

CORPORATE BEHAVIORAL RESPONSES TO THE TCJA FOR TAX YEARS 2017–2018

Tim Dowd, Christopher Giosa, and Thomas Willingham

We analyze the initial corporate response to the 2017 enactment of the “Tax Cuts and Jobs Act” (TCJA). The TCJA changed many corporate tax provisions, including a reduction of the corporate statutory tax rate from 35 percent to 21 percent effective in 2018 and sweeping changes to the taxation of income earned abroad by U.S. corporations. Based on a sample of U.S. corporate tax returns, we find that corporations accelerated deductions into 2017 and delayed income into 2018, thereby minimizing their taxes. We estimate an income and deduction shifting tax elasticity of -0.11 and 0.08 , respectively. Additionally, we study detailed tax returns of 81 large corporations to understand how those changes impacted them.

Keywords: corporate taxation, international taxation, taxpayer behavioral responses, income shifting

JEL Codes: H2, H3

I. INTRODUCTION

Congress passed Public Law 115-97, commonly referred to as the “Tax Cuts and Jobs Act” (TCJA), in December 2017.¹ The act fundamentally shifted tax-related incentives for businesses and individuals within the United States both before and after its specific provisions took effect. Our research, using longitudinal corporate tax

¹ While the TCJA was not enacted until December of 2017, the lead-up to tax reform was extensive. Tax reform was a major platform for the Republican party leading up to the November 2016 elections. In June of 2016, the Speaker of the House of Representatives Paul Ryan released a sweeping rewrite of the tax code, including a shift to a destination-based cash flow tax at a 20 percent rate for corporations (Gravelle, 2017). With commencement of the 115th Congress, work on tax reform began in earnest, culminating in Ways and Means Committee Chairman Kevin Brady introducing his bill on November 2, 2017, and passage out of the Ways and Means Committee and the House of Representatives on November 13 and November 16, respectively. In turn, the Senate Finance Committee considered the bill in November with passage out of the Senate on December 2.

Tim Dowd: Joint Committee on Taxation, Washington, DC, USA (tim.dowd@jct.gov)

Christopher Giosa: Joint Committee on Taxation, Washington, DC, USA (chris.giosa@jct.gov)

Thomas Willingham: Joint Committee on Taxation, Washington, DC, USA (tom.willingham@jct.gov)

return data including unique advanced data and data compiled by inspecting detailed corporate tax data, investigates the magnitude and direction of corporate behavioral responses to the TCJA. This paper answers the question: How did large corporate entities alter their recognition of income and timing of their deductions in 2017 and 2018 in response to the TCJA?

Upon enactment, many researchers predicted modest gross domestic product (GDP) increases and substantial federal revenue losses due to the Act (Page et al., 2017; Mertens 2018; Gale et al., 2018). Additionally, others sought to decipher and predict the directional impact of the TCJA on many facets of firm behavior including organizational form (Henry, Plesko, and Utke, 2018), the ability of firms to respond to the business cycle (Dowd and Landefeld, 2018), and incentives for investment at home and abroad (Lyon and McBride, 2018). Several other papers discuss the degree to which the new international provisions increase distortions on the chosen location of economic activity (Dharmapala, 2018) and reduce incentives to shift profits to low-tax jurisdictions (Clausing, 2020). Several recent publications use new financial reporting data to analyze more specifically whether the act was successful from a policy perspective (Avi-Yonah, 2018) or from a revenue perspective (Horst, 2019; Saunders-Scott and Shand, 2019). Our paper is an extension of a report done by the staff of the Joint Committee on Taxation (JCT) (Joint Committee on Taxation, 2020), and it contributes to this literature on the effects of the TCJA on corporate revenues and behaviors.

We first establish that large corporations intertemporally shifted income and deductions due to the TCJA reforms of domestic tax policy. We observe movements in components of income, deductible expenses, tax credits, and tax payments. These results allow us to appraise the validity of our own a priori assumptions regarding the TCJA and those of other researchers. In anticipation of the Act, we expected corporations to delay the receipt of some of their 2017 income to subsequent years and to accelerate deductions for future expenses into 2017 to the greatest degree possible. Our analysis assumes — particularly for our 2017 results — that corporations either responded swiftly once enactment appeared inevitable or that they were able to anticipate the reduction in the corporate tax rate as discussions of tax reform accelerated during the year. Because of the uncertainty about the reform, any effects we find could be considered a lower bound on what would have occurred had the reform been enacted earlier in the year or with more certainty. We find evidence of this type of behavior with an income shifting tax elasticity of approximately -0.11 and a deduction shifting tax elasticity of 0.08 .²

Prior literature especially relevant to this paper analyzed corporate responses to the Tax Reform Act of 1986 and found evidence of corporate entities accelerating deductions and delaying earnings in the year before the provisions of the bill took effect (Guenther, 1994). Researchers also attributed increased income in subsequent years to this type of shifting (Slemrod, 1995). As with the Tax Reform Act of 1986, researchers

² An alternative interpretation of the income shifting elasticity is that it is the result of increased economic activity in 2018 as a result of the reduced corporate tax rate or some combination of shifting and increased economic activity. Indeed, the Joint Committee on Taxation (2017b) reported that the macroeconomic effects of the TCJA were likely to result in a 0.7 percent increase in GDP over the budget window. Until we have more years of data, clarity regarding this distinction will remain unresolved.

theorized that the TCJA, a similarly expansive piece of legislation, would cause corporate income and deduction shifting behavior. Horst (2019) documents some of these types of tax minimizing strategies. Researchers especially expected firms to, at the expense of future contributions, shift pension and profit-sharing deductions (Gaertner, Lynch, and Vernon, 2020) and executive compensation (Durant, Gong, and Howard, 2020) to 2017. Our findings offer insight into the accuracy of models related to firm behavior and the magnitude by which large corporate entities can alter their taxable income and shift deductions for tax purposes.

Additionally, we evaluate firm behavioral adjustments in response to the TCJA's international provisions. Congress intends these provisions to provide incentives for firms to repatriate profits held in low or no tax jurisdictions and to locate activity in the United States. The international provisions involve newly created tax items, and our research provides an initial look into the revenue effects of these provisions.

Our paper contributes to the literature measuring and predicting the response of taxpayers to changes in tax policy, and it will also be a useful resource for policymakers and researchers in evaluating future proposed changes to tax policy. Importantly, because we can evaluate the effectiveness of the new Global Intangible Low-Taxed Income (GILTI) tax regime, our results will be particularly useful to the OECD as they consider Pillar II proposals in response to the digital economy (Organisation for Economic Co-Operation and Development, 2020). For those that have a GILTI income inclusion, we find that the GILTI regime brings in as taxable income as much as 24 percent of the worldwide consolidated net income as reported on financial statements. Moreover, we estimate a residual U.S. tax of 5.5 percent. These results carry important implications for the design of Pillar II, including whether it should exist on a global or country-by-country basis and whether to base the tax on financial statements.

The remainder of the paper proceeds as follows. In Section II, we discuss the major provisions enacted in the TCJA that affect corporations. In Section III, we discuss the various data sets that we use to analyze corporate behavior. In Section IV, we discuss summary statistics and our results using a limited sample of 81 very large corporations. In Section V, we present the results of a more formal regression analysis using a panel of corporate tax returns. Finally, in Section VI, we conclude.

