Chapter 1

Evaluating the Effects of the Tax Cuts and Jobs Act

The 2018 *Economic Report of the President*, citing an extensive literature of over 80 peer-reviewed studies, provided evidence that before the Tax Cuts and Jobs Act (TCJA), the U.S. economy and U.S. workers had been adversely affected by the conjunction of rising international capital mobility and increasingly uncompetitive U.S. business taxation relative to the rest of the world. The *Report* concluded that the results of the convergence of these two trends were deterred capital formation in the United States, an absence of capital deepening, and consequently stagnant wage growth. Considering the weight of evidence in support of these observations, the *Report* projected that the business and international provisions of the TCJA would raise the target U.S. capital stock, reorient U.S. capital away from direct investment abroad in low-tax jurisdictions and toward domestic investment, and raise worker compensation and household income through both a short-run bargaining channel and long-run capital deepening channel. Finally, the *Report* noted that reductions in effective marginal personal income tax rates could be expected to induce positive labor supply responses.

In this chapter, we evaluate each of these anticipated effects of the TCJA on the basis of currently available data, and with particular attention to the relevant time horizons of each margin of adjustment to the positive tax shock. We find that firms responded immediately to the TCJA by upwardly revising planned capital expenditures, employee compensation, and hiring. We further find that real private investment in fixed assets rose at an annual rate of about 8 percent from the fourth quarter of 2017 through the third quarter of 2018, to $150

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billion (about 6 percent) above the level reconstructed from the projected trend of the preceding expansion, during which fixed investments grew at an annual rate of about 5 percent. In addition to reporting a tally of over 6 million workers receiving an average bonus of nearly $1,200, we also estimate that, as of the third quarter of 2018, real disposable personal income per household was up $640 over the trend. Expressed as a perpetual annuity, this corresponds to a lifetime pay raise of about $21,000 for the average household—a $2.5 trillion boost to total real disposable personal income across all households.

Finally, we report that the flow of U.S. direct investment abroad declined by $148 billion, while U.S. direct investment in eight identified tax havens declined by $200 billion, as U.S. multinational enterprises redirected capital investment toward the domestic economy. Applying insights from a large body of corporate finance literature, we then discuss channels—particularly shareholder distributions—through which we expect repatriations of past corporate earnings previously held abroad in low-tax jurisdictions to be efficiently reallocated by capital markets from cash-abundant to cash-constrained firms.

On December 22, 2017, President Trump signed into law the Tax Cuts and Jobs Act (TCJA). With an estimated $5.5 trillion in gross tax cuts accompanied by $4 trillion in new revenue over 10 years, and with fundamental changes to itemization and a movement toward a territorial system of corporate income taxation, the TCJA arguably constituted the most significant combination of tax cuts and comprehensive tax reform in U.S. history. The TCJA was motivated by four principal objectives: tax relief for middle-income families, simplification of the personal income tax code, economic growth through business tax relief and increased domestic investment, and repatriation of overseas earnings.

First, accordingly, in the personal income tax code, the standard deduction was approximately doubled by the TCJA, thereby exempting a greater share of middle-class incomes from Federal income tax liability altogether, and simplifying tax filing for millions of American taxpayers who would previously have had to itemize deductions. The law also lowered marginal personal income tax rates across nearly all brackets, and raised and expanded eligibility for the Child Tax Credit. Second, the law eliminated certain deductions that disproportionately benefited higher-income households, while capping

others—such as the Mortgage Interest Deduction and State and Local Tax Deduction—that similarly skewed toward the highest-income tax filers.

Third, to address the previous relative international uncompetitiveness of U.S. business taxation, the TCJA lowered the top marginal Federal statutory corporate tax rate from 35 percent—the highest in the developed world—to 21 percent. In addition, the TCJA introduced a 20 percent deduction for most owners of pass-through entities and generally allowed for immediate full expensing of new equipment investment. Fourth, to encourage repatriation of past overseas earnings of U.S. multinational enterprises previously held abroad in low-tax jurisdictions, and to prevent future corporate profit shifting through the mispricing of intellectual property products and services, the TCJA applied a low 8 or 15.5 percent tax on previously untaxed deferred foreign income and introduced a trio of new mechanisms to deter artificial corporate profit shifting.

In the 2018 *Economic Report of the President*, the Council of Economic Advisers estimated that these provisions of the TCJA would:

1. Raise real capital investment by lowering the user cost of capital and thus raising the target steady-state flow of capital services.
2. Raise the growth rate of U.S. output—in the short run, through both supply- and demand-side channels; and in the long run, through a supply-side channel.
3. Raise worker compensation and household income, both through a short-run profit-sharing channel and a long-run capital deepening channel, raising the steady-state level of capital per worker.
4. Incentivize higher labor force participation.
5. Reorient U.S. capital investment away from direct investment abroad and toward domestic investment.
6. Induce large-scale repatriation of past overseas earnings of U.S. multinational enterprises previously held in low-tax jurisdictions.

In this chapter, we evaluate these estimates and projections utilizing data available since the TCJA became law, and with particular attention to the relevant time horizons of different margins of adjustment to a positive tax shock. Consistent with projections reported in the 2018 *Economic Report of the President*, we find that output and investment accelerated in response to the reduction in the user cost of capital, and more importantly rose substantially above the trend. Real gross domestic product (GDP) growth rose 1.0 percentage point above the recent trend, while capital expenditures by nonfinancial businesses were up 12.1 percent over the trend.

We also find that real disposable personal income rose above the trend, especially as forward-looking firms raised near-term compensation to retain similarly forward-looking workers in a tightening labor market. As of 2018:Q3, we estimate that real disposable personal income per household was up about $640 over the trend, while real median usual earnings of full-time wage and salary workers were up $805 on an annualized basis. We furthermore report

survey data indicating that these margins of adjustment were immediately anticipated by marked shifts in business expectations in response to the TCJA.

In addition, we report that in the first three quarters of 2018 alone, $570 billion in overseas corporate dividends, including earnings previously reinvested abroad, were repatriated to the United States, out of an upper-bound estimated total stock of as much as $4.3 trillion, and that U.S. direct investment abroad declined by $148 billion as U.S. multinational enterprises redirected capital investment toward the domestic economy. We then discuss how repatriation affects the distribution of corporate earnings to shareholders, and how efficient capital markets utilize shareholder distributions to reallocate capital from established, cash-abundant firms without profitable investment opportunities to more dynamic, cash-constrained firms with profitable investment opportunities. Finally, we also report the results of several simple simulations estimating the implied effects on long-run Federal government tax revenues of the higher economic growth that has thus far been observed since the TCJA's enactment.

In summary, we find that the U.S. economy is responding auspiciously to the positive tax shock of the TCJA along multiple margins, and in patterns that are both broadly and specifically consistent with projections reported in the 2018 *Economic Report of the President*. Looking ahead, we suggest that making permanent the TCJA provisions that are currently scheduled to expire would improve the long-run potential growth of the U.S. economy.

Output and Investment

Changes in corporate income tax rates and depreciation allowances can induce large investment effects through their effect on the user cost of capital—as demonstrated by Cummins and Hassett (1992); Auerbach and Hassett (1992); Cummins, Hassett, and Hubbard (1994, 1996); Caballero, Engel, and Haltiwanger (1995); Djankov and others (2010); and Dwenger (2014). Essentially, the user cost of capital is the rental price of capital, corresponding to the minimum return on investment required to cover taxes, depreciation, and the opportunity costs of investing in physical capital accumulation versus financial alternatives. By increasing (or decreasing) the after-tax rate of return on capital assets, a decrease (increase) in the tax rate on corporate profits decreases (increases) the before-tax rate of return required for the marginal product of new physical assets to exceed the cost of producing and using these assets, thereby raising (lowering) firms' demand for capital services.

As documented in the 2018 *Economic Report of the President*, early empirical estimates of the user-cost elasticity of investment (e.g., Eisner and Nadiri 1968) were much smaller than the neoclassical benchmark of unit elasticity (Jorgenson 1963; Hall and Jorgenson 1967), and were often outperformed by simple accelerator models of investment. However, subsequent studies (e.g.,

Goolsbee 1998, 2000, 2004; and Cummins, Hassett, and Oliner 2006) demonstrated that estimates likely suffered from considerable omitted variable bias owing to (1) unobserved firm heterogeneity; (2) mismeasurement of investment fundamentals, resulting in attenuation bias; and (3) the correlation of statutory changes in corporate income tax rates, depreciation allowances, and tax credits with cyclical factors.

Studies that successfully achieve identification—particularly by exploiting plausibly exogenous variation in the user cost of capital in the cross section of asset types (e.g., Cummins and Hassett 1992; Auerbach and Hassett 1992; Cummins, Hassett, and Hubbard 1994, 1996; and Zwick and Mahon 2017), or by utilizing micro-level panel data (e.g., Caballero, Engel, and Haltiwanger 1995; Dwenger 2014; and Zwick and Mahon 2017)—accordingly estimate much higher user-cost elasticities of investment. Indeed, Dwenger (2014) is unable to reject the null hypothesis that the user-cost elasticity is not statistically different from the neoclassical benchmark of –1.0. This implies that a tax change that lowers the user cost of capital by 10 percent would raise demand for capital services by up to 10 percent.

Following Devereux, Griffith, and Klemm (2002) and Bilicka and Devereux (2012), and assuming a consensus estimated user-cost elasticity of investment of –1.0, in the 2018 *Economic Report of the President*, the CEA calculated that the corporate income tax provisions in the TCJA would, on average, lower the user cost of capital, and thus raise demand for services, by approximately 9 percent. Using the Multifactor Productivity Tables from the Bureau of Labor Statistics in a growth accounting framework to increment the Congressional Budget Office's June 2017 10-year GDP growth projections by the additional contribution to output from a larger target capital stock, and assuming constant capital income shares, the CEA then calculated that the steady-state U.S. economic output would be between about 2 and 4 percent higher in the long run.

More formally, DeLong and Summers (1992) derive the adjustment dynamics by beginning with this identity:

$$\Delta Y_t = (r + \delta)\Delta K_t$$

where Y is output, r is the social net rate of return, δ is the economic depreciation rate, and K is the capital stock. The gross increase in Y produced by an increase in K is the gross rate of return on capital multiplied by the increase in K. The capital stock of an economy initially in the steady state that receives a permanent boost, I, to its gross investment therefore evolves according to:

$$\Delta K_t = I - \delta K_{t-1}$$

That is, the increase in the capital stock is equal to new gross investment minus depreciation of the preceding period's capital stock.

In the first period, the entire increase in investment translates into an increase in the capital stock: $\Delta K_t = I$, such that $\Delta Y_t = (r + \delta)I$. In the second period,

investment will still be higher by I, but because $K_1 > K_0$, depreciation will also be higher. The increase in the capital stock will therefore be smaller: $\Delta K_2 = (I - \delta K_1) = (I - \delta I) = (1 - \delta)I$, and $\Delta Y_2 = (r + \delta)(1 - \delta)I$. Successive increases in the capital stock will accordingly diminish, with the sum of changes gradually converging to a steady-state value ΔK^*:

$$\Delta K^* = I/\delta$$

And the cumulative change in output converges to a new steady-state level:

$$\Delta Y^* = I\,(r + \delta)\,/\,\delta$$

An increase in investment equal to 1 percentage point of output can therefore induce up to a $(r + \delta) / \delta$ percentage-point increase in the steady-state level of output, and up to a $(r + \delta) / \delta t$ increase in the growth rate of output over a period of t years.

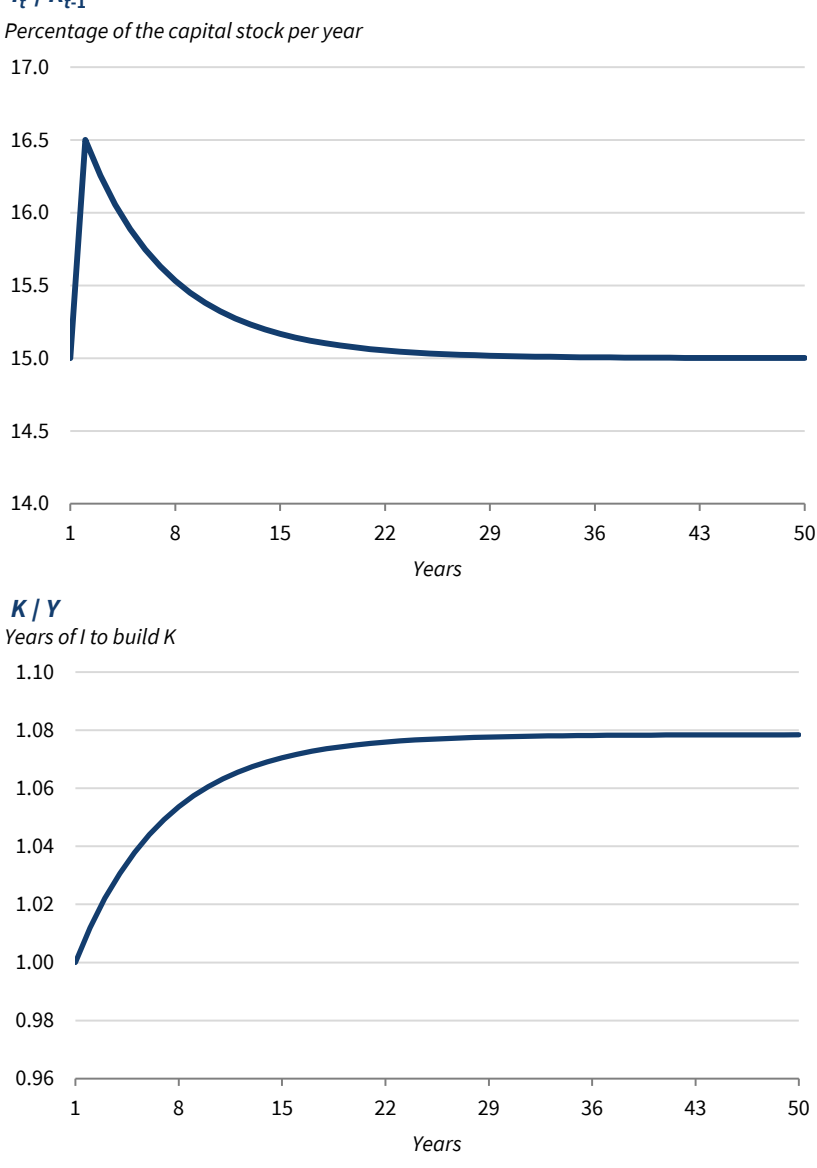
In the absence of capital adjustment costs, the standard neoclassical model therefore predicts an immediate jump in investment in the first period, though with no effect on the rate of growth of investment thereafter. The level effect, however, is permanent, such that the capital-to-output ratio and the ratio of the flow of new investment to the outstanding capital stock gradually approach their new, steady-state levels, as illustrated with a hypothetical example in figure 1-1.

