

Measuring the Effects of Corporate Tax Cuts

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On December 22, 2017, President Donald Trump signed the Tax Cuts and Jobs Act (TCJA), the most sweeping revision of US tax law since the Tax Reform Act of 1986. The law introduced many significant changes. However, perhaps none was as important as the changes in the treatment of traditional “C” corporations—those corporations subject to a separate corporate income tax. Beginning in 2018, the federal corporate tax rate fell from 35 percent to 21 percent, some investment qualified for immediate deduction as an expense, and multinational corporations faced a substantially modified treatment of their activities.

In the views of its critics, the previous US corporate tax system discouraged companies from being US corporations, discouraged US corporations from repatriating the earnings from their overseas operations, and discouraged both US and foreign companies from operating in the United States—or at least from reporting the profits from their US operations in the United States. Additional to these concerns was a more traditional focus from the standpoint of economic research on the possible effects of the tax system on the composition of investment within the United States and the incentive for borrowing due to its favorable tax treatment.

The debate leading up to the bill’s passage included some heated discussion among economists regarding the benefits of the corporate tax cut and who would receive them. Notably, the White House Council of Economic Advisers (2017) forecast that reducing the corporate tax rate to 20 percent (as the original version of

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the legislation proposed) would lead to a substantial rise in wages. The result would be to “increase average household income in the United States by, very conservatively, \$4,000 annually. ... Moreover, the broad range of results in the literature suggest that over a decade, this effect could be much larger.” Skeptics argued that the implied aggregate increase in income was implausibly large relative to the size of the tax cut. For example, Furman (2017) estimated that an increase in average income of between \$4,000 and \$9,000 (the upper bound for the CEA’s estimated income increase) would be “between 275% and 550% of the total cost of the \$200 billion corporate tax cut—implying a supply-side effect that’s more than a little far-fetched.” As discussed below, most other economic forecasts were for increases in income only a small fraction as large. Yet, in the weeks after the bill’s passage, many leading corporations announced plans to provide \$1,000 bonuses to their employees, commonly citing the tax cut as the reason for their actions (as reported in Shell 2018).

This paper seeks to evaluate these and other claims about the impact of the Tax Cuts and Jobs Act¹ to understand its effects on resource allocation and distribution. It begins by setting the stage with discussions of how corporate tax incidence has been studied in the past, comparisons of US corporate tax rates to other countries before the 2017 tax law, and some ways in which the US corporate sector has evolved that are especially relevant to tax policy—specifically, the decline in the share of business income accounted for by C corporations and the rising share of business income from international operations.

The discussion then turns to an explanation of the main changes of the Tax Cuts and Jobs Act of 2017 for the corporate income tax. A range of estimates suggests that the law is likely to contribute to increased US capital investment and, through that, an increase in US wages. The magnitude of these increases is extremely difficult to predict, because of the many channels through which investment may respond, the mechanisms connecting wage increases to increased investment and profitability, the instability of the law itself (because some of its provisions are explicitly temporary), how the law exacerbates the underlying US fiscal imbalance, and the possible international tax and trade policy reactions. Indeed, the public debate about the benefits of the new corporate tax provisions enacted (and the alternatives not adopted) has highlighted the limitations of standard approaches in distributional analysis to assigning corporate tax burdens. In particular, while such analyses have traditionally been framed in terms of the impact of the tax rate facing corporate fixed investment in a closed economy, such analysis must now be applied to the responses of multinational corporations, with worldwide operations and shareholder bases and a growing dependence on ideas rather than tangible assets. Such

¹Although the law is commonly known as the Tax Cuts and Jobs Act, this name was stricken from the bill shortly before passage, its adoption deemed as not germane, according to Senate rules, to the budget reconciliation process used to pass the bill using a simple majority. The law’s official name is considerably longer and not particularly memorable.

analysis requires a more sophisticated approach and more empirical evidence on the many potential margins of taxpayer response.

Measuring Corporate Tax Incidence: Some Preliminaries

Tax incidence analysis involves estimating the effects of tax policy changes on different groups of individuals via the effects on prices and returns to labor and capital. The starting point for discussions of corporate tax incidence—that is, who bears the corporate tax?—dates back to Harberger’s (1962) classic analysis of a two-sector general equilibrium model, which found that, in a closed economy with fixed factor supplies, the corporate tax fell approximately 100 percent on owners of all capital. The underlying intuition was that the corporate tax causes capital to shift from the corporate sector to the noncorporate sector (consisting of all businesses not subject to the corporate tax), depressing after-tax returns equally in both sectors but, for reasonable parameter assumptions, not shifting any of the tax burden to labor. Put equivalently, rebating all corporate tax revenues to owners of capital would leave them no better off than in the absence of the tax, and wage-earners no worse off.

With some modifications, the influence of Harberger’s (1962) basic approach continues. For example, until relatively recently the distributional analysis of the Congressional Budget Office adopted the Harberger result in assigning 100 percent of the burden of corporate taxes collected to individuals in proportion to their receipt of capital income. Congressional Budget Office (2012) modified this assumption, citing its review of the empirical literature, and now follows the practice of assigning 25 percent of the burden of corporate taxes to individuals in proportion to their receipt of wage and salary income and 75 percent in proportion to their receipt of capital income.

A main source of the assumed shift in some of the burden toward labor is the consideration of international capital flows. Standard incidence analysis indicates that immobile factors such as labor bear some of the capital income taxes imposed within a country as the result of capital flight, with this burden approaching full shifting to labor as a country’s size diminishes (for example, Kotlikoff and Summers 1987). More sophisticated open-economy general equilibrium models indicate a range of possible sharing of the burden of corporate taxes between labor and capital, depending on the degree of international capital mobility and the substitutability of foreign and domestic products, suggesting a share borne by labor of perhaps 40 percent based on calibration assumptions applicable to the United States (Gravelle 2013).

To pin down the effects of corporate tax changes more precisely, one would ideally look directly at empirical evidence on the effects of corporate tax changes on factor incomes in an international context. For an exogenous change in a country’s corporate tax system, one would compare changes in after-tax incomes of different factors (for example, capital and labor) in different locations, or preferably changes

in the purchasing power of such after-tax incomes, to determine the distribution of burdens of the tax change. A handful of studies have tried to approximate this type of experiment to determine the share of the burden falling on labor, using panel data on countries, labor compensation, and tax rates. Unfortunately, the results of such analyses fall within a very wide range, from finding virtually no effect (Clausing 2013) to finding that “a 1% increase in corporate tax rates leads to a 0.5% decrease in wage rates” (Hassett and Mathur 2015). Because corporate profits are small relative to wages in the average economy in their sample, the Hassett–Mathur results imply, for a given level of corporate profits, that the reduction in wages resulting from a corporate tax rate increase would far exceed the revenue raised. That is, the incidence of the corporate tax change on labor, in this framework, would be considerably higher than 100 percent.