II. TCJA 2017 OVERVIEW

A. TCJA Domestic Provisions

The JCT projected the TCJA domestic business provisions to decrease revenues by more than \$1 trillion during the 2018–2027 federal fiscal year budget period (Joint Committee on Taxation, 2017a).³ These provisions included both tax reforms aimed at providing tax relief and at increasing investment incentives, such as the lowering of

³ The amount includes \$414.5 billion for a provision granting a 20 percent qualified business income deduction for noncorporate taxpayers. All dollar amounts presented in this paper are nominal values unless otherwise noted.

corporate tax rates and the acceleration of depreciation deductions, and business tax reforms that provide some offsetting revenue increases, such as limiting the deductibility of interest and executive compensation.⁴

Prior to the enactment of the TCJA, corporate taxable income was subject to tax under a four-step graduated rate structure. The maximum corporate tax rate was 35 percent on taxable income in excess of \$10 million. Corporations were also subject to an alternative minimum tax, which was payable to the extent by which it exceeded the amount of tax liability determined under the regular graduated tax on taxable income. Alternative minimum tax paid in a prior tax year could be taken as a credit in a subsequent tax year to the extent regular tax liability exceeded tentative alternative minimum tax liability in the later year.

The TCJA replaces the graduated tax rate structure with a flat 21 percent corporate tax rate and repeals the alternative minimum tax. It also permits corporations to offset regular tax liability with unused alternative minimum tax credits from prior tax years and to receive a refund on unused alternative minimum tax credits through 2021.⁵ Economists at the JCT estimated the decrease in the tax rate and the repeal of the alternative minimum tax to reduce federal fiscal year revenues by \$1.4 trillion during the 10-year budget period from 2018 through 2027.

Corporations must capitalize the cost of tangible property through annual depreciation deductions. Before the TCJA, in 2017, taxpayers were permitted to expense \$510,000 in depreciation deductions⁶ in addition to a first-year depreciation deduction of 50 percent of the basis of certain property with recovery periods of 20 years or less that was placed in service during the tax year.⁷ The TCJA doubles the amount that may be expensed to \$1,000,000⁸ and increases the 50 percent bonus depreciation rate to 100 percent for property placed in service after September 27, 2017, and before January 1, 2023.⁹ The 100 percent allowance is phased down by 20 percent per calendar year for qualified property acquired after September 27, 2017, and placed in service after December 31, 2022.¹⁰ Thus, to be eligible for bonus depreciation, qualified property must be placed in service before January 1, 2027.¹¹ These cost recovery changes provide an additional \$112 billion in estimated tax relief for corporations and other businesses.

While the 100 percent bonus depreciation expands the amount of deductions corporations and other businesses may claim, other TCJA provisions limit the use of other

⁴ Many TCJA business-related provisions, including changes to the deductibility of depreciation and interest, affect not only corporations but businesses not organized in corporate form as well.

⁵ The Coronavirus Aid, Relief, and Economic Recovery Act enacted in 2020 permits a corporation to elect to apply for a refund adjustment in 2020 to its 2018 tax year to receive the full amount of its refundable credit.

⁶ The \$510,000 deduction is reduced by a dollar for each dollar invested in excess of \$2.03 million.

⁷ The first-year depreciation deduction is known colloquially as “bonus depreciation.”

⁸ The \$1,000,000 deduction is reduced by a dollar for each dollar invested in excess of \$2.5 million.

⁹ Before January 1, 2024, for longer production period property and certain aircraft.

¹⁰ After December 31, 2023, for longer production period property and certain aircraft.

¹¹ January 1, 2028, for longer production period property and certain aircraft.

deductions. The four largest of these provisions alone raise \$672 billion within the 10-year budget period relative to the tax rate decreases. First, the TCJA limits the amount of interest expense a trade or business can claim as a deductible expense. Instead of being fully deductible, in general, the interest expense deduction is limited to the business interest income of the taxpayer plus 30 percent of the adjusted taxable income of the taxpayer.¹² Second, the TCJA limits the net operating loss deduction to 80 percent of available net operating losses and eliminates the ability of corporations to carry back losses to prior tax years. Third, the TCJA repeals the deduction for income from domestic production activities; fourth, it requires certain previously deductible research and experimental expenditures to be amortized over five years or more.¹³

The TCJA contains other provisions that reduce deductions and may affect behavior. For example, the TCJA limits the deductions available to employers for fringe benefits. In general, the deduction for compensation is limited to \$1 million with respect to certain higher compensated officers of a publicly traded corporation. The TCJA expands the definition of compensation for purposes of this deduction to include performance-based compensation and commissions, thus making more income subject to the limit.

B. TCJA International Provisions

In addition to the corporate rate cut and these domestic corporate provisions, the TCJA enacted significant international reforms. In the years leading up to the passage of the TCJA, many policymakers, practitioners, and corporate leaders expressed concerns with the design of U.S. international tax rules. Chairman Kevin Brady argued that the Republican blueprint for tax reform would “level the playing field . . . and removes all the incentives to move jobs, research and headquarters overseas.”¹⁴ In addition, many multinational enterprises expressed concerns regarding the high statutory tax rate in the United States and the inflexibility in either repatriating profits to the United States or moving intangible assets into other jurisdictions. The combination of the high tax rate and the hybrid worldwide tax model meant that many U.S. multinational enterprises perceived a disadvantage relative to other firms in competing for new projects around the world. John Samuels, former vice president and senior counsel for tax policy at General Electric, synthesized corporate America’s concerns with the U.S. system of international taxation, stating that “virtually every other major developed country has dramatically reformed its tax system to make it more ‘business friendly,’ including by

¹² In this case, adjusted taxable income is generally taxable income computed without regard to business interest income and expense, depreciation, amortization, depletion, and net operating losses. After 2021, it is computed without regard to business interest income and expense and net operating losses.

¹³ The rule change for research and experimental expenditures is effective starting in 2022. While we do not observe this rule change in our data, we report the provisions with the largest revenue effects here for completeness.

¹⁴ Lohr, Steve, “New Approach to Corporate Tax Law Has House G.O.P. Support.” *New York Times*, December 12, 2016, <https://www.nytimes.com/2016/12/12/business/economy/new-approach-to-corporate-tax-reform.html>.

adopting territorial tax systems that reduce or eliminate home country tax on international business income.”¹⁵ Finally, corporations argued that most existing tax incentives encouraged manufacturing offshore.

In response to these concerns, Congress made significant changes to the way that corporations are taxed on their foreign earnings. These changes included five main components: (1) a 100 percent dividend received deduction (DRD); (2) a one-time tax at reduced rates on accumulated previously untaxed earnings — deemed repatriation; (3) a minimum tax on foreign earnings above an ordinary return on tangible assets — GILTI; (4) a reduced tax on U.S. based earnings derived from foreign sales — foreign derived intangible income (FDII); and (5) a U.S. minimum tax on deductible related party transactions flowing out of the United States — base erosion and anti-abuse tax (BEAT). Congress intended for the DRD to provide relief to U.S. multinational enterprises so that they could repatriate their earnings to their U.S. parent entity without triggering a tax event. In other words, this provision was meant to move the U.S. tax system closer to the territorial system, which many other countries use.