Economic research (e.g., Hartman 1972; Abel 1983; Caballero 1991; and Bar-Ilan and Strange 1996), suggests that the costs associated with adjusting capital stocks may result in short-run adjustment lags. Consequently, we would expect the first margin of adjustment to a positive tax shock to capital investment to be expectations, which, unlike capital and labor market contracts, are instantaneously flexible. Consistent with this anticipated effect, figure 1-2 reports the percentage of businesses in the National Federation of Independent Business's (NFIB's) monthly survey reporting plans to raise capital expenditures in the next 3 to 6 months, reported as a 3-month centered moving average to smooth out random noise.

Figure 1-2 shows two marked upward shifts in the percentage of firms reporting planned increases in capital investment—first, at the moment of Donald Trump's election to the U.S. Presidency; and second, at the moment of the TCJA's passage. These increases followed two years during which the percentage of firms reporting plans to raise capital expenditures was essentially flat. Reinforcing this pattern, figure 1-3 reports the percentage of NFIB respondents reporting that now is a good time to expand. Once again, the survey data reveal two marked spikes—first, after the election of President Trump; and second, after the TCJA's passage. After the TCJA's passage, the percentage of respondents reporting that now was a good time to expand broke the survey's previous 1984 record to set a new all-time high.

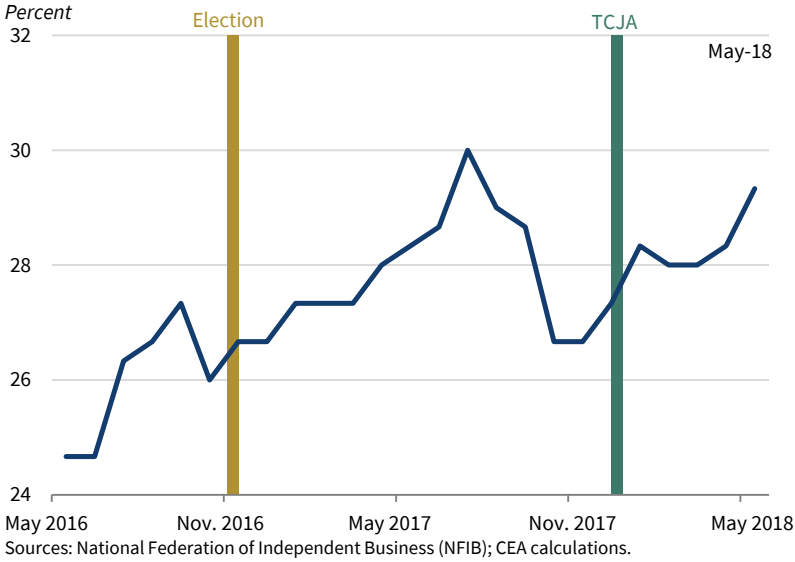
Meanwhile, in 2018:Q1, the Business Roundtable (2018) survey of CEOs reported record highs for their capital spending index and the percentage

Figure 1-1. Adjustment Dynamics to a New Steady-State Capital Output Ratio



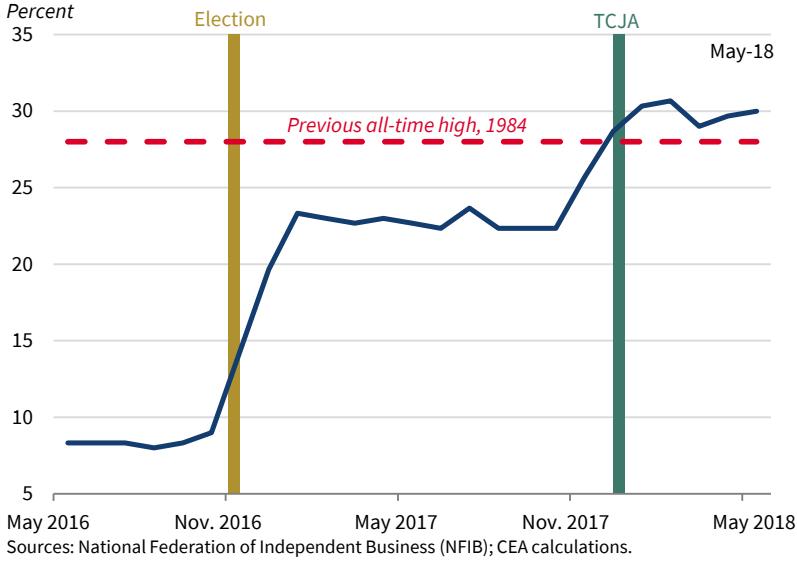
Source: CEA calculations.
Note: Adjustment to a new steady state after a 10 percent decline in the user cost of capital, assuming $r = 0.05$, $\delta = 0.15$, and an initial capital-output ratio of 1.0.

Figure 1-2. Percentage of NFIB Survey Respondents Planning Capital Expenditures in the Next 3 to 6 Months, 2016–18



Sources: National Federation of Independent Business (NFIB); CEA calculations.
Note: Data represent a centered 3-month moving average. TCJA = Tax Cuts and Jobs Act.

Figure 1-3. Percentage of NFIB Survey Respondents Reporting That Now Is a Good Time to Expand, 2016–18



Sources: National Federation of Independent Business (NFIB); CEA calculations.
Note: Data represent a centered 3-month moving average. TCJA = Tax Cuts and Jobs Act.

reporting rising capital spending in the next 6 months. Through 2018:Q3, both series remained higher than at any point since 2011:Q2. Also in 2018:Q1, the percentage of respondents to a National Association of Business Economists (2018) survey reporting rising capital expenditures on information and communication technology hit a record high, and has remained well above the previous average since the question entered the survey.

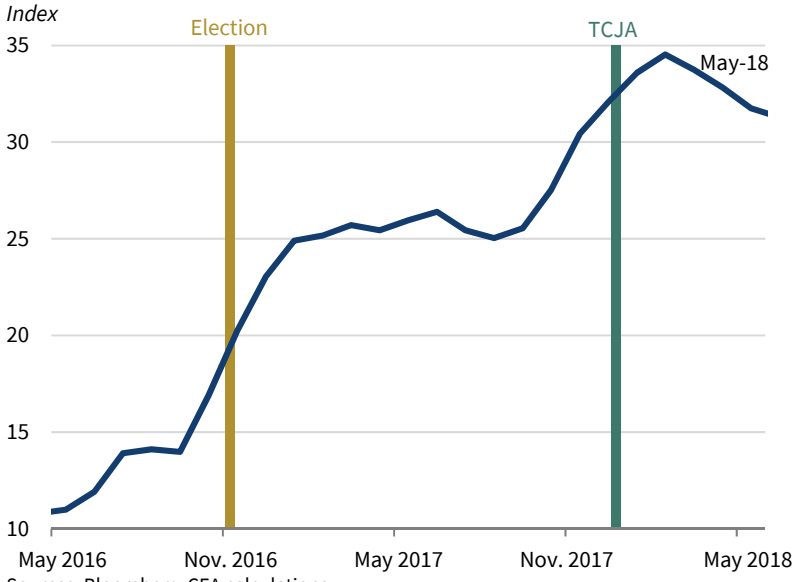
Broader survey results reflect the same pattern. Figure 1-4 reports the centered 3-month moving average of Morgan Stanley's Planned Capital Expenditures (Capex Plans) Index, which tracks what business firms will probably spend in coming months. Again, after two years of decline, we observe two marked spikes after the election of President Trump and the TCJA's passage. Indeed, at the start of 2018, the index set its all-time high. Over time, as actual investment begins to reflect investment plans, we would expect these indices, as well as other survey responses, to edge back, as more respondents report plans to leave investment unchanged once the new, higher level of investment is attained.

An additional, short-run margin of adjustment—succeeding the adjustment of expectations but preceding the adjustment of actual physical capital stocks—is new capital goods orders, as reported by purchasing managers. Figure 1-5 reports core capital goods orders, in billions of dollars, from January 2012 through November 2018. Once again, after two years of declines, we observe two sharp spikes in capital goods orders within months of investment-relevant events—first, after President Trump's election; and second, after the TCJA's passage.

Despite expected adjustment costs and investment lags in the transition to a higher-target capital stock, the first three quarters after the TCJA's passage saw a notable acceleration in investment. Figure 1-6 reports growth in real private nonresidential fixed investment from the time of the TCJA's passage until the third quarter of 2018, both for nonresidential investment overall and for the major subcomponents of structures, equipment, and intellectual property products, expressed as compound annual growth rates to smooth substantial quarterly volatility, with investment being the most volatile component of GDP.

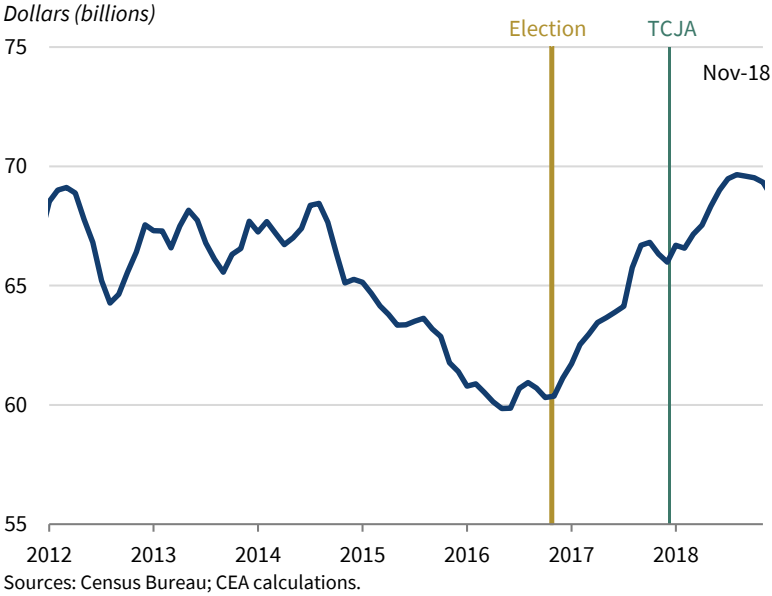
On a downward trend since 2014, we again observe a marked reversal, with private nonresidential fixed investment overall, as well as investment in each subcomponent of investment, up over preelection and pre-TCJA trends. Indeed, if we regress the compound annual growth rate of private nonresidential fixed investment on a linear time trend over the sample period 2009:Q3–2017:Q4 (2017:Q3 for equipment), and we project this trend into 2018 and reconstruct levels from forecasted growth rates, we find that as of 2018:Q3, overall private nonresidential fixed investment was up $150 billion (5.8 percent) over the trend. Among nonfinancial businesses, overall capital expenditures were up 12.1 percent over the trend.

Figure 1-4. Morgan Stanley's Capex Plans Index, 2016–18



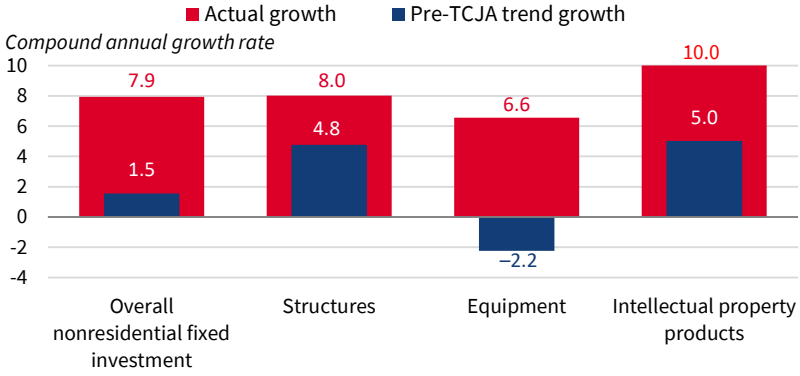
Sources: Bloomberg; CEA calculations.
Note: Morgan Stanley's Planned Capital Expenditures (Capex Plans) Index tracks what firms plan to spend in coming months. TCJA = Tax Cuts and Jobs Act. Data represent a centered 3-month moving average.

Figure 1-5. Core Capital Goods Orders, 2012–18



Sources: Census Bureau; CEA calculations.
Note: Core goods include nondefense capital goods, excluding aircraft. Data represent a centered 3-month moving average, truncating in November 2018. TCJA = Tax Cuts and Jobs Act.