This range of findings for national corporate tax changes in a global economy and the small number of recent published studies in this literature hint at the empirical challenges involved. It has proved difficult to identify credible natural experiments for corporate tax reforms or to control for the many developments occurring within countries at the same time as corporate tax changes. A larger recent literature on corporate tax incidence looks within countries, considering differences across industries and across states or regions, for the United States as well as other countries, and using a range of models and assumptions (or examples, see Arulampalam et al. 2012; Liu and Altshuler 2013; Suárez Serrato and Zidar 2016; Fuest, Peichl, and Siegloch 2018). The findings are typically that a large share of the corporate tax falls on labor—quite plausible for changes adopted in a small part of a country in which there is considerable capital mobility, but not directly applicable to the issue in the recent debate of how the Tax Cuts and Jobs Act would affect US wages.

In attempting to translate results from the incidence literature into predictions about the effects of the Tax Cuts and Jobs Act on wages, it is useful to keep several other points in mind. First, while the literature has typically focused on changes in some measure of tax rates, with the overall tax structure fixed, the Tax Cuts and Jobs Act contained important changes in the structure of taxation itself. Standard distributional analysis such as those from the Congressional Budget Office commonly assume the same relative impact on labor and capital of changes in corporate tax revenues regardless of the way in which corporate taxes change, but economic theory and evidence suggests otherwise.

Second, in using incidence assumptions to break down projected changes in tax revenue into the shares borne by different groups, one is effectively equating the burden of tax changes to changes in tax revenue. However, these two measures differ conceptually and in practice because of behavioral responses to taxation. The change in tax revenue is calculated as the difference between the original tax base multiplied by the original tax rate, and the new tax base multiplied by the new tax rate. However, the starting point for thinking about the burden of a tax change would look at the change in tax rate multiplied by the initial tax base (as discussed in Joint Committee on Taxation 1993, p. 26). Put another way, the difference

between the change in revenue and the change in burden is equal to the change in the tax system's deadweight loss—the change in tax burden over and above revenue raised.² If a tax cut resulted in a substantial increase in the tax base, as was argued by many of those supporting the 2017 corporate tax changes, then the measured impact on wages would be quite a bit larger if based on the net change in revenue rather than on the change in revenue holding the tax base fixed.³

A third point to keep in mind is that constructing distributional estimates implicitly requires filling in important details not provided in the legislation. As an illustration, estimates of the effects of the 2017 law on tax revenue, even those taking both firm-level and economy-wide behavioral responses into account, projected substantial increases in the federal budget deficit over the next decade (Joint Committee on Taxation 2017b). These deficits, as well as subsequent fiscal and monetary responses to them, have economic effects as well, which the Congressional Budget Office and other forecasters must confront in forming their economic forecasts about the effects of the new law. If deficits crowd out capital accumulation, for example, this will likely depress wage growth.

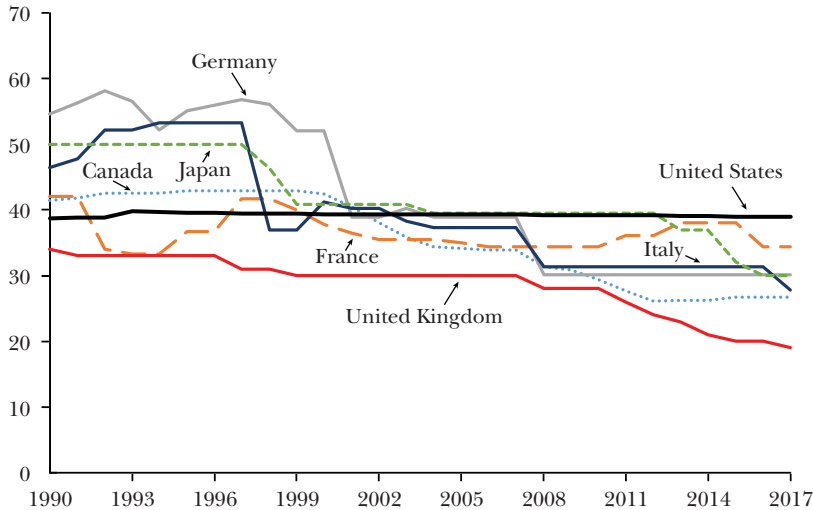
Finally, estimates of the allocation of the burdens of taxation generally reflect a long-run, equilibrium analysis without necessarily taking account of the adjustment process. For example, a forecast may find that, in the end, all capital equally bears a proportional share of a corporate tax change. But in the very short run with a given capital allocation, the change may fall largely on corporate shareholders (for further discussion of such dynamic incidence issues, see Auerbach 2006). Likewise, to the extent that wage growth results from capital accumulation, any effect of a tax change on wages ought to occur over time, rather than immediately. While it is possible that a tax cut may generate economic stimulus that pushes up real wages, this is typically ignored in distributional analysis due to the focus on longer-run estimates. In that sense, most analyses of tax incidence adopt a “supply side” approach.

Even in light of all of these qualifications, a primary mechanism through which a corporate tax cut may influence wages is still likely to be capital deepening in the corporate sector that leads to increased labor productivity. One may trace the controversy over distributional effects of the 2017 tax cut (or other potential tax corporate cuts) to differences over the effectiveness of such tax cuts at promoting capital deepening, differences over the extent to which any such capital deepening would generate increases in wages, and differences over whether a corporate tax cut might increase wages through other significant channels.

²Harberger's (1962) original analysis considered a small corporate tax introduced into an economy without such a tax initially; for this case, there would be no difference between the two measures (the burden of tax changes versus the changes in tax revenue)—that is, no first-order deadweight loss.

³Traditional revenue estimates of tax legislation, like those produced by the Joint Committee on Taxation, typically incorporate some behavioral responses, although they exclude macroeconomic feedback effects that characterize “dynamic” scoring exercises. Thus, they differ from the fully “static” estimates one might wish to use for incidence and welfare analysis but do not involve the full impact incorporating dynamic scoring.

Figure 1
G-7 Corporate Tax Rates
 (percent)



Source: Author using data from OECD Tax Database.

Note: Tax rates are for combined central and subcentral governments.

US Corporate Tax Rate(s) as of 2017: High or Low?

Perhaps the simplest and most familiar argument for cutting the US corporate tax rate during the years leading up to 2017 was the changing landscape of corporate tax systems in other countries. Over the past few decades, developed countries have generally reduced their statutory corporate tax rates. Figure 1 shows the evolution of statutory tax rates (including subnational corporate taxes) for the G-7 countries between 1990 and 2017. Over this period, the United States made the transition from low-tax-rate country to high-tax-rate country without undertaking any significant policy changes, as alone among the G-7 countries it did not reduce its federal corporate tax rate (which actually rose from 34 percent to 35 percent in 1993).