Policymakers consider the one-time tax to be a toll charge for repositioning the U.S. system. The rates of taxation are set at 8 percent and 15.5 percent on noncash and cash assets, respectively. Importantly, the provision taxes pre-effective date accumulated previously untaxed earnings in the last taxable year beginning before January 1, 2018. Because some taxpayers have taxable years beginning late in the year, their deemed repatriation liability and the payment of their liability may not appear on tax returns until they are filed in 2019. Moreover, often there is a difference between the fiscal year and month of an entity’s subsidiaries — usually delayed by a month relative to the parent — and the fiscal year and month of the parent entity itself. Therefore, some taxpayers may have new liabilities associated with the one-time deemed repatriation tax reported across their 2017 and 2018 tax year filings. As with prior law, foreign tax credits (FTCs) can offset U.S. tax liability under the deemed repatriation. Additionally, taxpayers could elect to pay their deemed repatriation liability in eight annual installments.

Congress created the GILTI provision as a backstop to the DRD provision. Without a stricter controlled foreign corporation regime, the DRD creates the incentive for business activity to be done offshore and for profits, including both U.S. and foreign profits, to be shifted to low-tax locations.¹⁶ Essentially, the GILTI provision is a minimum tax at a 10.5 percent rate on profits in excess of 10 percent of each firm’s foreign tangible assets. The 10.5 percent rate is achieved by a 50 percent deduction. In a departure from the regular treatment of foreign taxes, only 80 percent of foreign taxes paid on GILTI income is creditable. The 20 percent reduction in foreign taxes paid equates to a subsidiary operating in a country with a 13.125 percent tax rate paying no residual U.S. tax on that GILTI income. Congress also limited the ability of corporations to cross credit with other sources of income by creating a separate GILTI basket and eliminated the carryforward of credits to future years.

¹⁵ Samuels, John, *Tax Notes Today*, John Samuels Addresses Inversion and Tax Reform, February 10, 2015.

¹⁶ Depending on their corporate structure and aggressiveness, corporations may engage in either or both activities in response to a DRD. A minimum tax regime restricts both incentives.

In parallel to the GILTI provision, the TCJA enacted section 250, a provision which both details the 50 percent deduction for GILTI and creates the FDII provision. Congress constructed FDII for the purpose of treating U.S. business activity in a similar manner to how the GILTI provision treats foreign-based activity, thereby reducing shifting incentives between foreign and U.S. business activity. Under the FDII provision, taxpayers are allowed a deduction of 37.5 percent on the excess of their foreign derived income over 10 percent of their tangible U.S. based assets. The 37.5 percent deduction implies a reduced tax rate of 13.125 percent.¹⁷

The BEAT provision is a minimum tax at a 10 percent rate. Specifically, taxpayers with more than \$500 million in gross receipts, on average, over the last three years and with related party deductible payments making up more than 3 percent of their overall deductions are subject to the tax. The tax is the difference between 10 percent of modified taxable income and the taxpayer's regular tax liability after being reduced by credits. Modified taxable income is the taxpayer's regular taxable income with certain foreign related party deductible transactions added back.¹⁸

The JCT estimated that these five provisions would raise \$313 billion during the 2018–2027 federal fiscal year budget period (Joint Committee on Taxation, 2017a); a loss of \$224 billion on the DRD; a \$339 billion increase on the deemed repatriation one-time tax; a \$112 billion increase as a result of GILTI; a loss of \$64 billion as a result of FDII; and an increase of \$150 billion as a result of the BEAT.

III. DATA

To analyze the TCJA, we construct two data sets that document corporate behavior before and after the TCJA's enactment. Both data sets provide a perspective on the impacts of the TCJA with pre-enactment tax data through 2017 and newly constructed post-enactment 2018 data.

A. First Method: 81 Corporations

We selected 81 corporations from a list of the 200 C corporations that reported the greatest amount of total income on Form 1120 income tax return filed for tax year 2016.¹⁹ We did not include S corporations, insurance companies, mutual funds, or real estate investment trusts as part of the review. The median asset size of the 81 selected corporations is greater than \$75 billion. Over the period 2014–2018, these 81 corporate entities represent approximately 36 percent of C-corporation assets and earn a quarter of all corporate income. We reviewed the tax returns of the selected corporations, which allows us to analyze data related to the international provisions that are not otherwise available.

¹⁷ The section 250 deductions for GILTI and FDII income are scheduled to decrease after 2025 to 37.5 percent and 21.875 percent, respectively.

¹⁸ The Joint Committee on Taxation provides a detailed description of the BEAT and the other provisions enacted in P.L. 115-97 (Joint Committee on Taxation, 2018).

¹⁹ While we wanted to study the largest corporations, we chose returns in a manner that obfuscates the identities of the taxpayers.

For tax years 2014–2017, data are taken from the Statistics of Income Division (SOI) of the Internal Revenue Service large microlevel data sets of tax returns consisting of statistically sampled and edited tax returns.²⁰ Some data for tax year 2018 are taken from the SOI advance corporation income tax returns data set. We then merge the 2018 data with the 2014–2017 data to form a panel of the 81 corporations.²¹

B. Second Method: Overlapping Panel of C Corporations

For our second data set, we use both the SOI corporate income tax returns files from 2009–2017 and the SOI advance file for 2018. We constructed a panel of 2009–2018 tax return data comprised of corporations that are assigned a 100 percent probability of being sampled and included in the 2017 data set by the SOI. These corporations reported at least \$50 million in assets or \$10 million in the absolute value of either net income or gross receipts within the 2017 final SOI corporate file.²² This data set includes an increasing number of firms growing from 5,301 firms in 2009 to the 8,168 firms we observe in 2017. The advance 2018 file includes 5,766 firms, which overlap with our 2017 sample of returns. Next, we convert all the income and deduction items into real 2017 dollar amounts using the GDP deflator (Bureau of Economic Analysis, 2020).

IV. RESULTS FOR 81 LARGE CORPORATIONS

A. International Provisions and Aggregate Income and Deductions

Table 1 reports the aggregate amounts of income and deductions for the selected 81 corporations. Total income or gross income, reported in the first row, increased each year between 2014 and 2018 — ranging from an approximately \$60 billion increase in 2015 to an almost \$800 billion increase in 2018. A large part of the 2018 increase results from a \$350 billion one-time deemed repatriation dividend inclusion as well as a \$102 billion increase from GILTI. Excluding those two items, total income in 2018 increased \$326 billion over 2017.

Total deductions increased each year over the prior year between 2014 and 2018, with the largest increase of \$182 billion occurring in 2017. A combination of deferring income and accelerating deductions resulted in net income for 2017 being \$100 billion lower than any other year. Further, net income in 2018, excluding the deemed repatriation and GILTI income, was \$450 billion — \$200 billion larger than 2017.²³

²⁰ The SOI performs a sampling method each year to represent the population, sampling some firms with 100 percent probability and others with much lower probabilities (Statistics of Income, 2014).

²¹ The analysis of the 81 corporations is in nominal dollars.

²² Essentially, we create an unbalanced panel for corporations that are sampled at a 100 percent rate in 2017. We then merge with those observations the corporations that we observe within the advance 2018 file and prior years going back to 2009.

²³ The increase in income in 2018 could be the result of corporations delaying recognition of that income into 2018 or it could be the result of changes to accounting methods in section 451 enacted in 2017. Those changes in accounting methods would result in some income being recognized in 2018 that otherwise would have been recognized in a later year.