Figure 1-6. Growth in Real Nonresidential Fixed Investment, 2017:Q4–2018:Q3

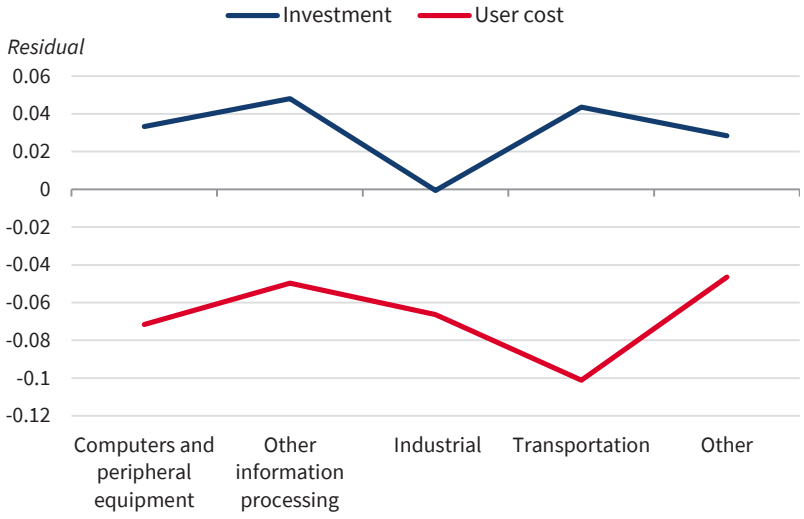


Sources: Bureau of Economic Analysis; CEA calculations.
Note: The structures and intellectual property products pre-TCJA trends are calculated on the sample 2009:Q3–2017:Q4. The equipment pre-TCJA trend is calculated on the sample 2009:Q3–2017:Q3, because full expensing was retroactive to September 2017. The data for structures and intellectual property products represent a 3-quarter compound annual growth rate. Equipment data represent a 4-quarter compound annual growth rate. The overall rates for the nonresidential fixed investment trend and actual compound annual growth are calculated based on a weighted average of the structures, equipment, and intellectual property product components.

Equipment investment, in particular, exhibited a pronounced spike in the fourth quarter of 2017, as both the House and Senate versions of the TCJA bill, which were respectively introduced on November 2 and November 9, stipulated that full expensing for new equipment investment would be retroactive to September 2017. This created a strong financial incentive for companies to shift their equipment investment to the fourth quarter of 2017, so as to deduct new equipment investment at the old 35 percent statutory corporate income tax rate. After the initial spike in the rate of growth in fixed investment, standard neoclassical growth models would predict a return of the *rate* of growth to its pre-TCJA trend, but from a higher, post-TCJA *level*, with the capital-to-output ratio thereby asymptotically approaching its new, higher steady-state level.

More revealingly, considering higher-resolution data at the detailed asset level, we observe that asset types exhibiting larger residuals from an *AR*(*n*) step-ahead forecast of the user cost of capital also experienced larger forecast errors for real investment in 2018. Following Cummins, Hassett, and Hubbard (1994), figure 1-7 reports autoregressive forecast errors for each disaggregated equipment investment series against forecast errors for the detailed asset-level user cost of capital, assuming equity financing. As can be observed in the figure, there is a negative correlation between forecast errors for the user cost of capital and investment, consistent with larger declines in the user cost of capital inducing larger increases in demand for capital services.

Figure 1-7. Forecast Errors for Equipment Investment and Price



Sources: Bureau of Economic Analysis; CEA calculations.
Note: Residuals from autoregressive forecasts of growth rates of each disaggregated equipment investment series are plotted against residuals from autoregressive forecasts of the percent change in the simplified user cost of capital by asset type.

Finally, though the projected increase in steady-state output is predominantly a long-run effect deriving from a higher flow of capital services as the economy transitions to a higher steady-state target capital stock, already in 2018 we observe the effects on growth of higher investment demand after corporate tax reform and robust consumer spending followed the enactment of the TCJA's individual provisions. During the 34 quarters between the start of the current expansion in 2009:Q3 and the TCJA's enactment in 2017:Q4, the average contribution of real private nonresidential fixed investment to GDP growth was 0.6 percentage point. But in the first three quarters after the TCJA's passage, the contribution of real private nonresidential fixed investment to GDP growth rose to 1.0 percentage point. As a share of GDP, private nonresidential fixed investment in the first three quarters of 2018 attained its second-highest level since 2001.

As documented in the 2018 *Economic Report of the President*, the principal challenge for estimating the effect of changes in corporate and personal income tax rates on economic growth is that the timing of tax changes tends to correlate with cyclical factors. Specifically, legislators tend to lower tax rates during periods of economic contraction and raise rates during periods of economic expansion, which can negatively bias estimates of the effects of changes in marginal tax rates on investment and output.

Two recent empirical approaches to addressing this threat to identification are structural vector autoregression (SVAR) and the use of narrative history

to identify exogenous tax shocks; both approaches were reviewed in the 2018 *Report*, and estimates from this literature were applied to the TCJA. The SVAR approach, which was pioneered by Blanchard and Perotti (2002), identifies tax shocks by utilizing information about fiscal institutions to distinguish between discretionary and automatic or cyclical tax changes. Meanwhile, the narrative approach, which was initiated by Romer and Romer (2010), relies on a textual analysis of tax debates to identify exogenous tax changes with political or philosophical, rather than economic, motivations. More recently, Mertens and Ravn (2013) have developed a hybrid of both approaches that utilizes Romer and Romer's narrative tax shock series as an external instrument to identify structural tax shocks.

Using the estimated revenue effects of the TCJA from the Joint Committee on Taxation (JCT 2017), Mertens (2018) applies estimated coefficients from the SVAR and narrative approaches to a tax cut of the TCJA's magnitude. He calculates that effects based on aggregate tax multiplier estimates—by Blanchard and Perotti (2002), Romer and Romer (2010), Favero and Giavazzi (2012), Mertens and Ravn (2012), Mertens and Ravn (2014), and Caldara and Kamps (2017)—imply a cumulative effect on GDP between 2018 and 2020 of 1.3 percent. Applying estimated impacts based on responses to individual marginal tax rates from Barro and Redlick (2011) and Mertens and Montiel Olea (2018), he calculates a cumulative effect by 2020 of 2.1 percent. Finally, applying estimated effects of disaggregated individual and corporate tax multipliers from Mertens and Ravn (2013), he calculates the cumulative effect on GDP between 2018 and 2020 of individual tax reform to be 0.5 percent, and the cumulative effect of business tax reform to be 1.9 percent.

As shown in figure 1-8, actual GDP growth in 2018 was consistent with these estimated effects. Between 2012:Q4 and 2016:Q4, the compound annual growth rate of real GDP averaged just 2.3 percent, slowing to 2.0 and 1.9 percent in 2015 and 2016, respectively. After increasing to 2.5 percent in 2017, GDP was on pace in the first three quarters of 2018 to grow by 3.2 percent over the four quarters of the calendar year, for the first time since 2004. Moreover, this growth represented a sharp divergence from the trend. Regressing the compound annual growth rate of GDP on a time trend over a pre-TCJA expansion sample period 2009:Q3–2017:Q4, projecting this trend into 2018, and reconstructing levels from forecasted growth rates, we find that as of 2018:Q3, GDP growth in 2018 was up 1.0 percentage point over the trend. Although it is difficult to empirically disentangle the TCJA's effects on growth from the effects of the Trump Administration's other economic policy initiatives to date, particularly deregulatory actions, the estimates reported in chapter 2, "Deregulation That Frees the Economy," of the 2018 *Economic Report of the President* suggest that these actions likely contributed less than 0.1 percentage point to growth in 2018.

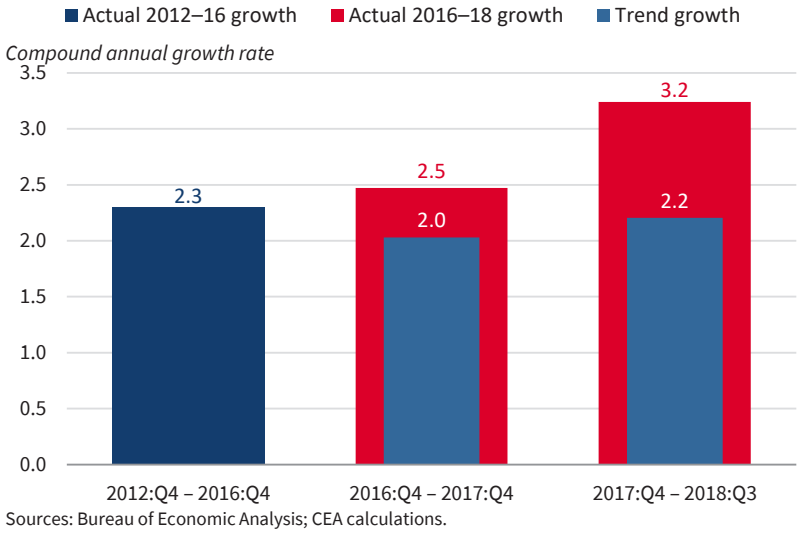
We also estimate the TCJA's effect on 2018 growth by calculating the divergence of observed growth from a 2017:Q3 baseline forecast, as discussed in chapter 10 of this *Report* and chapter 8, "The Year in Review and the Years Ahead," of the 2018 *Economic Report of the President*. To construct this baseline, we treat the TCJA as an unanticipated shock arriving in the fourth quarter of 2017. Adapting the approach of Fernald and others (2017), we then decompose pre-2017:Q4 growth rates into trend, cyclical, and higher-frequency components—using Okun's law and a partial linear regression model with a frequency filter—to estimate the long-run growth rate. We then estimate an unrestricted vector autogressive model (VAR) on detrended growth rates through 2017:Q3 of real GDP, the unemployment gap, the labor force participation rate, real personal consumption expenditures, and the yield spread of 10-year over 3-month Treasuries. We determine optimal lag length by satisfaction of the Akaike and Hannan-Quinn information criteria. Postestimation and VAR forecasting, we then add the estimated long-run trend. Relative to this baseline forecast, observed output growth was up 1.4 percentage points at a compound annual rate as of 2018:Q3. Figure 1-9 compares these two estimated effects of the TCJA to the SVAR and narrative estimates reported by Mertens (2018).

Another approach to evaluate the TCJA's effect on growth is to compare the Congressional Budget Office's (CBO) final, pre-TCJA 10-year economic projection with the post-TCJA actuals. In June 2017, the CBO forecasted real GDP growth of 2.0 percent in 2018, with real private nonresidential fixed investment growing by just 3.0 percent. If GDP growth during the four quarters of 2018 was instead 3.2 percent, as the U.S. economy was on pace to achieve through 2018:Q3, and if it were to then immediately revert to the CBO's June 2017 forecast, in 2027 economic output would be 1.2 percent higher than projected. If GDP were to simply grow by 3.2 percent in 2018, by the CBO's upwardly revised August 2018 forecast of 2.8 percent in 2019, and if it were to then revert to the pre-TCJA projection, in 2027 economic output would be 2.5 percent higher than projected, in line with the CEA's initial estimates.

Data available through 2018:Q3 therefore suggest that estimates from the Tax Policy Center (0.0), Penn-Wharton Budget Model (0.6–1.1 percent), JCT (0.7 percent on average over 10 years, implying a 10-year level effect of 1.2 percent), and Tax Foundation (1.7 percent) may constitute lower bounds. The preliminary evidence is, however, consistent with a more recent analysis by Lieberknecht and Wieland (2018), who employ a two-country dynamic stochastic general equilibrium model to estimate a long-run GDP effect of 2.6 percent.

An important implication of higher-than-projected growth is Federal government revenue. The JCT estimated the TCJA's conventional revenue cost at $1.5 trillion over 10 years, and a dynamic estimate of $1.1 trillion, after accounting for higher revenue due to economic growth, net of increased interest payments. If the TCJA's effect on economic growth exceeds the JCT's estimate, the actual long-run revenue cost may be lower.

Figure 1-8. Growth in Real GDP, 2012:Q4–2018:Q3

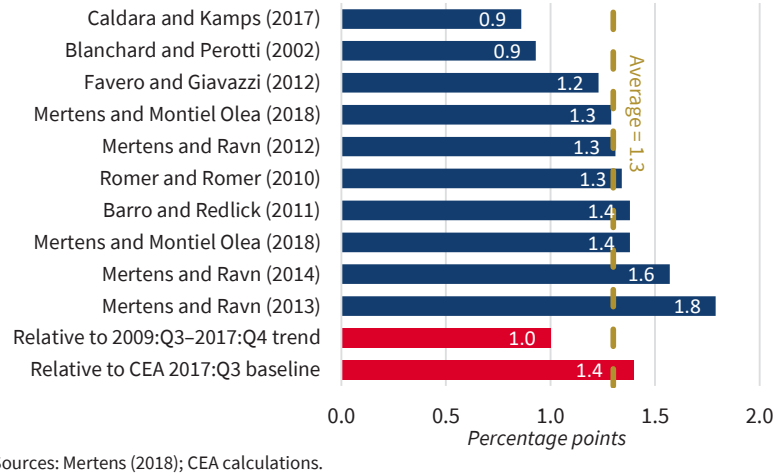


Sources: Bureau of Economic Analysis; CEA calculations.
Note: Data represent a compound annual growth rate over the given quarters. The 2016:Q4–2017:Q4 preelection trend projection is calculated for 2009:Q3–2016:Q4. The 2017:Q4–2018:Q3 pre-TCJA trend projection is calculated for 2009:Q3–2017:Q4.

The cumulative effect of higher near-term growth on revenue can be illustrated by calculating the difference between the CBO's final, pre-TCJA (June 2017) 10-year projections of growth and revenue, advancing from 2017:Q4 actuals, and the CBO's final, pre-TCJA 10-year economic projections updated with 2018 actual GDP data and April 2018 CBO revenue projections. Fiscal year revenue-to-GDP projections are converted to calendar years by assigning 25 percent of the subsequent fiscal year to the current calendar year. First, we assume that actual nominal GDP growth in the four quarters of 2018 achieved its 2018:Q1–2018:Q3 annualized pace of 5.6 percent. Second, we assume that actual nominal GDP growth in 2019 achieves the Administration's current projection of 5.3 percent. Third, we assume that, thereafter, growth reverts to the pre-TCJA trajectory projected by the CBO. Fourth, we assume that the ratio of revenue to GDP was as projected by the CBO in April 2018. In this simulation, Federal tax revenue would be about $500 billion higher over the 10 years through 2027. This macroeconomic feedback alone would thereby offset more than one-third of the conventional cost of the law.