While this comparison of statutory tax rates is striking, it ignores important differences among tax systems. Prior to the 2017 legislation, a common criticism of the argument for cutting the US corporate tax rate was that the effective US tax rate was actually not all that high if one took account of various provisions that narrowed the corporate tax base and lowered actual tax payments. As a simple illustration of the concept, if only half of US corporate income were subject to tax, then the tax system's effects would be the same as one that taxed all corporate income at half the statutory rate. However, other than the statutory rate itself, the provisions that affect corporate taxes are complicated and the implications for calculating the relevant effective tax rate are not clear. In the end, different effective tax rate measures will be useful, depending on the question that one seeks to address.

To illustrate the difficulty of constructing an aggregate effective tax rate measure, consider the common and apparently simple calculation that relates corporate taxes paid to corporate income, say T/Y . In 2013, the last year for which data are publicly available, C corporations in the United States had \$1.258 trillion in taxable income and paid \$293 billion in federal taxes, representing an average tax rate of 23 percent (Statistics of Income, 2013, Table 21), well below the statutory rate of 35 percent. This low rate, moreover, fails to account for deductions that had already reduced the denominator, taxable income, Y , relative to what some would argue is appropriate for measuring income; for example, accelerated depreciation that provides more generous deductions than economic depreciation. In this calculation, the only reason for the gap between the statutory and effective tax rate is, mechanically, the use of tax credits that reduce tax liability.

However, a closer look will discover that the bulk of these tax credits were foreign tax credits, intended to offset taxes already paid on foreign-source income to other countries. If one views the foreign tax credit as a loophole and considers as an ideal norm the full US taxation of the worldwide income of corporations without any credits for foreign taxes, then it makes sense to view the 23 percent tax rate as reflecting a low rate of tax. On the other hand, as of 2017 all other G-7 countries had largely dispensed with taxing foreign-source corporate income at all. The other six had all adopted a so-called “territorial” approach of exempting corporate foreign-source income from tax, which in this calculation would be equivalent to allowing foreign tax credits to eliminate all US taxes on foreign source income. Taking that territorial approach as the norm would suggest that US taxation of foreign-source income was high relative to other countries. In short, corporations faced a lower US tax rate on foreign-source income than on domestic-source income, but how one should interpret this fact is not obvious.

This difficulty increases once one recognizes that the location of profits reported by companies (domestic versus foreign) may differ from where profits are earned. One of the arguments for tax reform as of 2017 was that the US tax system encouraged companies to shift the location of reported profits to low-tax foreign countries, through cross-border transactions with related parties in these countries and shifts in the location of deductible expenses such as interest. To the extent that such profits then faced a lower tax rate, this would effectively represent a lower tax rate on US domestic profits.

The issue of how to view a lower tax rate on foreign-source income also arises in effective tax rate calculations presented in corporations’ public financial statements. For example, Apple’s 2017 Form 10-K reports (on p. 56) an effective tax rate (defined here as total worldwide taxes divided by total worldwide earnings) of 24.6 percent. Most of the reduction from the 35 percent US statutory rate is attributable to “indefinitely reinvested earnings of foreign subsidiaries”—the foreign-source earnings that financial accounting treats as having no deferred US tax liability associated with future taxes on earnings repatriation. In this instance, foreign taxes are included in the calculation, and so the lower tax rate reflects a lower overall tax on foreign-source income, rather than just a lower US tax.

However, even after adjusting corporate taxable income for provisions that reduce it relative to economic income, the tax rate on measured domestic corporate income does not appear to be low in relation to the statutory rate. In Auerbach (2007), I estimated average annual tax rates for US nonfinancial corporations, comparing taxes paid on domestic earnings to income as measured based on the National Income and Product Accounts, rather than the taxable income reported on tax returns. For the period from 1993 to 2003, when the corporate tax rate was 35 percent, nonfinancial corporations faced annual average tax rates ranging from 29.2 percent to 49.2 percent, as provisions that reduced tax rates, such as accelerated depreciation, were in many years more than offset by provisions that raised tax rates (notably, the limited deductibility of net operating losses). These limits on the deduction of losses raise average tax rates because the denominator (income) falls by a greater proportion than the numerator (taxes): in the extreme case where losses are completely nondeductible, losses affect only the denominator. Hines (2017), using a related approach based on the reported magnitudes of domestic tax expenditures—tax provisions that reduce the tax base—finds in more recent calculations only a small reduction in the average corporate tax rate relative to its statutory value, even without taking account of the increases associated with the limits on deduction of losses.

Thus, leading up to the tax debate in 2017, US corporations faced a very high statutory tax rate relative to other countries, a much lower US tax rate on foreign-source income relative to domestic-source income, and a reasonably high average tax rate on reported domestic-source equity income, even taking into account deductions and credits that lowered tax liabilities. One should note that none of these alternative tax rate measures accounts for the additional taxes paid by shareholders of US corporations, or the treatment of corporate borrowing and interest deductibility. Nor do they distinguish among industries or the types of assets in which companies might be investing.

In summary, it is difficult to know which tax rate calculation is appropriate without first identifying the question one wishes to answer, which in turn relates to the behavioral response, or responses, of interest. For example, one might wish to evaluate the responses of companies deciding how much to invest in the United States, or in which types of assets to invest, or whether to invest in the United States or another country, or of individuals choosing whether to invest in US corporate stock, corporate bonds, or noncorporate businesses. Each of these decisions involves a different tax rate calculation, and the decisions will naturally differ in their implications for corporate tax incidence. In addition, the importance of decisions on different margins has changed over time, not just because of changes in US and foreign tax provisions, but also because of the changing nature of corporate activity.

Modeling Behavior of the Evolving US Corporate Sector

Economic analyses of the behavioral responses to corporate taxation commonly begin by considering the tax wedge imposed on investment in the corporate sector.