Table 1
Income and Deductions Reported
by the Selected 81 Corporations on Form 1120
(Billions \$)

	2014	2015	2016	2017	2018
Total income	2088.7	2149.3	2258.7	2335.5	3113.9
Sales less COGS and allowances	1340.9	1388.5	1428.4	1506.4	1657.6
Dividends excl. repat/GILTI	82.7	94.0	95.2	65.5	52.7
Deemed repat inclusion amount	—	—	—	n.a.	350.3
GILTI	—	—	—	—	102.1
Total income excl. repat/GILTI	2088.7	2149.3	2258.7	2335.5	2661.5
Total deductions	1672.9	1742.7	1903.8	2085.5	2211.7
Net income	415.8	406.6	354.9	250.0	902.1
Net operating loss deduction	25.8	28.7	16.6	15.9	23.3
Repat deduction	0.0	0.0	0.0	n.a.	184.1
Sec. 250 deduction					78.8
Special deductions excl. repat & 250	1.0	0.8	0.7	0.8	12.3
Taxable income	396.2	381.6	351.4	251.3	597.0
Taxable income excl. repat, GILTI, & 250	396.2	381.6	351.4	251.3	407.5
General business credits	14.2	15.4	16.8	12.7	20.9
FTCs	50.9	42.3	35.4	24.5	41.2
Total tax liability including repat	73.4	76.0	70.8	55.3	65.9
Repat liability after credits paid	—	—	—	5.8	2.2
Repat liability before installment	—	—	—	63.5	20.9

Note: n.a. = not available.

Sources: SOI corporation tax returns (2014–2017) and SOI advance file corporation tax returns (2018).

We expected net operating loss deductions to increase in 2017 as taxpayers try to reduce their taxable income in that year. However, they are slightly lower than their 2016 level. A possible explanation may be that the net operating loss deduction would offset any deemed repatriation income first²⁴ — the deemed repatriation is applied to pre-effective date earnings and, therefore, will be reported on the taxpayers' 2017 tax filing²⁵ — essentially reducing a low-tax item in 2017 relative to the higher tax on ordinary income. On the 2018 Form 1120, the deemed repatriation deduction and the section 250 deductions to achieve the lower rate of tax are included in the special

²⁴ Seventy two of our 81 corporations reported foreign source earnings in 2016 on Form 5471.

²⁵ Depending on the fiscal year of both the taxpayer and the controlled foreign corporation, some repatriation tax liability will also be reported for the first time on the taxpayers' 2018 tax filing.

deductions line item. These corporations claimed \$184 billion in deemed repatriation deductions and \$78.8 billion section 250 deductions. Taxable income, excluding the deemed repatriation income and deductions, GILTI income and deductions, and FDII section 250 deductions, is only slightly larger in 2018 than in 2014. Total tax liability, including any amount paid for the deemed repatriation, declined in 2017 to \$55 billion from \$71 billion in 2016 and increased to \$66 billion in 2018. Many taxpayers elected to pay their deemed repatriation liability in installments or offset their liability with FTCs and losses. The total amount paid for the deemed repatriation liability was \$5.8 billion in 2017 and \$2.2 billion in 2018, out of overall deemed repatriation liability of \$63.5 billion and \$20.9 billion for years 2017 and 2018, respectively.

Table 2 provides more detail on the one-time deemed repatriation tax for these 81 corporations. The data are obtained from two sources. The first source is 2017 tax returns that are included in the SOI edited file and are reported in the first column of Table 2.²⁶ The repatriation tax information from the 2017 filing was inconsistently reported as there were scant directions and no existing form. The second source is from our examination of Form 965 filed with the corporation's 2018 tax return. Form 965 required detailed information regarding the amount of income, cash position, FTCs, and year of payment for the 2018 filing as well as more thorough reporting on what should have been filed with the 2017 filing. The second and third columns of Table 2 report the information

Table 2
One-Time Deemed Repatriation Tax for 81 Selected Corporations
(Billions \$)

	2017 Tax Return	2018 Tax Return Form 965	
	2017	2017	2018
Inclusion amount	—	655.1	350.0
Deduction amount	—	425.8	183.9
Tax liability	63.5	53.4	20.9
Deemed FTCs after disallowance	—	22.2	6.4
Tax liability after credits	—	31.2	14.5
Amount paid year 1	5.8	8.0	2.0
Amount paid year 2	—	n.a.	3.9
Average deduction, percentage	—	65.0%	52.6%
Average tax rate, percentage	—	12.3%	10.0%
Effective foreign tax rate	—	7.3%	3.3%
No. reported inclusion/liability	43	50	21
No. filed a 965 pdf or a form 965	63	n.a.	60

Note: n.a. = not available.

Sources: SOI corporation tax returns (2017) and authors' examination of physical returns (2018).

²⁶ The first column simply reproduces the information reported in Table 1.

we obtained from Form 965 filed with the 2018 tax return. The second column reports the amounts for 2017, and the third column reports the amounts for 2018. Focusing on the second and third columns, from the Form 965 data, over the two years, these 81 corporations included in income more than \$1 trillion in previously untaxed foreign earnings. The bulk of this money was included with the 2017 filing, but approximately a third was included with the 2018 filing. These 81 corporations owed almost \$75 billion in deemed repatriation liability — \$53.4 + \$20.9, before accounting for FTCs. These corporations claimed \$28.6 billion in FTCs after disallowing the portion of taxes paid owing to the deduction.²⁷ Consequently, liability after FTCs dropped to \$46 billion, a residual U.S. tax of 4.4 percent. Compared to Saunders-Scott and Shand (2019), these 81 corporations had a lower level of residual tax.²⁸

Some taxpayers may have offset their deemed repatriation liability with losses. The new section 965(n) allows taxpayers to elect not to use their available net operating loss from prior years, or their current year loss per Treasury regulations,²⁹ against their deemed repatriation liability. Nevertheless, it appears that some taxpayers used their losses to offset their deemed repatriation liability. Any loss applied to the deemed repatriation liability is applied before the deemed repatriation deduction. We calculate that as much as \$3.8 billion of net deemed repatriation income inclusion in 2017 was offset with losses.³⁰

Taxpayers could elect to pay their deemed repatriation liability in installments. The installment schedule is 8 percent of liability in the first five years, 15 percent in year six, 20 percent in year seven, and 25 percent in the eighth year. Our sample of corporations paid 26 percent of the 2017 liability and 14 percent of the 2018 liability in the first year. Approximately two-thirds of the corporations reporting a 2017 deemed repatriation inclusion elected to use the installment method. A similar percentage of the 21 corporations reporting a 2018 deemed repatriation inclusion elected to use the installment method.

Applying the average deduction percentage allows us to calculate the applicable tax rate on the deemed repatriation income. The average tax rate was 12.3 percent and 10 percent for 2017 and 2018, respectively.³¹ Because cash assets are taxed at a rate of 15.5 percent and noncash assets are taxed at a rate of 8 percent, we can calculate

²⁷ The lower rate of tax of either 8 or 15.5 percent on the deemed repatriation is achieved by a deduction. For instance, the 15.5 percent rate of tax is achieved by a deduction of 55.71 percent of the deemed repatriation income in 2017.

²⁸ This may simply be due to comparing previously reinvested earnings to our larger measure of previously untaxed earnings.

²⁹ These regulations can be found at paragraph e of CFR 1.965-7 Elections, payment, and other special rules.