Because increased growth in calendar year 2018 was likely augmented by other legislative and Administration policies, as well as nonpolicy economic factors, we also estimate the likely macroeconomic feedback of higher growth by applying the estimated coefficients from Romer and Romer (2010) and Mertens (2018) to GDP growth in 2018, 2019, and 2020, and assuming April 2018 revenue-to-GDP projections. This approach yields an estimated cumulative revenue effect of between $140 and $190 billion over 3 years, or between $480

Figure 1-9. Structural VAR and Narrative Estimates versus Actual



Sources: Mertens (2018); CEA calculations.
Note: VAR = vector autoregression. The 2009:Q3–2017:Q4 trend is estimated on compound annual growth rates and levels reconstructed from projected rates. The CEA's 2017:Q3 baseline is estimated using a VAR and statistical frequency filter, as described in chapter 10 of this *Report*. Mertens (2018) compiles references to 10 estimates from other papers (these other estimates are shown in this figure). Mertens and Olea (2018) provide two estimates from the same paper.

and $640 billion over 10 years if the level effect persists. Excluding Mertens's (2018) international estimations, which treat deemed repatriation—an effective reduction in the implicit tax liability of U.S. multinational enterprises—as a tax increase, the approach suggests a cumulative revenue feedback over 10 years of $810 billion. Because these empirically estimated growth effects only extend for three years, whereas the increased flow of capital services as the economy transitions to a higher steady-state capital-to-labor ratio is a long-run effect, the corresponding revenue effects may constitute a lower bound (box 1-1).

Because the TCJA was passed by Congress under the budget reconciliation process, the bill's conventional revenue cost, as estimated by its official scorer, the JCT, could not exceed $1.5 trillion over 10 years. As a result, several provisions of the TCJA are scheduled to expire by the end of fiscal year 2027. Specifically, many of the provisions affecting the personal income tax code are due to expire on December 31, 2025, whereas among corporate income tax provisions, bonus depreciation, particularly for equipment investment, is set to begin phasing out on January 1, 2023, and to fully phase out on December 31, 2026.

Using a neoclassical growth model, Barro and Furman (2018) estimate that making the TCJA's temporary business provisions permanent would raise long-run GDP by 2.2 percentage points above their baseline, law-as-written estimate, and by 0.8 percentage point over 10 years. Using a more

Box 1-1. The Mortgage Interest Deduction and the Tax Cuts and Jobs Act

Before the passage of the Tax Cuts and Jobs Act, discussions of potential changes in the mortgage interest deduction (MID) raised concern about possible future effects on home value and homeownership (NAR 2017). The National Association of Realtors commissioned a study that forecasted a 10.2 percent decline in home prices in the short run resulting from proposals in the TCJA that included, at the time, changes to the MID (PwC 2017). The TCJA did not eliminate the MID, but it did reduce the maximum mortgage eligibility by $250,000 (CEA 2018). In addition, the TCJA included a doubling of the standard deduction, which was projected to reduce taxable units claiming the MID and increase tax units utilizing the standard deduction (CEA 2017b).

The MID is a regressive subsidy with greater benefit for those with mortgages on more expensive homes, in part because individuals with higher incomes are more likely to itemize their deductions rather than opt for the standard deduction. The incentive provided by the MID for more expensive homes has ramifications for the housing market. Earlier CEA analyses and reviews of the literature note that the MID is not associated with higher home ownership rates, even though that was a central goal for maintaining the policy (CEA 2017b). Furthermore, given the incentive for larger and/or more expensive home purchases, the MID inflates housing prices.

The impact of the MID on housing prices is found to vary across different housing markets, depending on the elasticity of housing supply. A market with a more inelastic supply would face greater downward pressure on housing prices than a market with elastic supply as a result of an elimination of the MID. Furthermore, earlier CEA analyses comparing home ownership rates in the United States with those in Canada and other countries belonging to the Organization for Economic Cooperation and Development found the MID to be "neither necessary nor sufficient" for relatively higher home ownership rates (CEA 2017b, 7).

The final TCJA legislation, which was signed into law in December 2017, did not eliminate the MID—though, as noted above, both the change in the amount of mortgage debt for which interest can be deducted and the doubling of the standard deduction would result in fewer tax filers utilizing itemized deductions and the MID. Given this policy change, examining the reaction of both homeownership rates and housing prices across the country and across different markets can provide insight into the predicted effects detailed above. In the first 11 months of 2018, though housing prices continued to increase, the pace of housing price growth ticked slightly down. In the first three quarters of 2018, homeownership rates slightly increased.

Housing prices, measured by a number of housing price indices, have increased nationally since 2012. In the first 11 months of 2018, real house price indices continued to increase, though the pace of annual growth slowed slightly. The 12-month percentage change among three of the four real house

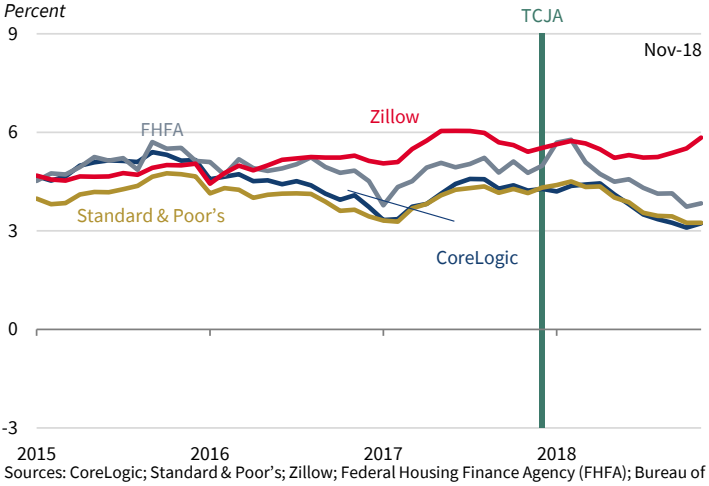
price indices displayed in figure 1-i decreased in 2018, though they have remained positive.

At the city level, the reaction of housing prices varied in the first three quarters of 2018. As noted above, how housing prices respond to a change in use of the MID is dependent on the elasticity of housing supply. In markets where housing supply is less responsive, such as San Francisco, housing prices would be expected to react more to changes in use of the MID versus a housing market with a less-regulated supply, such as Dallas. Though the real housing price indices in both San Francisco and Dallas continued to increase in the first three quarters of 2018, the annual change in Dallas's real housing price indices continued on the downward trend that was evident before the TCJA's passage. The pace of annual change in San Francisco, however, quickened in the first three quarters of 2018 after the TCJA's passage (figure 1-ii).

Contrary to a report commissioned by the National Association of Realtors in May 2017, which predicted that MID reforms similar to that ultimately enacted by the TCJA would cause a short-run decline in national home prices of 10.2 percent, housing prices have increased in some markets (PwC 2017).

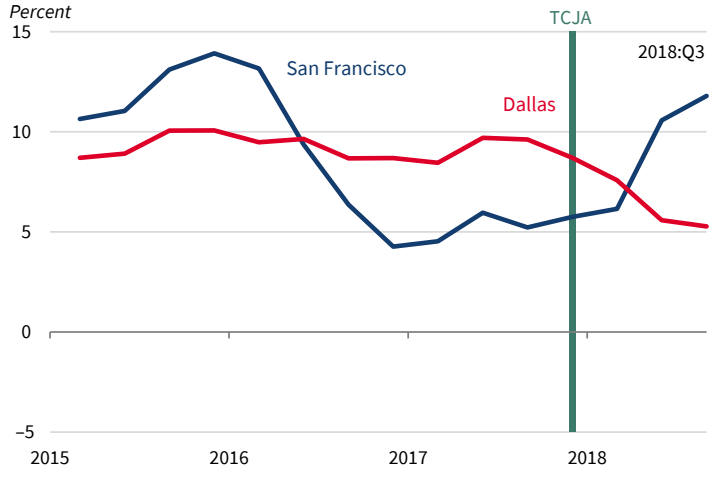
Homeownership rates nationally had trended down for several years, though they saw a reversal in 2016, when rates began to move upward for the first time since 2004. After the TCJA's passage, homeownership continued to increase nationally through the first three quarters of 2018 (figure 1-iii). Faster

Figure 1-i. 12-Month Percentage Change in National Real Housing Price Indices, 2015–18



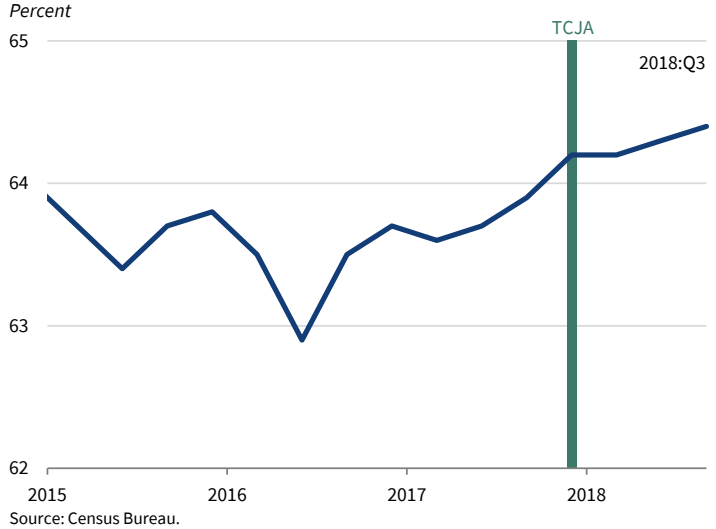
Sources: CoreLogic; Standard & Poor's; Zillow; Federal Housing Finance Agency (FHFA); Bureau of Economic Analysis; CEA calculations.
Note: TCJA = Tax Cuts and Jobs Act.

Figure 1-ii. Four-Quarter Percentage Change in Regional Real Housing Price Indices, 2015–18



Sources: Federal Housing Finance Agency; Bureau of Economic Analysis; CEA calculations.
Note: TCJA = Tax Cuts and Jobs Act.

Figure 1-iii. National Home Ownership Rate, 2015–18



Source: Census Bureau.
Note: TCJA = Tax Cuts and Jobs Act.

economic growth resulting from the TCJA would be expected to shift the demand curve for housing outward.

U.S. fiscal policy continues to implicitly subsidize owner-occupied housing by excluding imputed rental income from income taxation and through direct and indirect financial support of government-sponsored mortgage enterprises, as discussed in chapter 6 of this *Report*. User cost calculations reported by Poterba and Sinai (2008) suggest that the implicit subsidy of untaxed imputed rent is 1.5 times that of the MID, with the magnitude of the differential impact increasing in household income. Feldman (2002) and Passmore, Sherlund, and Burgess (2005), meanwhile, find that government sponsorship of the Federal National Mortgage Association and Federal Home Loan Mortgage Corporation lower mortgage rates by 7 to 50 basis points.

richly specified, two-country dynamic stochastic general equilibrium model, Lieberknecht and Wieland (2018) find that making the temporary provisions permanent would raise the long-run growth effect from 2.6 to 5.7 percent.

We can also estimate the effect on output of making permanent the TCJA's provisions currently set to expire in 2025 by calculating the static budget impact in 2026 and 2027 and applying the estimated impact multipliers reported by Mertens (2018). Specifically, calculating the change from 2025 in the JCT's (2017) static revenue estimate for 2026 and 2027, dividing by the Administration's projection for GDP in 2026 and 2027, reversing the sign, and applying the estimated tax multipliers indicate a cumulative impact of up to 0.4 percentage point by the end of 2027.

Labor Market Effects

In the 2018 *Economic Report of the President*, the CEA demonstrated that due to the high mobility of capital relative to labor, the incidence of corporate income taxation is increasingly borne by labor, though there is an important distinction between short- and long-run economic incidence. In the short run, increases (or decreases) in corporate income taxation are largely borne by current owners of corporate capital, through a decline (rise) in asset values, and by investors, through lower (higher) after-tax rates of return. However, the CEA estimated that in the long run, labor bears a majority of the burden of corporate income taxation, as an increase (decrease) in the effective tax rate on capital income from marginal investment lowers (raises) steady-state demand for capital services. The consequent decline (rise) in the capital-to-labor ratio lowers (raises) labor productivity and thus depresses (lifts) labor compensation.

Consistent with this investment channel, Giroud and Rauh (2018), employing Romer and Romer's (2010) narrative approach to estimate the effects of State-level corporate income tax changes, find short-run statutory corporate

tax elasticities of both employment and establishment counts of about –0.5, and elasticities of –1.2 over a 10-year horizon. Moreover, a broad survey of empirical studies of the incidence of corporate income taxation, reported in the 2018 *Economic Report of the President*, indicates that workers ultimately bear between 21 and 75 percent of the economic burden of corporate taxation, with more recent studies generally constituting the upper bound of this range, reflecting growing international capital mobility. The studies that were cited suggest a corporate income tax elasticity of wages of between –0.1 and –0.5, with estimated tax semielasticities from –0.4 to as large as –2.4.

Applying these estimated elasticities to the TCJA, the CEA calculated that a permanent 14-percentage-point reduction in the Federal statutory corporate tax rate would raise average annual household income by between $2,400 and $12,000 in the long run, with an average estimate of $5,500. Dropping the two lowest and two highest estimates suggests a tighter range, between $3,400 and $9,900.

Although these are long-run, estimated wage effects resulting primarily from a gradual transition to a new steady state with a higher capital-to-labor ratio, even in the short term, we would expect to observe forward-looking firms revising their labor market expectations. Models of rent sharing indicate that, in the short run, workers stand to benefit from increased profits accruing to their parent employer through a bargaining channel. This model does not make any predictions about changes in employment levels. Arulampalam, Devereux, and Maffini (2012) present a model of rent sharing in which changes in the corporate tax rate, expensing provisions, and overall marginal tax rates (from various and sundry other tax provisions) all serve to affect the wage. The model supposes a single union representing all wage earners. How the model's predictions would change under different bargaining arrangements is not clear, though in each case, the signs of the first derivative on corporate tax rates, longer depreciation schedules, and overall marginal tax rates are all negative, such that the TCJA is predicted to unambiguously increase workers' wages through the bargaining channel.

This theory accords with the empirical evidence, first noted by Krueger and Summers, that "more profitable industries tend to use some of their rents to hire better quality labor, and share some of their rents with their workers" (Krueger and Summers 1968, 17; also see 1988). More recent studies of intra-industry wage differentials confirm that rent sharing remains a feature of the U.S. labor market (Barth et al. 2016; Card et al. 2016; Song et al. 2019).