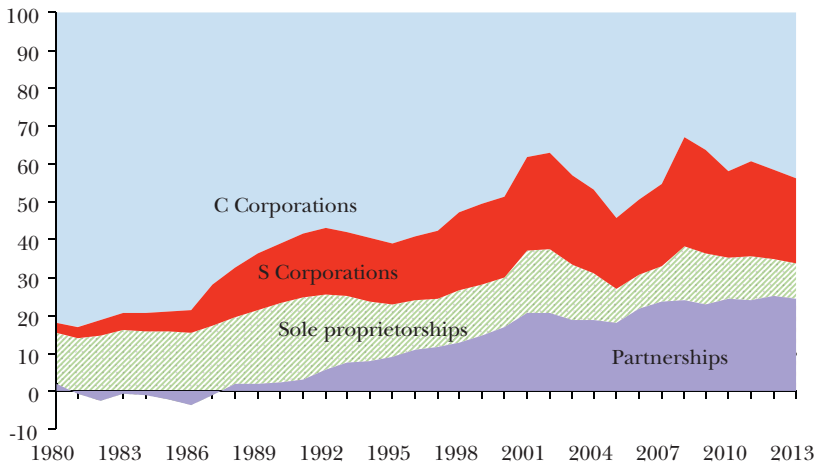
This wedge depends, of course, on the corporate tax rate itself, but on other tax provisions as well, although empirical studies of corporate tax incidence have not always taken account of these other provisions. Doing so leads one to compute a forward-looking *marginal effective tax rate* on new investment—in present value, the share of the before-tax rate of return on an incremental new investment going to federal (or federal plus state) taxes.

The marginal effective tax rate generally takes into account a number of factors: corporate-level taxes; incentive provisions applying to particular types of investment; interest deductibility at the corporate level; and the taxes of shareholders and bondholders on dividends, capital gains, and interest income. Estimates of the incentives to shift between corporate and noncorporate activity involve calculating a similar marginal effective tax rate for noncorporate investment. Because the marginal effective tax rate is a prospective tax rate applying to a particular investment decision, it relates more directly to specific behavioral responses than the average effective tax rates discussed in the previous section. The approach to calculating marginal effective tax rates has been refined for decades; Congressional Budget Office (2014) is a good recent example. The marginal effective tax rate is one component of the user cost of capital facing investment, along with actual depreciation and the required return to investors.

Having computed various marginal effective tax rates for different kinds of investments, one can estimate the effects of taxation on investment incentives in different sectors and the impact on returns to labor and capital. Among the insights one gets from such an analysis are that the corporate sector marginal effective tax rate has historically been substantially reduced by interest deductibility, given that interest income is typically received by individuals or entities (such as pension funds or retirement accounts) in much lower tax brackets than corporations. As a result, the net tax burden on interest payments, taking account of corporate tax deductions and taxes paid by recipients, is negative. For example, a Congressional Budget Office (2014) study found an overall marginal effective tax rate on corporate investment in tangible capital of 31 percent, equal to a weighted average of a 38 percent tax rate on equity-financed investment and -6 percent on debt-financed investment, confirming the strong tax incentive to use debt finance. In addition, effective tax rates vary considerably across assets, because of provisions for depreciation and other incentives that apply differentially. The Congressional Budget Office analysis found a 30 percentage-point range in effective tax rates for C corporations by asset type, varying from 12 percent for replacement railroad track to 42 percent for nuclear fuel.

The exact methodology varies from study to study; for example, Gravelle (2016) includes intangible assets (which could be expensed and in some cases qualified for the research and experimentation credit) in her calculations and accordingly finds lower marginal effective tax rates. But such calculations typically share a number of important common elements in addition to the focus on marginal investment decisions. These common elements include a closed-economy perspective that looks at the overall tax wedge faced when domestic savers provide funds for domestic

Figure 2

Shares of Total Business Net Income (Less Deficit) 1980–2013*(in percent)*

Source: The data come from Looney and Krupkin (2017).

investment. Such simplifying assumptions are increasingly restrictive because of how the corporate sector has evolved, and are limited in their usefulness in evaluating some tax reform proposals, particularly those affecting international corporate activities. To understand the nature of these restrictions and limitations, it is useful to highlight some features that now characterize the US corporate sector.

Figure 2 shows the components of overall US business sector income. The top area shows the C corporate sector, which fluctuates procyclically more than other business income, and hence has accounted for a lower share of business income during recessions. Also, the share of business income going to C corporations has fallen from around 80 percent in 1980 to about half of all business income. This trend is one factor underlying the relatively low share of federal tax revenue for which the corporate sector currently accounts.

It also highlights the importance of tax provisions affecting the remaining, “pass-through” entities: sole proprietorships, partnerships, and S corporations. The S corporations have corporate legal status, but pass through their earnings and tax liability to owners and face no entity-level federal tax; the sole proprietorships and partnerships pass through their earnings and tax liability to owners but do not have corporate legal status. (It is customary to lump S corporations with other pass-through entities when referring to the noncorporate sector, because they are taxed in the same way that noncorporate entities are.) The negative income of partnerships in the early 1980s is attributable to the tax shelters largely eliminated by the Tax Reform Act of 1986 (Auerbach and Slemrod 1997).

As of 2017, the differential tax wedge associated with the C corporation sector as compared to the pass-through sector was not especially large: Congressional Budget Office (2014) estimated the pass-through sector to have a marginal effective tax rate of 27 percent, relative to 31 percent for the corporate sector. While some of the growth of pass-through entities has been attributed in the past to attempts to avoid corporate double-taxation (for example, Auerbach and Slemrod 1997), net increases in top individual marginal tax rates between 1993 and 2017 along with lower tax rates on capital gains and dividends adopted over the same period reduced the tax gap between the two sectors. Thus, the tax wedge between corporate and pass-through sectors may be less important than in years past as a factor influencing the allocation of capital.

On the other hand, international capital flows have become more important over time, not only overall, but especially within the corporate sector, through the activities of multinational corporations. In the five decades between 1966 and 2016, the share of the income of US resident corporations that was accounted for by foreign operations rose from 6.3 to 31.1 percent (Auerbach 2017). The increasing importance of international capital flows is one factor underlying the shift in consensus that a lower share of the US corporate tax is now being borne by capital (typified by the 2012 change in assumptions by the Congressional Budget Office mentioned earlier). The intuition is that a higher US corporate tax rate may now more easily lead to a shift of capital to other countries. However, the magnitude of any such response depends on the tax rules that apply to international investment, and the complexity of such rules gives rise to a range of behavioral responses among firms potentially operating in more than one jurisdiction. These responses include discrete location decisions, rather than just investment levels, along with the financial and accounting strategies firms use to shift reported profits among countries. For both discrete location decisions and profit-shifting, the statutory tax rate may be more relevant than a computed marginal effective tax rate. The reason is that discrete location decisions may involve choosing where to locate profitable existing activities, which are subject to the statutory rate, in addition to new capital investment. Moreover, shifting reported profits need not coincide with changes in the actual location of investments. Indeed, differences in statutory tax rates among countries seem to affect both types of decisions (Devereux and Griffith 1998; Dharmapala 2014).