³⁰ We calculate this by comparing the available net operating loss carryforward available in 2018 to the amount available in 2017 plus any negative net income less any 2017 net operating loss deduction claimed. In most cases, these amounts are identical; however, in several cases, taxpayers with deemed repatriation inclusion amounts reported lower amounts of available carryover. We are implicitly assuming that this lower amount was used to offset 2017 deemed repatriation liability. Because we do not yet have 2019 data, we are unable to determine the amount of losses used to offset any 2018 liability.

³¹ Ten percent equals one minus the average deduction percentage multiplied by the corporate tax rate; $0.1 = (1 - 0.526) \times 0.21$, and 12.3 percent equals $(1 - 0.65) \times 0.35$.

that the 10 percent tax rate on 2018 income implies that approximately 73 percent of repatriated assets were held in noncash assets. Similarly, the 12.3 percent tax rate on 2017 income implies that approximately 55 percent of repatriated 2017 income was held in noncash assets.

Turning to the other main international components of the TCJA, Table 3 reports on the new tax items GILTI, FDII, and the BEAT. Our 81 corporations reported \$102.1 billion in GILTI income with a corresponding \$12 billion in foreign taxes paid.³² These 81 corporations had \$546 billion in worldwide consolidated net income as reported on their financial statements and schedule M-3. This implies that GILTI captures almost 19 percent of their worldwide income. Restricting to only those corporations that reported a GILTI inclusion amount, worldwide consolidated net income was \$427 billion, implying a GILTI capture rate of 24 percent.

These 81 corporations claimed \$79 billion in section 250 deductions for their GILTI and FDII income. The section 250 deduction is 50 percent of the GILTI income, 50 percent of the foreign taxes paid on the GILTI income, and 37.5 percent of FDII. We calculate that \$57 billion of that deduction is owing to the GILTI income. After claiming the deduction, we estimate that their GILTI liability was \$13 billion. The corporations claimed FTCs of \$6.6 billion for their GILTI income, leaving a GILTI net of FTCs

Table 3
GILTI, FDII, and BEAT for 81 Selected C-Corporations
(Billions \$)

	2018
GILTI income	102.1
GILTI foreign taxes paid	11.8
Implied Effective Foreign Tax Rate	10.4%
Sec. 250 deduction	78.8
Implied GILTI sec. 250 deduction	57.0
Implied FDII sec. 250 deduction	21.9
GILTI liability	13.0
GILTI FTCs	6.6
GILTI liability after FTCs	6.3
Average GILTI liability after FTCs	0.13
Average FDII benefit	0.10
BEAT liability	0.1

Sources: Authors' calculations and examination of Forms 1120, 8992, 8993, and 1118 on returns filed for tax year 2018.

³² GILTI income is from line 17 of Schedule C, Form 1120. GILTI foreign taxes paid is from Schedule D, column 4 of Form 1118. We increase the reported amount to account for the 20 percent haircut. Unfortunately, we do not observe a Form 1118 Schedule D in all cases where we observe a Schedule C, GILTI income. There is a small amount of GILTI income without an observed Form 1118 (under \$10 million).

liability of \$6.3 billion. The net \$6.3 billion liability implies a residual tax on the GILTI income of 5.5 percent.³³ The large difference between the foreign taxes paid and the amount claimed as an FTC are due to the 20 percent haircut and to a sizable number of corporations operating in an excess credit position.³⁴ Approximately 50 percent of the corporations operate in an excess credit position with respect to their GILTI income, with approximately a third of the FTCs disallowed.³⁵ Combining the \$6.3 billion U.S. liability with the \$11.8 billion in foreign taxes paid results in a total tax of \$18.1 billion — an overall effective rate of 16 percent.

Subtracting off the GILTI section 250 deduction leaves a residual \$22 billion claimed as a deduction for FDII. Grossing up the \$22 billion implies \$58.4 billion of FDII. Dowd and Landefeld (2018) simulated FDII over the period 2000–2015 for all C corporations. To construct their simulations, they made several assumptions including how to allocate expenses to different sources of income — in this case, they assumed a pro rata allocation — and how to allocate exports across industries and firm types. One result from their simulation is that the proportion of FDII as a share of deemed intangible income was below 10 percent. In comparison, the \$58.4 billion as a share of taxable income excluding the deemed repatriation, GILTI, and section 250 deductions — a measure likely to be broader than deemed intangible income — is 14 percent. This suggests that either the 81 corporations are particularly export oriented or some of their assumptions were incorrect. A question for future investigation is how aggressive corporations are in allocating expenses to other sources of income?

B. Income

Table 4 shows year over year percentage changes in sources of income reported by the 81 selected corporations on Form 1120 for tax years 2014–2018. A priori, we expected that year over year percentage changes should be larger for 2017–2018 than 2016–2017 as corporations delay the recognition of income. The final column of Table 4 reports whether these year over year changes lined up with our expectations. In all but one case — gross rents — the income items do line up with our expectations. Dividend income, which prior to 2018 is mostly dividends from related — including subsidiaries — and unrelated corporations, increased dramatically in 2018 due to the income inclusion amounts attributable to the deemed repatriation and GILTI provisions of the TCJA discussed above.³⁶ Recognition of interest and royalty income grew the most in 2018 compared to the remainder of the five-year period. As discussed above, beginning in 2018, greater interest income permits taxpayers to deduct a greater amount of

³³ This equals 6.3 divided by the sum of GILTI income of 102.1 and foreign taxes paid on their GILTI income of 11.8.

³⁴ Foreign tax credits are allowed against U.S. tax liability on foreign source income. FTCs are not allowed to offset liability on U.S. source income. As a result, some foreign tax credits could be disallowed. In general, this is called being in an excess credit position.

³⁵ Clausing (2020) assumes that about half of companies are operating in an excess credit position.

³⁶ The dividend line for 2017 does not include deemed repatriation amounts. Those were reported separately on attachments.

Table 4
Income Reported by the Selected 81 Corporations on Form 1120 Year
over Year Percentage Change

	2014– 2015 (%)	2015– 2016 (%)	2016– 2017 (%)	2017– 2018 (%)	Expected Differences
Gross profit	3.5	2.9	5.5	10.0	Yes
Dividends	13.7	1.2	–31.2	671.3	Yes
Interest income	1.9	12.3	15.0	22.9	Yes
Gross rents	11.1	8.7	6.3	–10.1	No
Gross royalties	–7.0	4.7	–2.4	14.6	Yes
Capital gains net income	–12.5	20.2	–11.0	16.4	Yes
Net gain or loss/Form 4797	–39.6	92.2	–28.1	160.1	Yes
Other income	3.1	6.4	–9.0	21.8	Yes
Total income	2.9	5.1	3.4	33.3	Yes

Sources: SOI corporation tax returns (2014–2017) and SOI advance file corporation tax returns (2018).

interest expenses. Capital gains income and other income also grew more rapidly in 2018. However, gross rents did not have the expected sign, a signal that this may be an income source particularly difficult to manipulate. Overall, total income grew 33 percent in 2018, substantially larger than any other year of growth.