In the results of the research by Arulampalam, Devereux, and Maffini (2012), the wage is roughly equal to the weighted average of the outside wage option of the employer and some share of the firm's location-specific profit. Changes in expensing provisions affect the profits over which employers and employees bargain, even in the absence of changes in the target capital stock—as do other adjustments outside the corporate income tax rate that

serve to affect the firm's tax liability. Arulampalam and her colleagues note that if cost reductions induced by the tax law are fully passed on to consumers in the output market, the profits over which to bargain are unchanged. Finally, Arulampalam and colleagues' result highlights the role of the corporate tax rate itself, τ, in the wage bargain. Higher values of τ raise the value of the firm's outside option (here, relocation to another tax jurisdiction) and lower bargained wages. Lowering τ reduces the value of the firm's outside option (in this case, another tax jurisdiction) and, thus, increases worker wages.

Each of these effects is "immediate," manifesting in higher worker wages as soon as the impact of changes in corporate taxes on firm profits is known with some certainty. Thus, the spate of bonus and increased wage announcements immediately after the TCJA's enactment, reported in box 1-2, is consistent with the rent-sharing model of worker wages. It is also consistent with survey data that were gathered immediately after the TCJA's passage. Figures 1-10 and 1-11 report the net percentage of NFIB survey respondents reporting plans to raise worker compensation and increase employment over the next three months, expressed as a three-month centered moving average to smooth random monthly volatility. As with planned capital expenditures, the survey results indicate two marked upward shifts in compensation and hiring plans—the first after the election of President Trump, and the second after the TCJA's passage. In August 2018, the net share of independent businesses reporting plans to increase employment in the next three months set a new all-time record, whereas in October 2018, the net share of independent business reporting plans to raise worker compensation in the next three months broke a 28-year record to set a new all-time high.

Reinforcing the private survey data, and consistent with the research of Giroud and Rauh (2018), data from the Bureau of Labor Statistics' Job Openings and Labor Turnover survey also show a sharp uptick in labor demand after the TCJA's passage. Figure 1-12 reports total private job openings from 2014 through 2018. After leveling off in 2016 at between about 5 and 5.5 million, private job openings surged after the TCJA's passage, topping 6.5 million by August 2018. In addition, during the entire pre-TCJA expansion, real nonproduction bonuses per hour grew at a compound annual rate of 5.4 percent. Since the TCJA came into effect, they have risen $150 per worker on an annual basis, or by 9.3 percent.

Available labor earnings data are also consistent with the CEA's projections. Relative to a time trend estimated over the entire pre-TCJA expansion sample period (2009:Q3–2017:Q4), as of 2018:Q3, real disposable income per household was up $640 over the trend. Expressed as a perpetual annuity, this corresponds to a lifetime pay raise of about $21,000 for the average household, assuming the real discount rate currently implied by Shiller's cyclically adjusted earnings-to-price ratio for the Standard & Poor's (S&P) 500 of 3.1 percent. Across all households, this constitutes a $2.5 trillion boost to household

Box 1-2. Corporate Bonuses, Wage Increases, and Investment since the TJCA's Passage

In a dynamic, competitive economy, like that of the United States, firms compete for workers. And a robust academic literature, pioneered by one of President Obama's CEA chairs, Alan Krueger, shows that more profitable employers pay higher wages. Why? Because a firm that attempts to pay a worker less than he or she is worth will quickly lose the worker to a competitor. In a tight labor market, wage bargaining models predict that firms will respond to a profits windfall by raising wages and bonuses to attract and retain talent.

The CEA has already tallied 645 companies that have offered bonuses, and/or increased retirement contributions, since the TCJA was enacted. The total number of workers receiving a bonus or increased retirement contribution now stands at over 6 million, with an average bonus size of $1,154 (figure 1-iv). Additional workers are seeing higher take home pay, given that nearly 200 companies have announced increases in wages, with 102 of these firms announcing minimum wage increases.

Walmart, the Nation's largest private employer, has announced an increase in the starting wage of its workers of $2 an hour for the first six months and $1 thereafter. For a full-time employee working 40 hours a week, this means up to $3,040 a year in additional pay. These pay increases are for those earning Walmart's minimum wage, so, as a share of income, the gains are substantial—at least 16 percent.

Many other employers have done the same as Walmart—including BB&T, the 11th-largest bank by assets in the United States, where full-time workers who are paid the bank's minimum wage will see a $6,000 increase in their annual income. Nearly 15 percent of firms announcing minimum wage hikes have provided increases of at least $4,000.

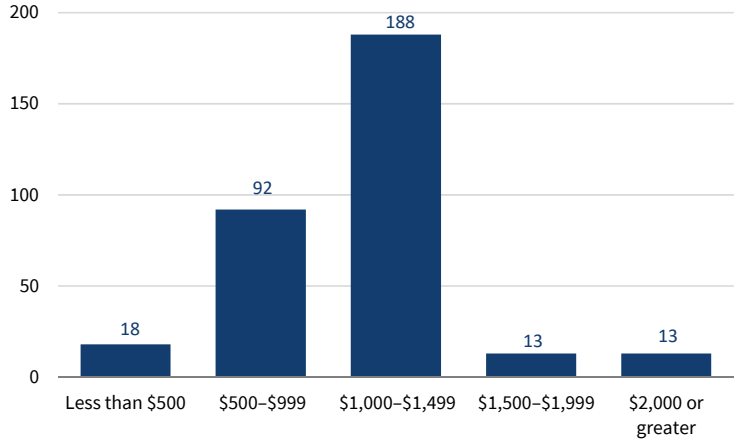
Hard-working Americans are also seeing savings in their electricity bills thanks to the TCJA. More than 130 companies have pledged to pass tax savings on to their customers in the form of reduced tax rates—a practice that will pass savings on to millions.

The President's promise to lower corporate taxes and reduce red tape has led American businesses to a surge in investment, and since the TCJA became law, the CEA has tallied over $220 billion in new corporate investment announcements attributable to it. Likewise, the March 2018 Morgan Stanley composite Planned Capital Expenditures (Capex Plans) Index marked a record high in a series that began 13 years ago. As discussed earlier in this chapter, the official investment statistics show that this investment boom is already taking hold. This is welcome news; according to the CEA's calculations, a return to the historical rate of capital deepening in the United States would give households a boost of $4,000 in annual wage and salary income by 2026.

The bottom line is that the TCJA's enactment in December 2017 gave a much-needed boost to American workers, who in recent years have endured

Figure 1-iv. Distribution of Announced Tax Reform Bonuses, 2018

Number of companies



Sources: Americans for Tax Reform; CEA calculations.
Note: This figure does not encompass all companies that have announced tax reform benefits. Benefits related to retirement, wage increases, and ambiguous bonus announcements are excluded.

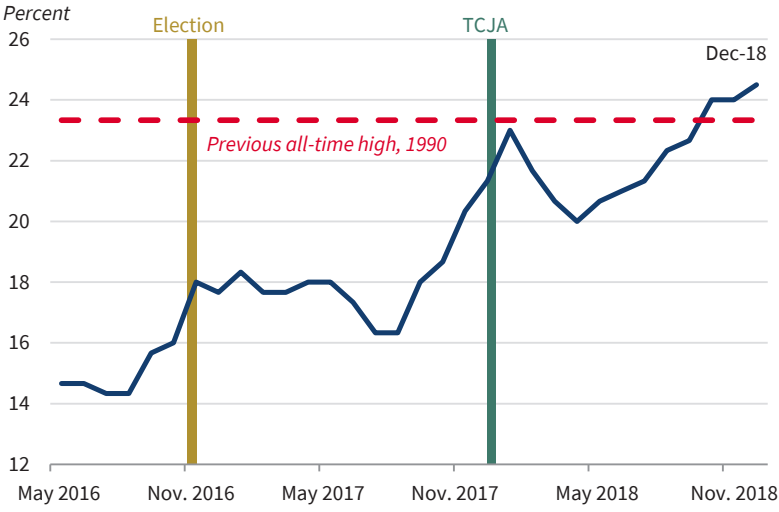
chronic underinvestment due to a corporate tax code that discouraged domestic capital formation. With investment growth now accelerating in response to the corporate tax cuts, we should consider the recent spate of bonus and wage hike announcements as merely a down payment on a long-overdue raise for American households.

income. As discussed above, this effect is expected to grow over time through increased capital deepening, raising capital per worker, labor productivity, and wages. Though long-run capital deepening is expected to further raise real disposable personal income, this effect will be partially offset if the personal income tax cuts currently scheduled to expire after 2025 are not extended or made permanent through new legislation.

Figure 1-13 reports compound annual growth rates in real median weekly earnings of full-time wage and salary workers and real average weekly earnings of production and nonsupervisory employees in manufacturing since the TCJA's enactment, relative to the recent trend. On an annualized basis, real median usual earnings for full-time wage and salary workers were up $805 over the trend, while real average earnings for production and nonsupervisory employees in the manufacturing sector specifically were up $493 (box 1-2).

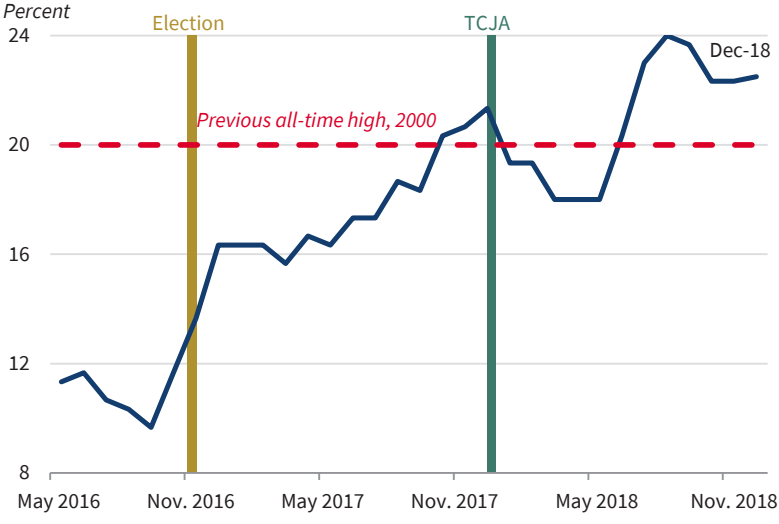
In the longer run, as articulated by the CEA (2017a) and in the 2018 *Economic Report of the President*, we expect wage gains to be driven primarily by increased investment raising the target capital stock, and thus the

Figure 1-10. Net Percentage of NFIB Survey Respondents Planning to Raise Worker Compensation in the Next 3 Months, 2016–18



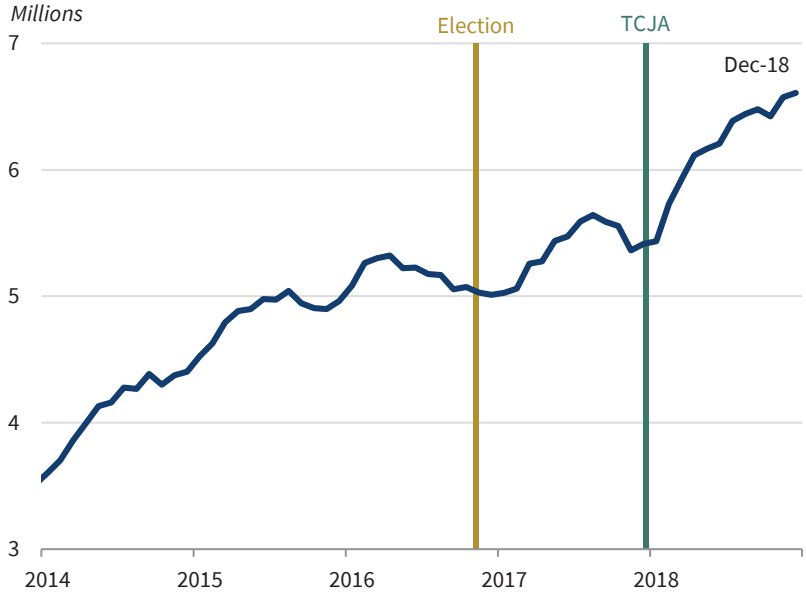
Sources: National Federation of Independent Business (NFIB); CEA calculations.
Note: Data represent a centered 3-month moving average, truncating in December 2018.
TCJA = Tax Cuts and Jobs Act.

Figure 1-11. Net Percentage of NFIB Survey Respondents Planning to Increase Employment, 2016–18



Sources: National Federation of Independent Business (NFIB); CEA calculations.
Note: Data represent a centered 3-month moving average, truncating in December 2018.
TCJA = Tax Cuts and Jobs Act.

Figure 1-12. Total Private Job Openings, 2014–18

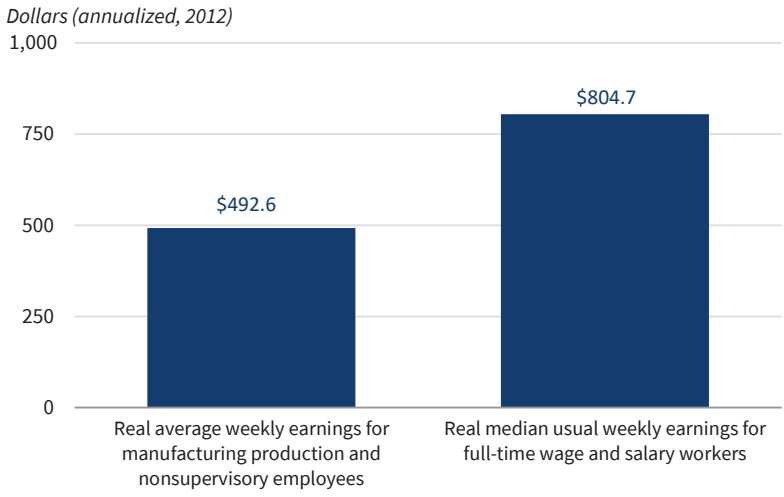


Sources: Bureau of Labor Statistics; CEA calculations.
Note: Data represent a centered 3-month moving average, truncating in December 2018.
TCJA = Tax Cuts and Jobs Act.

steady-state level of capital per worker and, consequently, labor productivity. Already in 2018, we observe evidence of this mechanism operating. During the pre-TCJA expansion in 2009:Q3–2017:Q4, growth in business sector labor productivity averaged 1.0 percent, compared with a pre-2008 postwar average of 2.5 percent. Growth in nonfarm business sector labor productivity averaged 1.1 percent during the pre-TCJA expansion, compared with a pre-2008 postwar average of 2.3 percent. In contrast, in the first three quarters of 2018, business sector labor productivity grew at an annual rate of 2.0 percent—double the rate of the pre-TCJA expansion. Labor productivity in the nonfarm business sector grew at an annual rate of 1.8 percent.