Another relevant aspect of the increase in international capital flows is the growth in cross-border ownership of corporations. The traditional view that equates the nationality of corporations and their owners is now far from accurate; foreign shareholders owned roughly a quarter of US corporate equity in 2015 (according to Rosenthal and Austin 2016). This pattern calls into question the suitability of marginal effective tax rate or related calculations that combine US corporate and shareholder taxes in constructing an overall tax wedge. To the extent that companies draw from a worldwide shareholder base, incentives to invest in the United States may depend more on corporate-level taxes than those at the US shareholder level.

The internationalization of shareholding also suggests that companies may change residence even if their shareholders do not—an issue that has arisen as

corporations engaged in so-called “inversions” undertaken to shift their corporate residence away from the United States. Tax incentives to invert relate not only to the US corporate tax rate, but also to the traditional US approach to taxing foreign source income. As already discussed, the United States has attempted to impose some taxes on the foreign source income of US corporations—but only US corporations—while other countries have increasingly adopted a territorial tax system in which they do not seek to tax the foreign source income of their resident corporations. This difference meant that a US company would face a higher overall tax rate on its investments in low-tax countries than would a non-US company, even if the non-US company resided in a country with a tax rate as high as or higher than the US tax rate.

Finally, the composition of investments by the US corporate sector has changed over time, with an increasing share devoted to intangible assets. Measuring the total value of such assets is difficult because one can view many business expenditures (such as advertising) as creating value. However, based on relatively narrow definitions of purchased intellectual property assets, both the Bureau of Economic Analysis Fixed Assets Accounts and the Federal Reserve Board’s Flow of Funds Accounts show a doubling of the share of intangible assets as a share of business capital over the 50 years from 1966 to 2016 (Auerbach 2017).

The growing dependence of production on intangible assets presents an increasing challenge to the enforcement of international tax rules for multinational corporations. Such rules rely on determining the location and profitability of a firm’s assets, but this determination is especially difficult for intangible assets with no physical presence and with firm-specific characteristics that determine profitability. These characteristics facilitate the responsiveness of profit-shifting to differences in statutory tax rates, and companies that rely heavily on intellectual property have been among the highest-profile firms criticized for international tax avoidance. This enhanced opportunity for profit shifting, as well as perceived spillover benefits from the development and use of intellectual property, has led many countries, including Ireland, the United Kingdom, Belgium, the Netherlands, and Luxembourg, to adopt favorable tax rates for income attributed to intellectual property tax regimes, sometimes called “patent boxes.”

In summary, the rise of the multinational corporation, with cross-border ownership and operations, and the growing importance of intellectual property in production have broadened the set of relevant behavioral responses to corporate taxation and led governments to participate in a multidimensional tax competition game. In this game, each country chooses not only its statutory corporate tax rate, but also asset-specific provisions applying to domestic investment and rules applying to cross-border investments. Changes in any one instrument may affect firms on several decision margins, and policy changes might influence US investment through several direct and indirect channels. While one may expect a reduction in the US corporate tax rate to encourage US-based investment and production, the effects of other policy changes may be more complex.

For example, consider an increase in the US tax rate applicable to the foreign source income of US companies. This could affect US domestic investment and

production in at least three ways. First, it might discourage those companies from producing abroad, because of a lower after-tax rate of return on foreign production. This may cause an increase or decrease in their investment and production in the United States, depending on whether the foreign and domestic activities of multinational companies are gross substitutes or gross complements in production—although available evidence suggests overall complementarity of foreign and domestic operations (for example, Desai, Foley, and Hines 2009; Becker and Riedel 2012). Second, it could reduce the tax benefits US companies get by shifting their US source profits to low-tax foreign countries, which raises the effective tax rate on US profits and therefore discourages US production. Evidence from other countries confirms this effect, finding that strengthening provisions aimed at limiting profit shifting reduces domestic investment (Overesch 2009; de Mooij and Liu 2018). Third, an increase in the US corporate tax rate applicable to foreign-source income might encourage companies to relinquish US residence through corporate inversions, because only US companies are subject to this higher tax on foreign operations. Although there is little empirical evidence on this question, some have argued that shifting residence may also lead to shifts in certain activities away from the United States.

More generally, it is useful to think of international tax provisions and their effects in terms of the extent to which they conform to three different ways of taxing companies: residence-based corporate taxation, which countries define in various ways but usually involves factors like location of key management and headquarters activities and place of incorporation; source-based taxation, which looks at where the companies' production takes place; and destination-based taxation, which looks at where the companies sell their products. The US corporate tax system before the 2017 legislation was a hybrid of residence- and source-based taxation. It imposed corporate income tax on all profits resulting from production occurring in the United States, whether by US or foreign companies, but also taxed the foreign-source earnings of US companies when repatriated (with a credit for foreign tax paid). The increase in multinational activity and the greater reliance on intellectual property in production had made it easier for companies to shift the location of their production or at least the reported location of their profits, challenging a reliance on source-based taxation. The internationalization of companies and their ownership had made corporate residence less of a fixed characteristic, challenging a reliance on residence-based taxation.

The challenges to relying on source or residence as a basis of taxation has led some to consider a move in the direction of destination-based taxation, with the rationale that the location of consumers is more determinate. Indeed, for a time during the recent tax reform debate, the US Congress considered a proposal for doing so in the form of a destination-based cash-flow tax (Ways and Means Committee 2016).⁴ (Though the proposal ultimately was not adopted, the Tax Cuts and Jobs

⁴ A related approach would be to apportion profits to particular jurisdictions in proportion to the location of the company's sales. Among US states, the use of sales to apportion corporate taxes has been growing in importance over time, for related reasons (Suárez Serrato and Zidar 2016, figure 3).

Act includes provisions, discussed below, that are related in form and motivation.) Such a tax is still formally on corporations and other businesses, but its incidence should be quite different from traditional corporate taxes, precisely because of its use of a destination basis. To understand why, consider the destination-based cash-flow tax in the context of the national income identity.

Start with the national income identity that GDP equals the sum of consumption (C), domestic investment (I), government purchases (G) and exports (X) less imports (M). It follows that $C = GDP - I - G - X + M$: taxing consumption can be achieved by taxing income net of exports, also taxing imports, allowing expensing of investment, and not taxing government purchases. (This explanation follows Auerbach 2017).⁵ If one divides private GDP ($GDP - G$) into returns to labor, W , and returns to capital, R , then the consumption tax can be implemented in two pieces, as a tax on returns to labor, W (already effectively covered by the existing personal income tax), plus a border-adjusted tax (that is, allowing a deduction for exports and imposing a tax on imports) on business cash flows, $R - I - X + M = C - W$. This latter component is the destination-based cash-flow tax base. In its operation, companies would pay tax on their domestic cash flows: receipts from domestic purchasers less domestic labor costs and purchases of intermediate and investment goods from domestic sellers.