C. Deductions

Table 5 shows the changes in deductions claimed for the 81 selected corporations. A priori, we expected corporations to accelerate deductions from 2018 into 2017. That would correspond with a year over year percentage increase for 2016–2017 greater than the 2017–2018 percentage change. The final column of Table 5 shows whether the differences in percentage changes between 2016–2017 and 2017–2018 meet our expectation. Nine of the 14 deduction items display the expected differences, although the percentage change in total deductions peaks for 2016–2017 while growing at a slower rate for 2017–2018. The notable deduction items that confirmed our expectations included compensation of officers, salaries and wages, pension and profit-sharing plans, and employee benefit plans.³⁷ As noted above, beginning in tax year 2018, the TCJA further limited the amount of deductible compensation paid to officers, perhaps explaining the 2018 result. Deductible contributions to pension and profit-sharing plans increased by 40 percent in 2016 and 4 percent in 2017 before declining by 35 percent

³⁷ However, pension and profit-sharing plan deductions appear to have considerable variability year over year.

Table 5
Deductions Claimed by the Selected Corporations on Form 1120 Year
over Year Percentage Change

	2014– 2015 (%)	2015– 2016 (%)	2016– 2017 (%)	2017– 2018 (%)	Expected Differences
Compensation of officers	–0.6	–33.4	8.3	0.3	Yes
Salaries and wages	5.9	3.6	9.0	2.9	Yes
Repairs	4.5	3.3	1.2	5.6	No
Bad debts	3.0	16.2	13.3	–8.8	Yes
Rents	–3.3	3.8	–2.5	6.1	No
Taxes and licenses	–6.6	1.0	2.4	8.9	No
Interest paid	0.8	16.9	24.4	31.9	No
Charitable contributions	7.7	–0.6	0.6	109.6	No
Depreciation	15.3	14.8	15.7	9.6	Yes
Depletion	17.4	–12.4	14.9	–79.6	Yes
Advertising	11.7	10.4	3.8	22.9	No
Pension, profit-sharing, plans	–0.5	39.8	4.2	–35.4	Yes
Employee benefit plans	5.2	2.7	11.0	–10.8	Yes
Other deductions	3.5	10.0	6.2	5.4	Yes
Total deductions	4.2	9.2	9.5	6.1	Yes

Sources: SOI corporation tax returns (2014–2017) and SOI advance file corporation tax returns (2018).

in 2018. Depreciation deductions increased 16 percent in 2017 as corporations were eligible for 100 percent bonus depreciation for qualifying property placed in service after September 27, 2017, under the TCJA. Depreciation deductions continued to increase 10 percent in 2018.

In contrast, some deductions that we expected firms to accelerate do not appear to have been moved into 2017. Counterintuitively, charitable contributions grew markedly in 2018, although a substantial portion of the result is driven by a small subset of returns. Some deductions may be more difficult to accelerate, such as rents, nonfederal taxes and licenses, or advertising where contacts may have already been in place before the enactment of the TCJA.

V. REGRESSION RESULTS FOR OVERLAPPING PANEL OF C CORPORATIONS

In this section, we more formally explore the degree to which corporations shifted income and deduction items across their filing years for 2017 and 2018. As indicated above, we observe that some corporations reduced their recognition of income in 2017 in order to realize that income in 2018 at a lower overall corporate tax rate. Conversely,

our data suggest that some corporations accelerated their deductions from 2018 or other future years into 2017 so that they may reduce their 2017 taxable income. To explore these possibilities in more detail, we estimate the following equation:

$$(1) \quad \ln(y_{i,t}) = \alpha + \beta_1 \ln(y_{i,t-1}) + \sum_{t=10, j \neq 17}^{18} \beta_j (\text{Year} = t) + \mu_i + \varepsilon_{i,t}.$$

Equation (1) regresses the natural log of the current year value of an income or deduction item on a constant, the lagged value of the dependent variable, year fixed effects, and firm fixed effects.³⁸ We include the lagged value of the dependent variable because we believe there to be considerable mean reversion for our data. The alternative would be to first difference the data; this is a severe restriction assuming that the data are generated as a random walk. We expect that β_1 will be less than one for each income or deduction item since the underlying series are not exploding and we expect mean reversion.³⁹ For the purpose of this research, we are most interested in the coefficients on the year fixed effects. Fixed effects for the year 2017 are excluded from the regressions. Thus, each of the fixed effects coefficients represents how different those years are from 2017, the year before the TCJA was implemented. We include firm fixed effects in order to account for substantial heterogeneity in the efficiency, size, and responsiveness of corporations. For income items, if taxpayers reduced their income in 2017, we expect coefficients on the year fixed effects to be positive and significantly different from zero. Conversely, for deduction items, we expect coefficients to be negative and significantly different from zero.

This is a dynamic panel model, which will produce inconsistent estimates without correcting for the correlation between the errors and the lagged dependent variable. We address this problem by using the Arellano–Bond estimator (Arellano and Bond, 1991). Separately in the Online Appendix, we also report the results of the fixed effects model and the lagged dependent variable model.⁴⁰

We expect that there may be trends in the percent change of income and deduction items. These trends may make it difficult to simply compare the fixed effects for 2018 and the other years with 2017 to understand the effects of the TCJA on corporate behavior. To account for this possibility, we forecast the counterfactual estimate of what the fixed effects for 2017 and 2018 would have been had the TCJA not been enacted. Our forecast for 2017 and 2018 is a linear regression of the year fixed effects estimates for the years prior to 2017 on a constant and a time trend, as indicated by Equation (2):

$$(2) \quad \beta_j = \alpha + \gamma \times \text{time}_j + \varepsilon_j.$$

Equation (2) regresses the recovered year fixed effects estimates, β_j , on a constant and a time trend. We then forecast the counterfactual estimate of the fixed effects for 2017 and 2018. This allows us to calculate a simple arc elasticity as the percentage difference in

³⁸ We are implicitly assuming ε to be independently and identically distributed with a mean of zero.

³⁹ A value of one would indicate the data are generated in a random walk process. A value of zero would imply full mean reversion.

⁴⁰ The Online Appendix can be found at www.twillinghamecon.com.

the income or deduction item implied by our estimated fixed effects for 2017 and 2018 and the counterfactual predictions over the percentage change in the corporate tax rate.

To estimate Equation (1) with any level of precision, we require more than 81 observations. Therefore, we expand our analysis by using the data sample described in Section III.B. Notably, this data sample includes information ranging from 2009 to 2018; for each year, we inflate or deflate the income and deduction amounts to 2017 dollars using the GDP price index.

Table 6 reports the results from the regression of Equation (1) for six specific items of income.⁴¹ As expected, all six coefficients on the lagged dependent variable are significantly less than one. Both the capital gains items have the greatest mean reversion of the variables. Turning to our year fixed effects, the coefficients for dividends received, excluding deemed repatriation and GILTI income, are positive and significant each year.⁴² The value of the coefficients appears to be growing from 2010 through 2014, and then it appears to be flat for 2014 through 2016. The 2016 estimate is 20 percent higher than the 2017 value, while the 2018 estimate of 0.374 indicates the 2018 value is 45 percent higher than 2017. These results strongly suggest that corporations were changing the timing of dividends from related corporations.

Moving across the table, we see that for interest income, most of the coefficients are negative and significant. Perhaps the receipt of interest payments may be less easily controlled by the receiver than the payer, a possibility we investigate when we turn to deductions. Surprisingly, net capital gains income does not display a strong pattern of manipulation; the fixed effects for 2016 are essentially indistinguishable from 2017. However, it appears that corporations increased their capital gains realizations in 2018 in response to the lower tax rate. For gains on business property, coefficients are predominately positive and significantly different from zero, suggesting that this is a more malleable income source than capital gains income. However, the 2018 fixed effects are indistinguishable from the 2017 values. Next, the coefficients on other income suggest that the 2017 value is not statistically different from the fixed effects estimates for the early years but is statistically different from 2016 and 2018. The large coefficient for 2018 of 0.147 corresponds with a 15.8 percent difference between 2018 and 2017.