Finally, as noted in the 2018 *Economic Report of the President*, Keane and Rogerson (2012, 2015) demonstrate that because incremental human capital acquired through employment raises expected future earnings—the net present value of which varies inversely with age—older and relatively more experienced workers can be expected to have larger labor supply responses to changes in marginal personal income tax rates than younger, less experienced workers. Indeed, we observe this effect in the data. Regressing the employment-to-population of over-55-year-olds on a linear time trend fully interacted with a binary variable for post-TCJA over a sample period July 2009–December 2018, we estimate a positive coefficient on the interaction term, and we can reject the null hypothesis of no slope change with 95 percent confidence. In

Figure 1-13. Above-Trend Real Labor Compensation and Wage Growth, 2018



Sources: Bureau of Labor Statistics; Bureau of Economic Analysis; CEA calculations.
Note: The trend is calculated for 2009:Q3 (September 2009 for monthly data) through 2017:Q4 (December 2017 for monthly data). Annualized 2012 dollars assume a 52-work-week year.

contrast, we cannot reject the null hypothesis with a similar level of confidence for other age cohorts, which suggests that the TCJA may have had a specific, positive effect on labor force participation among near-retirement and retirement-age workers at the margin.

Although there is some evidence (e.g., Blau and Robins 1989; Whittington 1992; and Haan and Wrohlick 2011) that expansion of the Child Tax Credit may positively affect the long-run potential labor supply through the fertility channel, the data that are currently available do not permit evaluation of this hypothesis. However, there is also evidence (e.g., Blau and Robins 1989; Whittington 1992; Averett, Peters, and Waldman 1997; and Haan and Wrohlick 2011) of positive labor supply responses among females to decreases in the effective cost of child care through public subsidies. Consistent with this literature, female labor force participation among those age 25–34 years rose 0.9 percentage point in 2018—2.1 percentage points above the trend during the period 2009:Q3–2017:Q4. In contrast, overall female labor force participation rose 0.5 percentage point (1.3 percentage points over the trend), while male labor force participation among those age 25–34 rose just 0.3 percentage point (0.7 percentage point above the trend). The elimination of personal exemptions may have partially offset any maternal-specific labor supply effects of the Child Tax Credit's expansion, though this offsetting effect would have been mitigated by the near doubling of the standard deduction.

International Developments

In the 2018 *Economic Report of the President*, the CEA reported that an additional margin along which changes in corporate income tax rates can affect economic growth is through the propensity for multinational enterprises to engage in profit shifting across international tax jurisdictions. One technique for effecting such profit shifts is the use of international transfer pricing of intellectual property assets between U.S. multinational enterprises and their subsidiaries in lower-tax jurisdictions.

Though transfer pricing is intended by tax authorities to be conducted on an "arm's length," transactional basis, in practice the pricing of relatively untraded or otherwise illiquid proprietary intellectual property is often opaque, with the result that firms may systematically underprice the value of the transferred asset. Guvenen and others (2017) estimate that such profit shifting by multinational enterprises results in substantial U.S. economic activity being imputed to overseas affiliates, and therefore has been understating the United States' GDP, particularly since the 1990s. These researchers correct for this mismeasurement by reweighting the consolidated firm profits that should be attributed to the United States by apportioning profits according to the locations of labor compensation and sales to unaffiliated parties. Applying these weights to all U.S.-based multinational enterprises and aggregating to the national level, the authors calculate that in 2012, about $280 billion in official foreign profits could have been properly attributed to the United States.

Importantly, the 2018 *Economic Report of the President* documented that the propensity to engage in international profit shifting is highly responsive to effective marginal corporate income tax rate differentials. For example, Hines and Rice (1994), estimate a tax semielasticity of profit shifting of –2.25, indicating that a 1-percentage-point decrease in a country's corporate tax rate is associated with an increase of 2.25 percent in reported corporate income.

Before the TCJA, the United States had one of the highest statutory corporate income tax rates among the countries that belong to the Organization for Economic Cooperation and Development, and U.S. multinational enterprises therefore faced strong incentives to report profits in lower-tax jurisdictions. Hines (2010), Phillips and others (2017), and Zucman (2018) each rank the top 10 jurisdictions they quantitatively identify as tax havens. In these rankings, 8 economies—Bermuda, Hong Kong, Ireland, Luxembourg, the Netherlands, Singapore, Switzerland, and the U.K. Caribbean islands—appear on all three lists. As of 2017, these 8 jurisdictions, with a combined population of just 0.6 percent (44 million) of the world's population and 3.2 percent of global output, accounted for 43 percent of the United States' direct investment abroad position, on a historical cost basis. After the TCJA's passage, in the first two quarters of 2018, U.S. direct investment in these 8 jurisdictions declined by $200 billion (box 1-3).

The "Deemed Repatriation" of Accumulated Foreign Earnings

In addition to reduced incentives to shift corporate earnings on a flow basis, the TCJA also included provisions designed to incentivize the repatriation of past earnings previously held abroad. In particular, the TCJA imposed a one-time tax, which it termed "deemed repatriation," on past, post-1986 earnings that were being held abroad, regardless of whether these earnings are repatriated. With a tax of 15.5 percent on earnings representing liquid assets such as cash and 8 percent on earnings representing illiquid, noncash assets, payable over eight years, deemed repatriation was intended to incentivize the reallocation of past corporate earnings from investment in low-yield assets in low-tax jurisdictions to real investment in U.S.-based fixed assets. Indeed, on a directional basis, outbound U.S. direct investment consequently declined by $148 billion in the first three quarters of 2018, as U.S. multinational companies redirected investment toward the domestic economy.

Although the precise volume of total accumulated U.S. corporate earnings held abroad is difficult to estimate, we can calculate an approximation by summing the net flow of earnings reinvested abroad since 1986—as reported in table 6.1 of the Bureau of Economic Analysis' International Transactions Accounts—through 2017. This calculation suggests that a maximum cumulative total of $4.3 trillion was held abroad by U.S. multinational enterprises as of 2017:Q4. Of this sum, $571 billion, or 13 percent, was repatriated in the first three quarters of 2018 alone, including both the flow of current earnings and the distribution of past earnings. The trend in the volume of quarterly repatriations through 2018:Q3 suggests that this pace can be expected to abate in 2019.

Although the distribution of past earnings between cash and noncash investments abroad is similarly difficult to assess, Credit Suisse (2015) recently estimated that 37 percent of overseas earnings of nonfinancial S&P 500 companies were held in the form of cash. The share, 43 percent, of the U.S. direct investment position accounted for by the eight small jurisdictions identified by Hines (2010), Phillips and others (2017), and Zucman (2018) as tax havens is therefore consistent with the Credit Suisse estimate. Assuming a 37 percent cash share of a $4.3 trillion stock, deemed repatriation could raise as much $460 billion in additional tax revenue by 2026, before reduced credits for foreign taxes are paid.

This constitutes an extreme upper-bound estimate of potential revenue from deemed repatriation, because the cumulated flow of reinvested earnings may include defunct firms and/or firms that have since been acquired by other foreign-based firms. But there are also reasons to expect that the JCT and the Bureau of Economic Analysis's (BEA's) estimates of $340 and $250 billion, respectively, may be conservative. Specifically, data revisions since the JCT and BEA estimations, as well as the inclusion of reinvested earnings in 2017:Q4, yield a substantially larger tax base for the deemed repatriation tax. Second, private sector estimates (Credit Suisse 2015) suggest calculations based on the

Box 1-3. The TCJA's Provisions Shift the United States toward a Territorial System of Taxation

Accompanying the substantial reduction in the U.S. corporate tax rate as part of the Tax Cuts and Jobs Act were provisions that shifted the United States away from a worldwide system of taxation and toward a territorial system. The provisions of the Global Intangible Low-Tax Income (GILTI), the Foreign Derived Intangible Income (FDII), and the Base Erosion and Anti-Abuse Tax (BEAT) aim to address the incentives for U.S. firms to shift profits abroad. Profit-shifting has become increasingly costly in recent decades, with estimated revenue loss increasing 2.5 times between 2005 and 2015, rising by an estimated $93 to $114 billion, or 27 to 33 percent of the U.S. corporate income tax base (Clausing 2018). A total of 80 percent of the profit shifted abroad by U.S. firms in 2015 was to tax haven countries. The previous worldwide system taxed U.S. firms on their global profits, though most profits earned abroad by U.S. firms were only taxed once they were repatriated to the United States. Evidence from surveyed U.S. tax executives indicated that U.S. firms exposed themselves to nontax costs to avoid taxes on repatriated income (Graham, Hanlon, and Shevlin 2010). The United States was one of just 6 nations among 35 countries belonging to the Organization for Economic Cooperation and Development with a worldwide tax system before the TCJA's passage. As a result, U.S. firms were left at a potential competitive disadvantage to other OECD-country firms competing in overseas markets that were generally not subject to home-country taxes on profits earned abroad (Pomerleau 2018). The inclusion of the GILTI, FDII, and BEAT in the TCJA shifted the United States toward a hybrid territorial system, lowering incentives for U.S.-based firms to shift profits out of the country.

The GILTI and FDII are complementary provisions that address the tax system's treatment of intangible income. The GILTI is a tax at a reduced rate on the foreign profits of a U.S. firm earned with respect to activity of its controlled foreign corporations in excess of a 10 percent return, where 10 percent is the rate of return attributable to depreciable tangible assets in a competitive market. A rate of return in excess of 10 percent is attributed to mobile income from intellectual property or other intangible assets. The FDII also addresses profits from intangible assets, including intellectual property, but with respect to U.S. firms' excess returns related to foreign income earned directly. The FDII provides for a reduced tax rate on foreign-derived U.S. income in excess of the 10 percent rate of return associated with tangible assets (Pomerleau 2018). Together, the GILTI and FDII are intended to neutralize the role that tax considerations play in choosing the location of intangible income attributable to foreign market activity.

The BEAT establishes a tax on U.S. firms with revenue of $500 million or more and base erosion payments generally in excess of 3 percent of total deductions. Base erosion payments are generally certain deductible payments that a U.S. firm makes to related and controlled foreign corporations.

The BEAT discourages firms from profit-shifting to lower-tax foreign jurisdictions by applying the 10 percent BEAT tax rate generally to both taxable income and base erosion payments made by the firm (Pomerleau 2018). The 10 percent rate started phasing in from 5 percent in 2018, and will end up rising to 12.5 percent in 2025.

The BEAT, GILTI, and FDII contribute to reshaping the incentives the firms face in determining the location of assets as well as new investment when considering after-tax income. When coupled with the notable reduction in the corporate tax rate, this shift toward a territorial system of taxation may contribute to the TCJA's supply-side effect on changing the growth rate of U.S. output. The growth in the intellectual property component of real nonresidential business fixed investment is above the recent trend (see figure 1-6 in the main text). Investment in real intellectual property products grew at the fastest pace since 1999 in the first three quarters after the TCJA's passage, at a compound annual rate. Further, by disincentivizing profit shifting, the provisions could have a positive impact on the corporate income tax base. The GILTI, modeled with the reduction of both the corporate income tax rate and the rate for repatriated income, is estimated to increase the corporate tax base by $95 billion, resulting in $19 billion in additional U.S. revenues (Clausing 2018).

cash share of total assets less equity of U.S.-majority-owned foreign affiliates, as reported in the BEA's Activities of U.S. Multinational Enterprises accounts, may substantially underestimate the share of cumulated reinvested earnings liable for the deemed repatriation taxation at the 15.5 percent rate. During the temporary two-year repatriation holiday introduced by the Homeland Investment Act (HIA) of 2004, U.S. multinational firms repatriated $400 billion, of which about $300 billion, or 27 percent of the about $1.1 trillion in then-accumulated overseas earnings, is attributed to the HIA (Redmiles 2008; Herrick 2018).

However, though many authors have attempted to draw comparisons between the HIA and the TCJA (e.g., Gale et al. 2018; and Herrick 2018), aside from introducing an incentive to repatriate, the two laws are otherwise generally incommensurable. Most importantly, the comparison is invalid because the TCJA, in addition to deemed repatriation, also permanently lowered the user cost of capital, whereas the HIA, a temporary tax cut on past earnings, did not. Though the Jobs and Growth Tax Relief Reconciliation Act of 2003 had expanded first-year depreciation allowances for certain properties, increased Section 179 expensing, and cut the dividend tax rate for individual shareholders, these provisions were all temporary, expiring, respectively, in December 2004, December 2005, and December 2008. Thus, the bonus depreciation introduced in 2003 expired before the HIA came into effect, while Section 179

expensing applied for only half the duration of the repatriation holiday, and the dividend tax cut applied to no more than three or four years of the lives of assets newly installed during the HIA repatriation holiday.

In addition, under the "new view" of dividend taxation, the tax advantage of financing marginal investment out of retained earnings or low-risk debt exactly offsets the double taxation of subsequent dividends. As a result, among firms financing marginal investment out of retentions and paying dividends out of residual cash flows, taxes on dividends have no impact on investment incentives (King 1977; Auerbach 1979; Bradford 1981; Auerbach and Hassett 2002; Desai and Goolsbee 2004; Chetty and Saez 2005; Yagan 2015). This contrasts to the "traditional view," in which marginal investment is financed through variations in the level of new shares. Under the "new view" of dividend taxation, we would therefore expect the impact of the HIA on U.S. domestic investment to have been limited to cash-constrained firms.