Because the destination-based cash-flow tax is a tax on domestic consumption net of returns to labor, one would expect it to have incidence similar to a tax on domestic consumption that exempts consumption financed by wage and salary income—roughly approximating a tax on domestic wealth. Its incidence would therefore be quite different from what is usually assumed for the corporate tax, as this form of tax would omit the main channel through which the corporate tax is modeled as being shifted to labor—capital flight—precisely because there would be no tax discouraging domestic production or lowering the rate of return to domestic investment. Companies would face no additional tax because of producing in the United States. They would also have no capacity to shift profits to other countries, because the destination-based cash-flow tax would ignore all of the transactions typically used to do so, including interest deductions and cross-border transactions with related parties. However, as a tax on domestic US consumption, the destination-based cash-flow tax would also not fall on foreign-owned capital, whereas taxes based on US production or the ownership of US companies could do so to some extent. This is the case, even though distributional analyses dividing the corporate tax burden between labor and capital often ignore the distinction between foreign and domestic owners of capital.

One further complication in thinking about the effects of any US policy change, especially those relating to international activity, is the need to account for the responses of other countries. Although a number of multilateral initiatives

⁵Note that expensing of investment, rather than the schedule of depreciation deductions traditionally allowed under an income tax, is required to achieve a tax on consumption but that a destination-based income tax is also possible.

have sought to limit tax competition by tightening the rules applicable to multinational companies, most recently through the OECD project on Base Erosion and Profit Shifting, such restrictions may change the nature of tax competition without necessarily restraining it. For example, some forms of tax competition, such as the “patent box” regimes mentioned above, may still be allowed. Also, more restrictions on provisions that allow companies to avoid taxes through profit-shifting might lead to more intense tax competition between countries with respect to statutory tax rates, and less efficient overall outcomes, by focusing tax reductions more on activities with relatively low responsiveness to taxation (Keen 2001). In the present setting, one may expect the significant changes in the US tax system to prompt responses in other countries, although these effects are generally not considered in the various projections that have been done for the effects of the Tax Cuts and Jobs Act of 2017.

The Tax Cuts and Jobs Act and its Potential Effects

Several aspects of the US corporate tax and its effects were under scrutiny during the tax reform process, including the high statutory corporate tax rate and continued worldwide taxation of the profits of US corporations. Using a worldwide base for corporate taxation was cited not only as a driving factor behind corporate inversions, but also—because the additional US tax would be due only upon the repatriation of foreign-source income—as a reason behind the large accumulation of retained earnings offshore—estimated as of 2015 at \$2.6 trillion (Joint Committee on Taxation 2016). The worldwide basis for US corporate taxation has also been linked to the large concentration of US companies’ offshore earnings in tax havens—generally defined as countries with very low corporate tax rates and flexible rules regarding the transactions of multinationals (in this journal, Zucman 2014).

In the end, the new tax law introduced a substantial cut in the corporate tax rate and a temporary allowance for investment expensing of certain classes of capital, both of which one would expect to encourage domestic investment by lowering the marginal effective tax rate on new investment.⁶ Working in the same direction was the elimination of the corporate Alternative Minimum Tax (AMT). This investment stimulus is somewhat offset by a new limit on interest deductibility and new restrictions on the ability of companies to use net operating losses to offset past or future income (through tax loss carrybacks and carryforwards).

⁶ It is worth noting that the effects of these two provisions on the effective tax rate on new investment interact negatively. That is, a reduction in the statutory corporate tax rate makes the accelerated deductions from expensing less valuable; for assets qualifying for full expensing, a well-known result is that the marginal effective tax rate on equity-financed investments is zero, and therefore is not reduced at all by cuts in the statutory tax rate. Indeed, to the extent that investment assets are debt-financed, assets that are expensed face a negative marginal effective tax rate at the corporate level, so that a reduction in the statutory tax rate actually raises the marginal effective tax rate.

The new law also adopted a 20 percent deduction for the qualifying income of pass-through entities, with the determination of qualifying income being subject to a very complicated set of provisions aimed primarily at preventing wage and salary income from being reclassified as business income. Even with this tax benefit, the sharp drop in the corporate rate likely reduces the tax incentive for a business to operate as a pass-through business rather than as a C corporation. For example, Congressional Budget Office (2018) estimates that the marginal effective tax rate for corporate business capital will fall by around 8 percentage points during the early years under the new tax law, before investment incentives decline, while the marginal effective tax rate for noncorporate business capital will fall by about half as much.

In addition, the law includes three key provisions aimed specifically at influencing the behavior of multinationals, each with its own new acronym.

First, the Global Intangible Low Tax Income (GILTI) provision replaced the tax on *repatriated* foreign-source income with an annual tax at half the domestic rate (10.5 percent) levied on *accrued* foreign-source income above a 10 percent rate of return on foreign plant and equipment and subject to only a partial (80 percent) foreign tax credit. As a consequence, the GILTI left earnings taxed abroad at less than 13.125 percent still subject to some US tax.⁷ While the effect of a change in the present-value tax rate on foreign-source income is ambiguous (an immediate tax on accrual of income replacing a higher-rate tax on deferred realization of income), eliminating the tax consequences of repatriation reduces the incentive to keep earnings offshore, the so-called “lock-out effect.” This change could increase domestic investment, to the extent that companies facing a lower tax barrier to repatriating earnings are liquidity-constrained. However, evidence from a previous episode during which the tax incentive to repatriate earnings was temporarily enhanced found that the induced repatriations led to little additional domestic investment (Dharmapala, Foley, and Forbes 2011).

Second, the Base Erosion Anti-Abuse Tax (BEAT) is a new minimum tax at a rate of 10 percent on the income of companies operating in the United States. The minimum tax base calculation disallows deductions for some imports from related parties.⁸ The BEAT aims to limit the extent to which companies can shift reported

⁷Accompanying the elimination of the tax on any earnings repatriated in the future was a one-time tax on previously accumulated offshore earnings, which is a lump-sum tax (if one ignores the possibility of any behavioral impact coming through induced changes in expectations about future tax policy). The common rationale for this transition tax is that it substitutes for the taxes that companies would have been expected to pay on repatriations of previously accumulated offshore earnings under the old system. However, the tax rates associated with this measure rose throughout the brief legislative process, suggesting that the rates were determined by a need to hit a tax revenue target as much as to satisfy a specific policy aim. Moreover, there was no attempt to offset other windfalls associated with changes in business taxation, in particular the reduced corporate tax rate applied to the income from past domestic investments.