⁴¹ We use robust standard errors to correct for the heteroskedasticity we expect with our data. A test for proper specification with the Arellano–Bond estimator is that the first differenced error terms are autocorrelated across time but that the higher order differenced error terms are not. Using the Arellano–Bond test for zero autocorrelation in the first differenced errors, we find each income item has first differenced autocorrelation in the errors, which is expected. However, only the capital gains items do not have second differenced autocorrelation, while all the items do not have third differenced autocorrelation. In the Online Appendix, we report the results of including a second lagged dependent variable in the specification. When the second lag is included, all the income items have first differenced autocorrelation, while neither the second nor the third differenced errors have autocorrelation. This suggests that the proper specification is with two lagged dependent variables. However, the coefficient estimates for the fixed effects are essentially the same across these two specifications. Consequently, we prefer to use the single lag in order to keep additional year fixed effects for our estimate of Equation (2). Including the second lag would reduce our sample size for estimation of Equation (2) by one-seventh. Our Online Appendix also provides additional regression results for other income and deduction items not reported in this paper as well as information on the taxes and credits claimed by the 81 corporations we described earlier. It can be found at www.twillinghamecon.com.

⁴² Generally, because the dependent variable is the natural log, we can think of coefficients close to zero as representing a percent change in the underlying variable.

Table 6
Regressions of Corporate Income Items

Natural Log of:	Dividends Excl. Repat, GILTI	Interest	Net Capital Gain Income	Gain/Loss Business Property	Other Income	Total Income Excl. Repat, GILTI
Lag dependent variable	0.419*** (0.0294)	0.641*** (0.0247)	0.0982*** (0.0280)	0.0610* (0.0318)	0.297*** (0.0193)	0.521*** (0.0391)
2010 fixed effects	0.0994** (0.0423)	-0.272*** (0.0233)	0.269* (0.139)	0.362*** (0.0807)	0.00479 (0.0328)	-0.0902*** (0.0151)
2011 fixed effects	0.0827** (0.0401)	-0.249*** (0.0217)	0.0907 (0.124)	0.379*** (0.0739)	0.0496 (0.0322)	-0.0842*** (0.0127)
2012 fixed effects	0.164*** (0.0379)	-0.266*** (0.0211)	0.257** (0.107)	0.560*** (0.0698)	0.018 (0.0299)	-0.0833*** (0.0126)
2013 fixed effects	0.124*** (0.0391)	-0.320*** (0.0213)	0.217** (0.103)	0.276*** (0.0664)	0.0168 (0.0284)	-0.0810*** (0.0111)
2014 fixed effects	0.210*** (0.0357)	-0.275*** (0.0209)	0.278*** (0.0924)	0.297*** (0.0606)	0.0335 (0.0272)	-0.0364*** (0.00978)
2015 fixed effects	0.180*** (0.0335)	-0.218*** (0.0213)	0.241*** (0.0808)	0.242*** (0.0540)	0.0476* (0.0260)	-0.0416*** (0.00973)
2016 fixed effects	0.190*** (0.0329)	-0.125*** (0.0208)	-0.0313 (0.0787)	0.260*** (0.0488)	0.0611** (0.0252)	-0.0251*** (0.00908)
2018 fixed effects	0.374*** (0.0405)	0.170*** (0.0238)	0.187** (0.0841)	0.0776 (0.0548)	0.147*** (0.0296)	0.0493*** (0.0105)
Firm fixed effects	x	x	x	x	x	x
No. observations	24,568	44,761	7,036	9,091	35,350	47,020
No. firms	4,186	7,180	2,130	2,548	6,533	7,425

Notes: Robust standard errors are clustered at the firm level and reported in the parentheses. Income amounts are real in 2017 dollars using the GDP deflator. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.

Finally, the fixed effects coefficients for total income, excluding deemed repatriation and GILTI income, for years prior to 2017 are all negative and significant. Apparently, these corporations were unable to significantly reduce their 2017 income relative to prior years. Conversely, the fixed effects for 2018 is large and statistically different from 2017.

While this analysis suggests that 2017 and 2018 coefficient estimates might be significantly different from prior years in some cases and not at all in other cases, there is strong evidence that there is a trend in the coefficients. As discussed above, in order to consider this possibility, we next turn to a graphical presentation of these results and compare it with a linear time trend.

Figure 1 shows how these coefficients vary over time. The figure plots the eight separate year fixed effects estimates, their confidence intervals from the panel regressions, and a linear time trend. The linear time trend is based on the seven observations prior to 2017 and then forecasted to 2017 and 2018. The gray cone around the linear time trend captures the 95 percent confidence interval in the estimate of the linear time trend for the coefficients and the forecast. Next to the 2018 fixed effects estimate is the p-value for the probability of the null hypothesis that the fixed effects estimate is the same as the linear time trend estimate.⁴³

Moving left to right and top to bottom, the figure clearly reflects the results from Table 6. Dividends were statistically significantly lower in 2017 from both the other year fixed effects estimates as well as the linear time trend. The p-value of 0.034 indicates that firms reported dividends significantly above the linear time trend at a 5 percent level in 2018. The fixed effects estimates for interest received were statistically significantly higher in 2017 and 2018 from both the other year fixed effects estimates as well as the linear time trend estimate. Moving to net capital gain income, despite the 2018 fixed effects value of capital gains income being statistically significant — significantly different from zero — its value is well within the bounds of the 2010–2016 linear time trend and it is not statistically different at the 10 percent level with a p-value of 0.303. In contrast, gain on business property was statistically significantly below both the other year fixed effects as well as the trend for 2017. However, the 2018 fixed effect is not statistically different from either zero or the trend for 2018. For other income, while only the 2016 fixed effects estimate was only significantly different from 2017 value of zero, the linear trend is statistically significantly above the 2017 value of zero. The coefficient for 2018 was significantly different from the linear time trend at a 5 percent level. Finally, looking at total income, we see that the 2017 and 2018 values are both significantly different than the other fixed effects coefficients, but only 2018 is statistically different from the linear time trend. The implied percentage difference, after exponentiating, between the 2018 fixed effects estimate (0.0493) and the linear time trend estimate (−0.0046) is 5.5 percent. This implies an income shifting tax elasticity of −0.11.⁴⁴

⁴³ We construct the p-value from the t-distribution of the difference between two estimates with differing variances.

⁴⁴ The arc elasticity is 0.055 divided by the percent change in the tax rate $0.5 = 0.14 / ((0.35 + 0.21) / 2)$. As can be seen in the Online Appendix, the two-lag model produces similar results with an income shifting elasticity of −0.1.