Consistent with the "new view," Dharmapala, Foley, and Forbes (2011) find that the HIA had no significant effect on domestic investment, employment, or research and development, in part because most U.S. multinationals were not financially constrained at the time, and because repatriated earnings were generally distributed to shareholders through share repurchases, particularly among firms with stronger corporate governance. Among firms with low investment opportunities and high residual cash flows, stronger corporate governance would indeed predict higher shareholder distributions, given that weakly governed managers may face incentives to raise executive compensation or embark on risky or otherwise low-return acquisitions. Blouin and Krull (2009) also find that, on average, firms that repatriated in response to the HIA had lower investment opportunities and higher free cash flows than nonrepatriating firms, and relatively increased share repurchases by about $60 billion, though this had no significant effect on dividend payments.

In contrast to Dharmapala, Foley, and Forbes (2011), but consistent with the "new view," Faulkender and Petersen (2012) find that the HIA had a large, positive effect on domestic investment by previously capital-constrained firms, though unconstrained firms accounted for the majority of repatriations. Faulkender and Petersen's findings suggest that domestic and foreign internal funds are not perfectly fungible, and that lowering the cost of repatriating foreign income reduces the cost of financing marginal investment with internal foreign funds. Consistent with the imperfect fungibility of domestic versus foreign internal funds, Desai, Foley, and Hines (2016) find that high corporate tax rates encourage borrowing through trade accounts, with U.S. multinational firms employing trade credit to reallocate capital between locations with differing tax rates. These researchers conclude that the additional corporate borrowing through trade accounts is comparable in magnitude to the additional borrowing through bank loans and debt issuance associated with higher corporate tax rates.

Reinforcing Faulkender and Petersen's results and in contrast to Dharmapala, Foley, and Forbes (2011), Dyreng and Hills (2018) find that employment increased in the geographic region surrounding the headquarters of repatriating multinational enterprises in the three years immediately after the HIA's inception, and that the effect of repatriation on employment was increasing in the amount repatriated. Dyreng and Hills observe that the positive employment effect was strongest when the geographic region is defined as a 20-mile radius around the headquarters of repatriating firms, with estimates indicating that employment rose by more than three employees for every $1 million repatriated in response to the HIA.

Share Repurchases and Capital Distributions

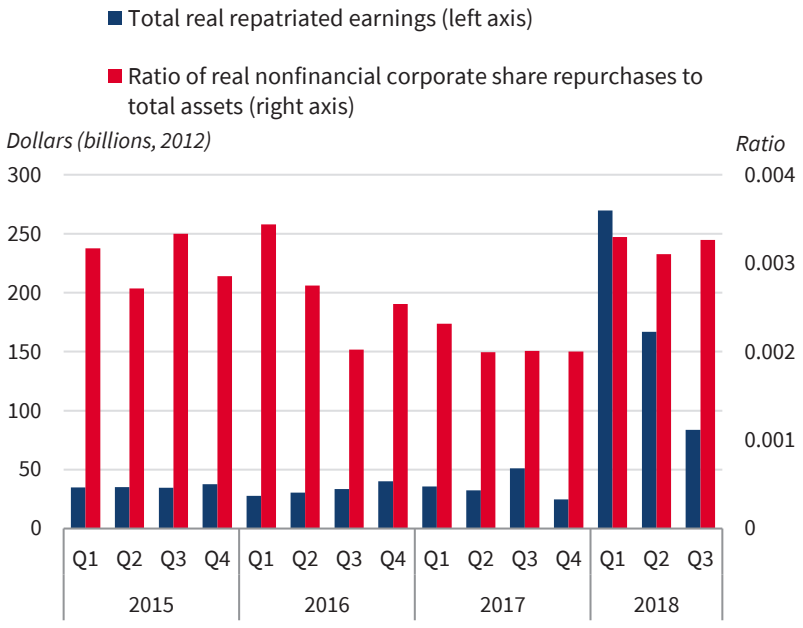
Research conducted by the Federal Reserve shows that, coinciding with repatriated earnings in the first quarter in 2018, there was a substantial increase in share repurchases conducted by U.S. multinational firms (Smolyansky, Suarez, and Tabova 2018). This analysis further shows that the increase in share repurchases was concentrated in the top 15 firms in terms of total cash held abroad. Figure 1-14 shows the elevated level of real repatriated earnings by U.S. firms coincident with an increase in real share repurchases relative to total assets.

The large positive shock to share repurchases, centralized in the top cash-held-abroad U.S. firms, after the TCJA's enactment has garnered an extensive discussion on the impact of share repurchases. As noted in more recent research, "a common critique is that each dollar used to buy back a share is a dollar that is not spent on business activities that would otherwise stimulate economic growth," though "people seem to forget some of the very basic lessons of financial economics when it comes to share repurchases" (Asness, Hazelkorn, and Richardson 2018, 2).

Jensen's (1986, 323) free cash flow hypothesis outlined the agency conflicts that arise between shareholders and corporate managers when firms have substantial "cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital." Jensen notes that managers of a firm with large free cash flows may use those excess flows to pursue low-return acquisitions rather than distributing residual cash to shareholders. He further suggests that agency conflicts between managers and shareholders are greater within firms with larger free cash flows as "the problem is how to motivate managers to disgorge the cash rather than investing it at below the cost of capital or wasting it on organization inefficiencies" (Jensen 1986, 323). Jensen's seminal hypothesis informs the later literature by underscoring how excess or free cash flows, if unable to be invested in projects with a positive net present value, may incur economic costs and lead to agency conflicts.

Dittmar and Mahrt-Smith (2007) find evidence in support of Jensen's hypothesis. Consistent with Dharmapala, Foley, and Forbes's (2011) observation

Figure 1-14. Real U.S. Repatriated Earnings and Share Repurchases, 2015–18



Sources: Federal Reserve Board; Bureau of Economic Analysis; CEA calculations.

that share repurchases in response to the HIA were particularly pronounced among repatriating firms with stronger corporate governance, Dittmar and Mahrt-Smith estimate that investors value $1.00 in cash in a poorly governed firm at only $0.42 to $0.88. Contrary to popular myth, this is the primary mechanism whereby share repurchases may raise share prices; repurchases otherwise have no mechanical effect on share price. For example, following Cochrane (2018), suppose a company with $100 in cash and a factory worth $100, and with two outstanding shares, each valued at $100, uses that $100 in cash to repurchase one of the two outstanding shares. The company now has one asset—a factory worth $100—and one outstanding share, worth $100. There has been no change in share price or shareholder wealth. However, if investors had previously worried that there was a 40 percent chance that corporate management would squander the $100 in cash on excessive executive compensation or loss-making investment projects or acquisitions, then the two shares would have been valued at $80 each. If the company then repurchased one of the two outstanding shares, it would have $20 in cash, a factory worth $100, and one outstanding share valued at $112, assuming that investors still attach a 40 percent probability to mismanagement.

Grullon and Michaely (2004) also provide empirical evidence that supports Jensen's free cash flow hypothesis, finding, among other results, that

the market reaction to firms announcing share repurchases is more robust if the firm is more likely to overinvest, and that repurchasing firms experience substantial reductions in systematic risk and the cost of capital relative to nonrepurchasing firms. Their findings support Jensen's hypothesis that share repurchases are a firm's value-maximizing response when they do not have investments to make that have a positive net present value. Grullon and Michaely (2004, 652) further note that "repurchases may be associated with a firm's transition from a higher growth phase to a lower growth phase. As firms become more mature, their investment opportunity set becomes smaller. These firms have fewer options to grow, and their assets in place play a bigger role in determining their value, which leads to a decline in systematic risk."

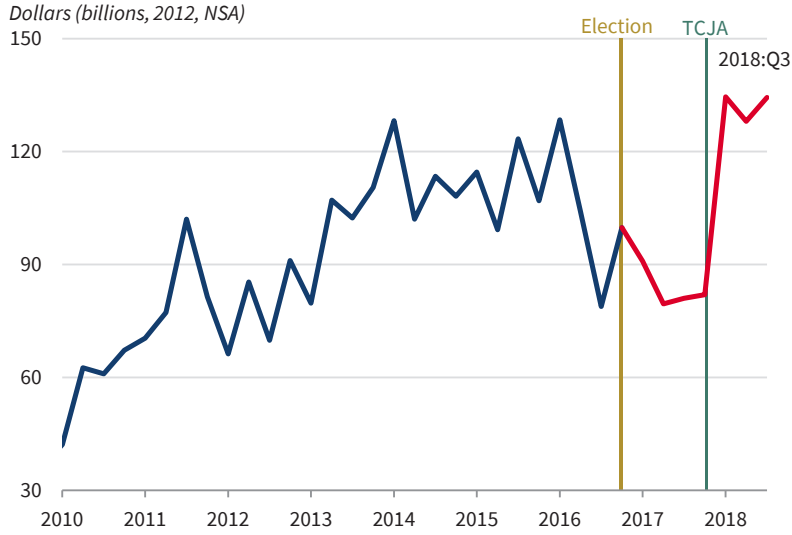
Though share repurchases and dividend payments constitute alternative mechanisms for distributing earnings, they are imperfect substitutes. First, dividends are subject to personal income tax when received, but capital gains are not taxed until realized, and therefore many investors prefer share repurchases over dividends because they allow the shareholder to determine when he or she incurs the tax liability. Second, in open market repurchases, firms do not have to commit to repurchase. Third, there is no expectation that distributions through share repurchases will recur on a regular basis, in contrast to dividends (Dittmar 2000). In practice, market participants view changes in the amount of dividends paid to be a signal of management's view of the firm's prospects. Because dividend decreases are viewed negatively, firms tend not to raise dividend payments unless management believes they can be maintained. Dividends thus tend to exhibit "stickiness," increasing when management believes the firm's prospects are sustainably good and decreasing only when absolutely necessary (Brav et al. 2005).

Brennan and Thakor (1990), Guay and Harford (2000), and Jagannathan, Stephens, and Weisbach (2000) accordingly find that since the Securities and Exchange Commission legalized share repurchases in 1982, they have become firms' preferred method for distributing "transient," nonoperating residual cash flows, whereas dividend payments are the preferred method for distributing "permanent," operating residual cash flows. Thus, theory and empirical evidence suggest that, among cash-unconstrained firms, a large, positive shock to cash flow, such as from a lowered cost of accessing the accumulated stock of past residual cash flows abroad, is likely to be distributed via share repurchases. Among previously cash-constrained firms, any profit windfall in excess of positive expected return investment opportunities is also likely to be distributed via share repurchases.

Figure 1-15 reports a pronounced increase in corporate share repurchases after the TCJA's passage, with repurchases rising above the recent trend by $200 billion as of 2018:Q3. In contrast, figure 1-16 reports that though corporate net dividend payments rose slightly after the TCJA's passage, the increase was modest, and net dividends were only $15 billion above the recent trend.

Figure 1-15. Real Nonfinancial Corporate Share Repurchases, 2010–18

Dollars (billions, 2012, NSA)

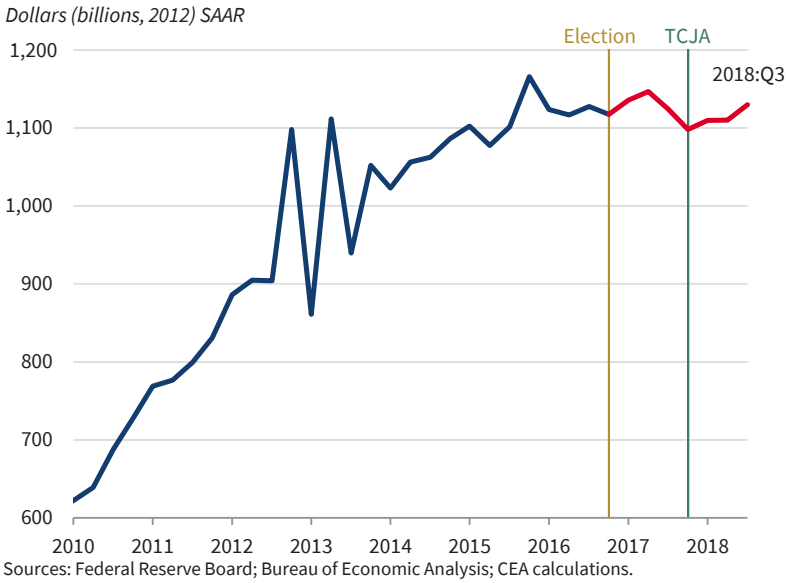


Sources: Federal Reserve Board; Bureau of Economic Analysis; CEA calculations.
Note: NSA = non–seasonally adjusted. TCJA = Tax Cuts and Jobs Act.

Observed share repurchases may be substantially smaller in volume relative to repatriations because under the "new view" of dividend taxation, a simultaneous positive shock to cash flow and investment generates an ambiguous effect on shareholder distributions, depending on the relative magnitudes of the coincident shocks. Though the has TCJA created a positive financial windfall—both for past residual earnings and future cash flow—it has also substantially and permanently lowered the break-even rate of return on marginal investment. Auerbach and Hassett (2002) find that though the probability of share repurchases is higher among firms with a greater cash flow, the probability of repurchase activity is lower among firms with more investment, and the estimated coefficients on cash flow and investment are of the same absolute magnitude. Indeed, a Wald test that the sum of the estimated coefficients on two lags of investment equals (in absolute value) the sum of the estimated coefficients on two lags of cash flow is accepted at all standard levels of significance, and for every specification estimated, and the simple correlation is very close to –1.0.