⁸ In particular, import costs falling in the accounting category “cost of goods sold”—referring to intermediate goods—still are deductible, whereas other imports from related parties, such as accounting and financial services, are not.

profits out of the United States using internal transfer pricing manipulation by inflating the cost of their imports from related foreign parties. However, the tax applies to imports even from high-tax countries. Companies subject to the BEAT would face higher costs of operating in the United States, as well as an incentive to spin off foreign-related parties so that imports would no longer be covered by the tax.

Third, the Foreign Derived Intangible Income (FDII) provision introduces a lower tax rate (13.125 percent) on the share of domestic earnings from foreign-derived intangible income in excess of 10 percent of assets and attributable to exports (based on the share of export sales in all sales). This provision resembles the “patent box” tax rules adopted in other countries, which as discussed above aim to reduce the tax rate on one kind of especially mobile activity. However, it does not refer specifically to income generated by intellectual property, and in applying only to export income it is more limited in scope than existing patent boxes. It would encourage companies to locate export-related activities in the United States, particularly those involving intangible assets (which typically will not show up in the asset base calculation and so will not raise the threshold above which earnings are tax favored).⁹

Heightening the usual uncertainty about the effects of a major new tax law was the fact that it calls for many additional changes during the next 10 years. These include phasing out investment expensing, tightening the interest deduction limit, introducing a requirement that companies amortize rather than immediately deduct expenditures on research and development, and raising the tax rates associated with all three of the key international provisions just discussed.¹⁰ These changes are central to the budget chicanery that has become a central part of the US legislative process, enabling Congress to hit a predetermined 10-year revenue-loss target and to avoid increasing deficits after 10 years; otherwise, the new tax law would have raised deficits in a way that required an unattainable supermajority vote in the Senate. Further, the large increase in budget deficits even under the bill as enacted could lead to other modifications, such as an eventual increase in the corporate tax rate, which would lessen any immediate positive impact on domestic investment.

Table 1 summarizes the new tax law provisions, indicating the anticipated impact on domestic investment. The last column of the table provides the associated 10-year revenue estimates from Joint Committee on Taxation (2017a) as well as those for fiscal year 2020, a year after initial phase-ins and before most changes

⁹In terms of US dependence on residence, source, or destination as a basis of taxation, one may view the first of the three changes listed in this section as maintaining but reforming the pre-existing approach that combines residence- and source-based taxation. The second and third provisions involve rather limited steps in the direction of destination-based taxation, with a similar motivation of curbing tax avoidance as the border adjustment that would have been part of the destination-based cash flow tax, as they reduce both the tax deduction for imports and the tax on exports.

¹⁰The requirement for research and development amortization is particularly puzzling in light of the apparent intent of the FDII provision to encourage the location of intellectual property in the United States.

Table 1

Key Provisions of the Tax Cut and Jobs Act Affecting Multinational Corporations

<i>Provision</i>	<i>Policy change</i>	<i>Predicted economic impact</i>	<i>Revenue impact, JCT (\$billions), 2020 (above) & 10-year (below)</i>
Corporate tax rate cut	Reduction from 35% to 21%	Increased domestic investment, from lower marginal effective tax rate (intensive margin) and lower average tax rate (extensive margin)	- 130.5 -1,348.5
Investment expensing	Full through 2022; gradually phased out by 2027	Increased domestic investment; possibly larger if temporary	- 24.6 -86.3
Limitation on interest deductions	30% of EBITDA through 2021; 30% of EBIT thereafter	Reduced domestic investment; increased borrowing abroad	+19.7 +253.4
Net operating loss deductions	Elimination of 2-year loss carrybacks; limit of use of loss carryforwards to 80% of taxable income; elimination of 20-year expiration of loss carryforwards	Reduced domestic investment, especially in more cyclical industries	+11.1 +201.1
Tax on offshore earnings	Elimination of tax on earnings repatriation; one-time tax on previously accumulated offshore earnings (15.5% for cash; 8% for assets) subject to scaled foreign tax credit; new tax on earnings in excess of 10% of offshore assets (GILTI) at 10.5% through 2025 and 13.125% thereafter	Increased earnings repatriation; uncertain impact on foreign and domestic investment	+6.0 +227.6
Minimum tax on domestic earnings	Tax on expanded base (BEAT) that eliminates deduction of cost of imports (except for "cost of goods sold") from related foreign parties, at a rate of 5% in 2018, 10% from 2019–2025, and 12.5% starting in 2026	Reduced domestic investment; spinoff of foreign operations	+13.3 +149.6
Tax benefit for exports	Reduced tax rate, at 13.125% through 2025 and 16.406% starting in 2026, on foreign-derived intangible income (FDII), which is earnings above 10% of assets, multiplied by the fraction of domestic earnings apportioned to export sales	Increased location of intellectual property in the United States, to the extent that provision is expected to survive	+6.9 - 63.8

Note: JCT is the Joint Committee on Taxation. EBITDA is Earnings Before Interest, Taxes, Depreciation, and Amortization. EBIT is Earnings Before Interest and Tax. GILTI stands for Global Intangible Low Tax Income. BEAT stands for Base Erosion and Anti-Abuse Tax.

and expirations.¹¹ For some provisions, such as the permanent corporate tax rate cut, the 10-year and 2020 revenue effects are in close alignment. For others, the relationship between the two revenue effects is affected by phase-out (as in the

¹¹ For the change in the treatment of offshore earnings, the numbers in the table are the sum of those from three changes: elimination of the tax on repatriations, introduction of the tax on accrued offshore income, and the transition tax on previous accumulations by foreign subsidiaries.

case of expensing) or phase-in (as in the case of interest deduction limits). In the case of the Foreign-Derived Intangible Income (FDII) provisions, the one-year and 10-year revenue effects are of opposite sign because of a short-run timing response, presumably due to an immediate reduction in profit-shifting and a relocation of some intellectual property to the United States.

Assessing the net impact of these provisions on investment is very challenging, as it requires one to account for the interaction of a broad range of provisions, with little evidence regarding many behavioral responses. The task is much more difficult than for the case of a simple cut in the corporate tax rate, the conceptual experiment that many have in mind when predicting the effects of corporate taxation on production, investment, and wages. Further, overall assessments, especially with regard to the short run, must also account for the pace of adjustment, demand stimulus, the effects of increased deficits on national saving and capital inflows, and the potential response of monetary policy.

