows the gap between the METRs on debt-financed and equity-financed investment for corporate entities from 44 percentage points under 2017 law to just 15 percentage points under the TCJA. In addition, the TCJA moves toward a more equal treatment of corporate and noncorporate investments. That gap between the METR on equity-financed investments for corporate businesses and the METR on noncorporate, equity-financed investments shrank from 6 percentage points in 2017 to just 3 percentage points under the TCJA.

In a similar vein, an ideal tax system does not distort the decision of which asset to invest in. In other words, METRs should be similar across different types of assets. Table 3 shows METRs before and after the TCJA by asset type, for equipment, structures, intellectual property, inventories,

Table 4. Effective Average Tax Rates on Investment, Tax Year 2018

	2017 Law	TCJA	Difference
All Corporate Investments			
Typically Financed	0.28	0.16	–0.12
Debt Financed	0.22	0.12	–0.10
Equity Financed	0.31	0.18	–0.13
All Noncorporate Investments			
Typically Financed	0.30	0.21	–0.09
Debt Financed	0.30	0.22	–0.07
Equity Financed	0.31	0.21	–0.10

and land. Among corporate investments, intellectual property has the lowest METR under both sets of policies, and inventories have the highest.[7] The range between these under 2017 law was 32 percentage points, but under the TCJA it is 23 percentage points. This shows that the treatment across asset types has generally become more uniform under the TCJA. However, the gaps between some asset types have increased. For example, consider the difference in METRs on corporate investment in equipment and structures. This gap is 10 percentage points in 2017, but 12 percentage points in 2018. The increase is driven by the switch to full expensing that applies to most equipment under the TCJA, but does not apply to most investment in structures. Patterns are similar for noncorporate investments.

V. Changes in EATRs

METRs are useful for considering the effects of taxes on marginal investments. But the METR is not the appropriate measure to consider if one wants to understand the incentives affecting investments that are expected to yield an above-market return. To understand how the tax system affects such investments, one will want to look at average tax rates. The average tax rate is relevant for decisions pertaining to investments in projects with above-market rates or return or for decisions regarding where to locate capital.

One approach to measuring average tax rates is offered by Devereux and Griffith (2003). The EATRs that Devereux and Griffith propose provide a forward-looking measure of the EATR on a new investment that can be computed with much of the same information used to compute the METR. The single additional piece of information that is necessary is the expected rate of return on the new investment, which is no longer constrained to be equal to the cost of capital). In the Devereux and Griffith formulation, the EATR ranges between the METR (when the rate of return equals the cost of capital) and the top statutory marginal tax rate (as the rate of return approaches infinity). Specifically:

$$EATR = \frac{p-\rho}{pu} + \frac{\rho}{p} METR,$$

where p is the rate of return on the investment, ρ is the cost of capital, and u the statutory marginal tax rate for the first layer of tax (either the corporate income tax rate or the marginal tax rate on pass-through business income).

B-Tax can be used to compute this EATR measure, and we summarize them under 2017 Law and the TCJA in Table 4. In these calculations, investments are assumed to yield a 20 percent rate of return. Using a weighted average across all types of investments shows a decline in the EATR on corporate investments of 12 percentage points

[7] As noted above, we do not model the effects of the research and experimentation credit, which would further lower the METRs on certain intellectual property qualifies for the credit.

and a decline on all noncorporate investments of 9 percentage points. These are driven by the switch to 100 percent expensing and the lower tax rates on corporate income and pass-through business income. Such a large decline in the EATR suggests that the TCJA will also affect nonmarginal investments, with perhaps more of these investments taking place in the US than would have under prior law.

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Acknowledgments

The authors are grateful to John McClelland and Richard W. Evans for their helpful comments on earlier drafts.

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