Auerbach and Hassett (2002) further observe that the probability of repurchase activity is highest among large firms with strong capital market access—as indicated by high bond ratings and coverage by multiple analysts. Consistent with these results, Hanlon, Hoopes, and Slemrod (2018), analyzing corporate actions in response to the TCJA, find that observed increases in share repurchases after the TCJA's passage were extremely concentrated among a

Figure 1-16. Real Corporate Net Dividends, 2010–18



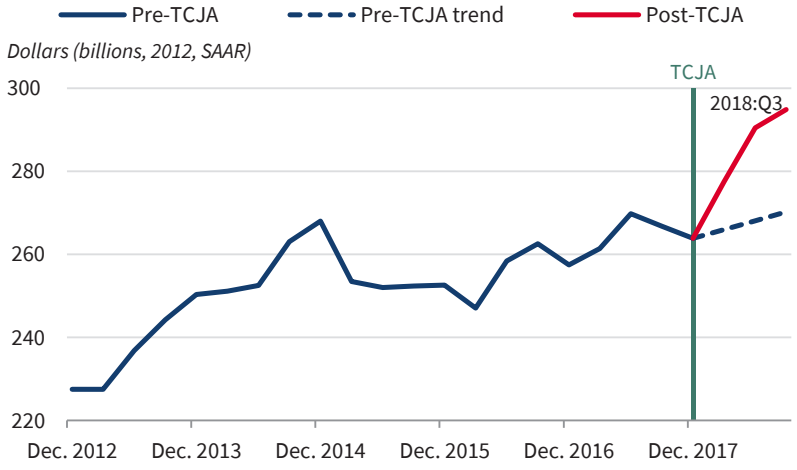
Sources: Federal Reserve Board; Bureau of Economic Analysis; CEA calculations.
Note: SAAR = seasonally adjusted annual rate. TCJA = Tax Cuts and Jobs Act.

very small subset of cash-abundant firms—particularly Apple, Amgen, Bank of America, Pfizer, and JPMorgan Chase. Excluding already-cash-unconstrained Apple alone from the sample, these researchers find that the value of shares repurchased in 2018:Q1 were no higher than the value of shares repurchased in 2016:Q1. The concentration of the increase in the volume of repurchase activity among such a small subset of firms suggests that though these firms may have been cash-unconstrained, many other firms faced binding financing constraints.

The corporate finance literature therefore strongly suggests that repurchase activity is an integral margin of adjustment to a positive cash flow–cum–investment shock, constituting the primary mechanism whereby efficient capital markets reallocate capital from mature, cash-abundant firms without profitable investment opportunities to emerging, cash-constrained firms with profitable investment opportunities. For example, Alstadsaeter, Jacob, and Michaely (2017) find that a 10-percentage-point cut in Sweden's dividend tax rate in 2006 improved efficiency by inducing capital reallocation from established, cash-rich firms to cash-constrained firms.

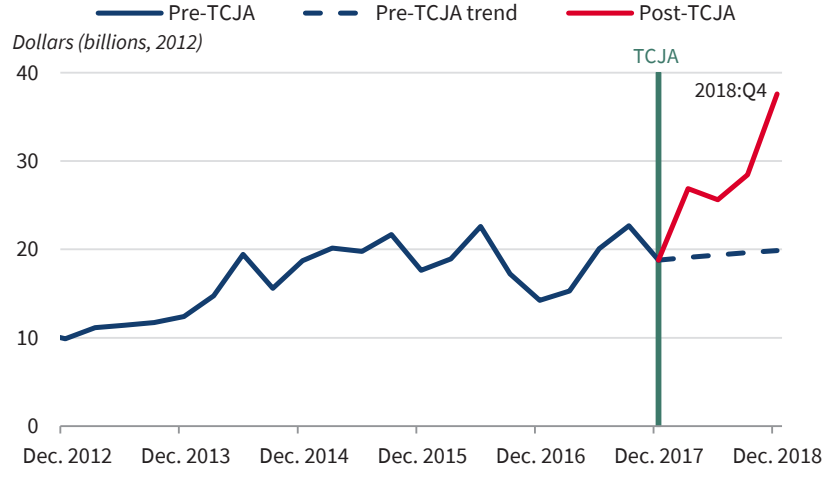
Similarly, Fried and Wang (2018) find that non-S&P 500 public firms—which are generally younger and faster growing than S&P 500 firms—were net importers of equity capital for every year between 2007 and 2016, with net shareholder inflows into these firms equal to 11 percent of net shareholder distributions by S&P 500 firms. These researchers further observe that a

Figure 1-17. Real Private Nonresidential Fixed Investment by Noncorporate Businesses, 2012–18



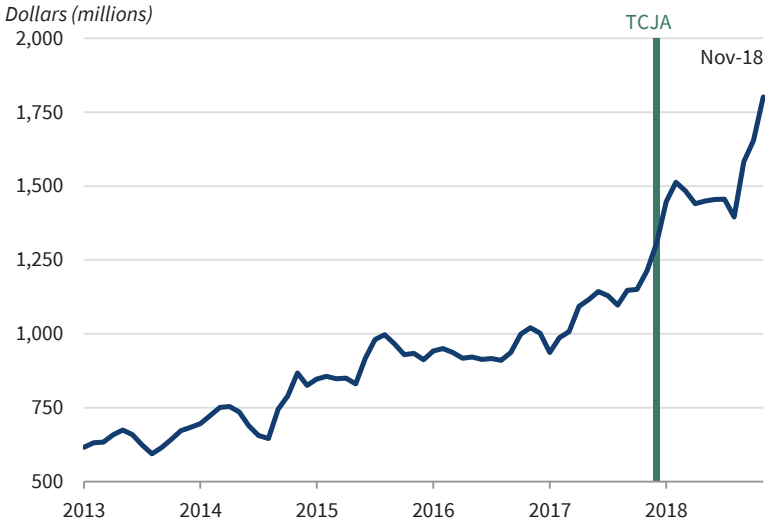
Sources: Federal Reserve Board; Bureau of Economic Analysis; CEA calculations.
Note: SAAR = seasonally adjusted annual rate. The trend is calculated for 2009:Q3–2017:Q4. Nominal values are deflated using the chain price index for private nonresidential fixed investment. TCJA = Tax Cuts and Jobs Act.

Figure 1-18. Real Venture Capital Investment, 2012–18



Sources: National Venture Capital Association; Bureau of Economic Analysis; CEA calculations.
Note: The trend is calculated for 2009:Q3–2017:Q4.To deflate the real value in 2018:Q4, it is assumed that the GDP chain price index grew at the same compound annual rate in 2018:Q4 as in 2018:Q1–Q3. TCJA = Tax Cuts and Jobs Act.

Figure 1-19. Gross Foreign Sales of U.S. Corporate Stocks, 2013–18



Sources: Federal Reserve Board; CEA calculations.
Note: Data represent a centered 3-month moving average, truncating in November 2018.
TCJA = Tax Cuts and Jobs Act.

substantial fraction of net shareholder distributions by all public companies is reinvested in initial public offerings by newly listing companies, as well as in nonpublic firms through venture capital and private equity vehicles. They additionally note that these firms account for more than 50 percent of private nonresidential fixed investment, employ nearly 70 percent of U.S. workers, and generate almost half of corporate profits. As shown in figures 1-17 and 1-18, real private investment by noncorporate businesses and private equity firms rose sharply in 2018. Among noncorporate firms, in the first three quarters of 2018, real nonresidential fixed investment rose 16.0 percent at a compound annual rate, which would constitute the fastest calendar-year growth in noncorporate business investment since 1993 if sustained through the fourth quarter (see box 1-4 for a discussion of the TCJA and family farms).

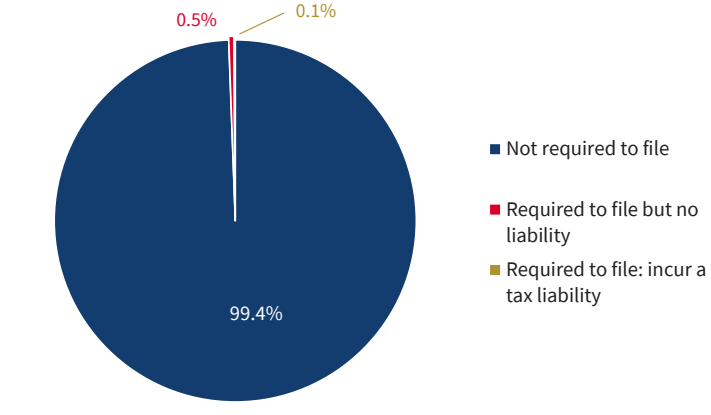
Asness, Hazelkorn, and Richardson (2018, 4) echo Fried and Wang's (2018) findings. In particular, they address the "myth" that "share repurchases have come at the expense of profitable investment." They note that funds obtained by the shareholder after a repurchase are often invested elsewhere. This "redirection of available capital" ensures that capital flows to new investment opportunities. They do note that "there is always the possibility for agency issues to create incentives for corporate managers to engage in suboptimal share repurchase decisions," though the literature on agency theory finds positive value in paying back free cash flows as much as it does negative ones.

Box 1-4. Estate Taxes and Family Farms

A total of 98 percent of U.S. farms are family businesses. Succession planning, successfully passing the farm to the next generation, is a critically important issue for farm families. The Tax Cuts and Jobs Acts reduced the effective tax rate for family farm households by 3.3 percent. Williamson and Bawa (2018), researchers at the Department of Agriculture, estimate that if the TCJA's estate tax provisions had been in place in 2016, family farm households would have faced an average effective tax rate of 13.9 percent that year instead of 17.2 percent. The TCJA also doubled the estate value that could be excluded from an individual's estate taxes to $11.18 million. A large portion of a farm's assets are illiquid, most often with land as the largest category, equaling millions of dollars. Without a significant estate tax exemption, farms would sometimes need to be liquidated to meet estate tax liability.

President Trump was clear that he wanted to spare farm families from the punitive effects of estates taxes when passing the farm to the next generation. The TCJA achieves this objective by virtually eliminating the need for farms to pay estate taxes. Williamson and Bawa (2018) estimate that if the TCJA's estate tax provisions had been in place in 2016, then 0.11 percent of all farm estates would have had to pay estate taxes, and only 0.58 percent would have had to file an estate tax return. And Williamson and Bawa also estimate that the aggregate tax liability of all farm estates in 2016 would have been

Figure 1-v. The Tax Cuts and Jobs Act: Farm Estates Exempted from Filing and Paying Estate Taxes, 2016



Source: U.S. Department of Agriculture.
Note: Data are based on 2016 farm estates.

reduced from $496 million under the previous estate tax rules to $104 million under the TCJA (figure 1-v).

By doubling the estate tax threshold, introducing a 20 percent deduction for pass-through income, and extending and expanding bonus depreciation for equipment investment, the TCJA may also positively affect investment by independent farms. Poterba (1997) demonstrates that the estate tax is effectively a tax on capital income and thus lowers after-tax investment returns—particularly, as mortality risk is increasing in age, among older proprietors. Kotlikoff and Summers (1981, 1988) and Gale and Scholz (1994) also highlight the substantial contribution of intergenerational transfers to aggregate capital formation. Especially if the TCJA's provisions that are currently scheduled to expire are made permanent, the TCJA can therefore be expected to incentivize new capital formation among independent farms, thereby raising productivity and steady-state output.

Finally, an additional second-order effect of increased repurchase activity in response to repatriation is the impact of share repurchases on measured foreign direct investment. The BEA (2018) defines foreign direct investment as the ownership or control, directly or indirectly, by a single foreign individual or entity, of "10 percent or more of the voting securities of an incorporated U.S. business enterprise, or an equivalent interest in an unincorporated U.S. business enterprise." Consequently, given that U.S. multinational enterprises employ some fraction of repatriated funds to repurchase outstanding shares, some of these shares may have been previously held by foreign entities. Accordingly, figure 1-19 reports the three-month centered moving average of gross foreign sales of U.S. corporate stocks. Consistent with repatriating firms repurchasing shares, including shares previously held by foreign entities, we observe a substantial spike in gross foreign sales immediately after the TCJA's enactment.

Conclusion

In the 2018 *Economic Report of the President*, the Council of Economic Advisers demonstrated that before the TCJA's enactment, the U.S. economy and labor market were adversely affected by the conjunction of rising international capital mobility and increasingly internationally uncompetitive U.S. business taxation, with adverse consequences for domestic capital formation, capital deepening, and wages. Drawing on an extensive academic literature, the *Report* concluded that the TCJA's business and international provisions would raise the target U.S. capital stock, reorient U.S. capital away from direct investment abroad in low-tax jurisdictions and toward investment in the United States, and raise household income through both a short-run bargaining channel

and a long-run capital deepening channel. The *Report* also documented that reductions in effective marginal personal income tax rates by the TCJA were expected to induce positive labor supply responses.

In this chapter, we have used the available data to examine each of these anticipated effects of the TCJA, with particular attention to the relative velocities of adjustment along each margin. We find that the TCJA had an immediate and large effect on business expectations, with firms immediately responding to the TCJA by upwardly revising planned capital expenditures, employee compensation, and hiring. We also observe revised capital plans translating into higher private investment in real fixed assets, with nonresidential fixed investment growing at an annual rate of about 8 percent in the period 2017:Q4–2018:Q3, to a level $150 billion over the recent trend. In addition to tallying more than 6 million workers receiving bonuses that could be directly attributed to the TCJA, with an average bonus of $1,200, we also estimate that as of September 2018, real disposable personal income per household had risen $640 over the trend during calendar year 2018 thus far. As a perpetual annuity, this increase in compensation corresponds to a lifetime pay raise of about $21,000 for the average household, or $2.5 trillion across all households.

Finally, we also report evidence of a reorientation of U.S. investment from direct investment abroad, particularly in low-tax jurisdictions, to investment in fixed assets in the United States. Specifically, in the first three quarters after the TCJA's enactment, U.S. direct investment abroad declined by $148 billion, while the U.S. direct investment position in eight identified tax havens declined by $200 billion. Citing a large body of corporate finance literature, we conclude that shareholder distributions through share repurchases is an important margin of adjustment to a simultaneous positive shock to cash flow and investment, constituting the primary mechanism whereby efficient capital markets reallocate capital from mature, cash-abundant firms without profitable investment opportunities to emerging, cash-constrained firms with profitable investment opportunities.