With these concerns duly noted, there have been attempts to quantify the legislation's impact on domestic investment. The Joint Committee on Taxation (2017b) "projects an increase in investment in the United States, both as a result of the proposals directly affecting taxation of foreign source income of US multinational corporations, and from the reduction in the after-tax cost of capital in the United States." The average increase in the capital stock over the 10-year budget window is 0.9 percent and the average increase in GDP is 0.7 percent, although the increases are smaller at the end of the period because of the changes in provisions noted above. Congressional Budget Office (2018) projects an average increase in GDP of 0.7 percent over the 10-year budget period. A relatively similar private-sector assessment by Macroeconomic Advisers (2018) finds that potential GDP rises by 0.6 percent by the end of the budget period, "mainly by encouraging an expansion of the domestic capital stock." The Penn Wharton Budget Model (2017) estimates a 10-year growth in GDP of between 0.6 and 1.1 percent, depending on assumptions about the composition of returns to capital. Barro and Furman (forthcoming, Table 11) estimate that GDP would be higher as a result of an increased capital-labor ratio, by 0.4 percent after 10 years under the law as written, and 1.2 percent if initial provisions were made permanent, with the effects being smaller if deficit-induced crowding out is taken into account.¹²

Based on a production-function approach, using the standard Cobb–Douglas constant-income-shares assumption, a GDP growth estimate in this range, say 0.6 percent, also suggests an increase in annual labor income of 0.6 percent, or approximately \$500 per household at current income levels.¹³ An increase in compensation of \$500 per family for 125 million families equals \$62.5 billion, which

¹²The estimates by Barro and Furman explicitly do not take account of the effects of the international tax provisions. It is unclear how important a role these provisions play in the estimates by Macroeconomic Advisers and the Penn Wharton Budget Model.

¹³This uses Furman's (2017) estimate of 125 million households and 2017 compensation of employees of \$10.3 trillion, and follows footnote 3 in using the revenue estimate exclusive of dynamic scoring.

compares to the fiscal year 2020 revenue loss from the corporate tax rate reduction alone, listed in Table 1, of \$130.5 billion. This increase amounts to about half of the reduction in corporate tax revenues, or roughly double what one would get by applying the common assumption that 25 percent of the corporate tax cut goes to labor.

An effect of this size is certainly plausible, given the many other provisions that may stimulate investment and the initial deficit-induced demand stimulus, but it is a far smaller number than some of those discussed in the introduction. Might these analyses fail to account for important potential channels or macroeconomic responses through which the tax reform might affect output and wages? The impact of the international provisions is especially subject to uncertainty, but many other modeling assumptions are involved in the overall estimates. Moreover, how does one square these predictions of a gain in the range of \$500 per household with numerous companies having announced immediate \$1,000 bonuses to their workers?

From the basic perspective of a competitive economy without frictions, treating labor markets as spot markets, one would predict that firms would raise wages only when labor demand increases, which in turn would require an increase in labor productivity or a spur in demand for the firm's products. Even accounting for the impact of fiscal stimulus on product demand, one would not expect this increase in labor demand to occur immediately. Moving to a slightly more complex view of labor markets, involving costs of training and adjustment and other frictions, could help explain why firms might raise wages in anticipation of stronger future labor demand, as firms would wish to smooth fluctuations in their employment by building up their workforce. (These actions could also have been encouraged to the extent that companies could deduct payments at the higher, 35 percent tax rate.) Whether such an explanation suffices is unclear, given the magnitude of immediate bonus payments.

However, in a less-competitive setting, in which firms earn rents, the possibility arises that firms may share some of those rents with workers. For a recent survey of the extent of rent sharing by firms, see Card, Cardoso, Heining, and Kline (2018, especially Table A1). To the extent that such rents have increased relative to normal returns to capital (as suggested, for example, by Furman and Orszag 2015), rent sharing could play an important role in determining the incidence of corporate tax changes.¹⁴ In this setting, a corporate tax rate reduction could potentially lead to an increase in labor compensation by immediately increasing after-tax corporate

¹⁴The rent-sharing hypothesis with respect to corporate tax changes stands in contrast to other assumptions about corporate tax incidence based on the existence of rents. Notably, the US Treasury assumes that the corporate tax collected on supernormal returns (which it estimates to account for 63 percent of corporate taxable income) is borne by owners of corporate capital (Cronin, Lin, Power, and Cooper 2013). Even without direct rent sharing with workers, the incidence of a tax on rents could still fall partially on workers to the extent that the rents are specific to a company rather than to a location, for then the company could move the rent-producing activities to other jurisdictions, thereby lessening worker productivity (Auerbach and Devereux 2018).

profitability, prior to the occurrence of any increase in labor productivity. Indeed, some of the recent empirical literature on corporate tax incidence within countries adopts the rent-sharing approach, including Arulampalam, Devereaux, and Maffini (2012) and Liu and Altshuler (2013). Why such a sharing of rents with workers should take the form of bonuses rather than wage increases is unclear, without knowing the process underlying the determination of rent sharing, although the uncertain fate of various provisions of the Tax Cuts and Jobs Act could potentially be playing a role.¹⁵

Discussion

While there is no simple consensus framework in which to evaluate the Tax Cuts and Jobs Act of 2017, one can reach some plausible conclusions about the rough magnitudes of the effects of the tax reform on US labor and capital income. But the potential for disagreement with these estimates is large. One source of disagreement is over whether one assumes that the changes in the Tax Cuts and Jobs Act supposed to occur within the next ten years (such as expiring incentives or changes in tax rates) will be sustained or modified. Another set of disagreements can arise because of differences in behavioral models of corporate responses or assumed parameter values. At a more subtle level, differences can also occur in the hypothetical experiments that individuals have in mind. For example, what changes other than a reduction in the corporate tax rate are included in a given study? Measuring the potential effects of the legislation requires accounting for myriad other provisions affecting investment decisions and international activity, which the law substantially altered. To do this, one must calculate tax wedges and trace out potential behavioral effects on several margins, for which there may be relatively little or no direct empirical evidence, or for which historical evidence may be of limited use given the changing characteristics of the US corporate sector. In addition, one must take account of interactions among different provisions, some of which may be subtle and not even intended. Finally, one must decide how to address the possibility that monetary and fiscal policy will be altered in the future to deal with projected deficit increases.

There are other important questions not even addressed in the recent debate and analysis. For example, even if workers gain as a group from the legislation, the recent growth in earnings inequality highlights that one should not think about wage and salary earners as a monolithic group. Whether through differences in rent sharing across the income distribution, or differences in capital-labor

¹⁵The Council of Economic Advisors (2018) argues that the reduction in profit shifting by US corporations induced by a lower corporate tax rate would lead to additional rent-sharing by US workers. This analysis suggests that the workers' share of rents depends on the magnitude of those rents reported as domestic US profits, rather than a firm's overall profits: for example, the argument is that if a US multinational shifted its reported profits from tax havens to the United States, or repatriated earnings recorded abroad, the higher measured US profitability would directly benefit workers.

complementarity that lead to differences in gains (and losses) from capital deepening, the effects of corporate taxation on different groups of wage earners is another direction in which distributional analysis needs to develop.

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