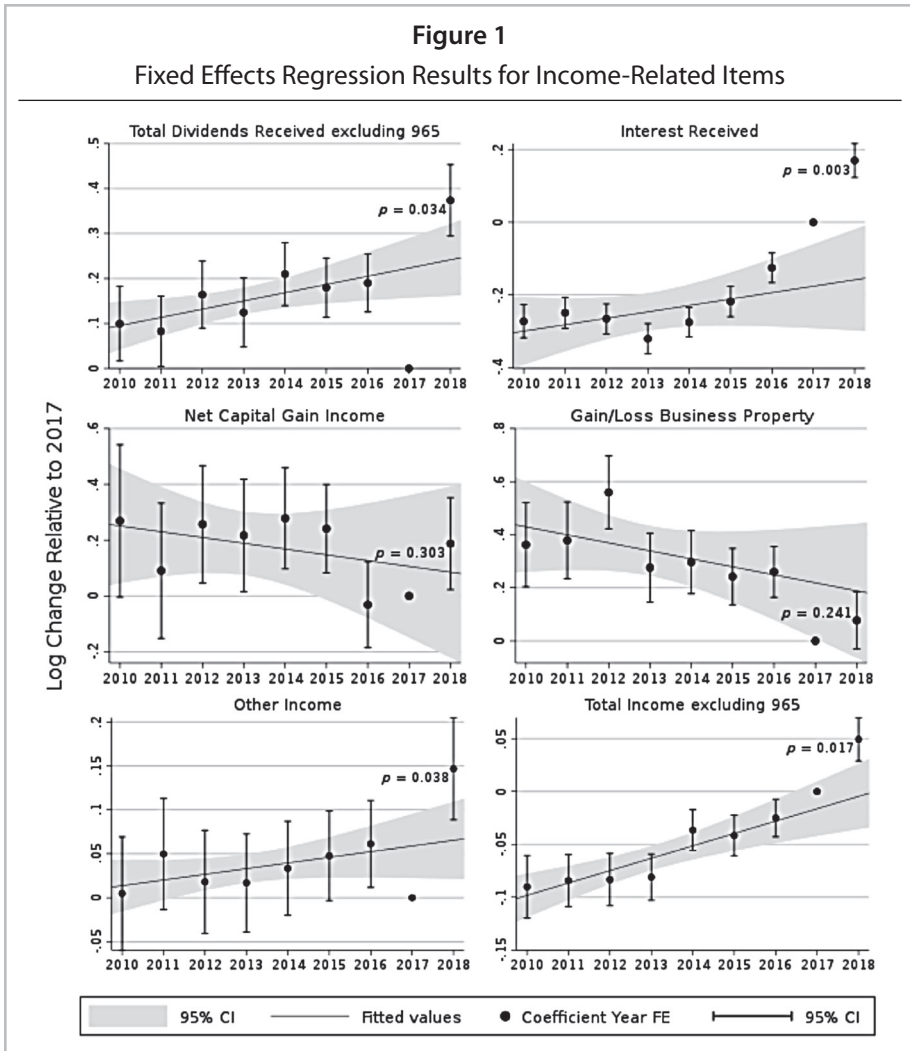


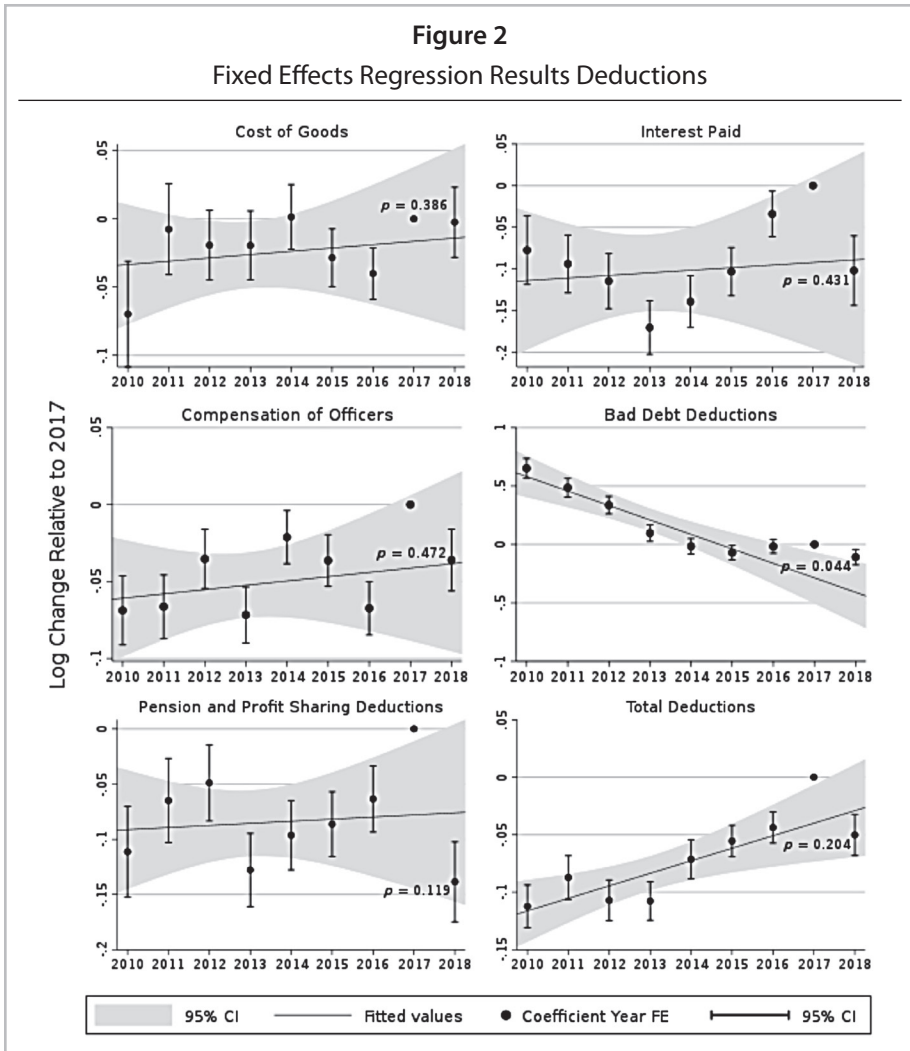
Table 7 presents our results for estimation of Equation (1) for six chosen deduction items. As with the income items, the coefficients on the lagged dependent variables are all less than one. In contrast to the income items, the coefficients on the year fixed effects are all largely negative and statistically significant; in general, tax deductions in 2017 were larger than normal.⁴⁵ Relative to 2016, 2017 deductions for cost of goods

⁴⁵ As with the results for the income items, the Arellano–Bond test for autocorrelation in the error terms indicates there is autocorrelation in the first differenced and second differenced errors but not with the third differenced errors. Including the second lagged dependent variable resolves the issue with no autocorrelation in the second and third differenced error terms. Like the income items, the year fixed effects coefficients are very similar between the specifications. We report the results of the two-lag model in the Online Appendix at www.twillingamecon.com.

Table 7
Regressions of Corporate Deduction Items

Natural Log of: Lag dependent variable	Cost of Goods	Comp. of Officers	Interest Paid	Bad Debt Deduction	Pension and Profit Sharing	Total Deductions
	0.445*** (0.0577)	0.542*** (0.0205)	0.527*** (0.0282)	0.160*** (0.0170)	0.424*** (0.0244)	0.605*** (0.0361)
2010 fixed effects	-0.0697*** (0.0197)	-0.0687*** (0.0114)	-0.0774*** (0.0210)	0.652*** (0.0436)	-0.111*** (0.0210)	-0.112*** (0.00950)
2011 fixed effects	-0.00756 (0.0170)	-0.0664*** (0.0105)	-0.0940*** (0.0177)	0.486*** (0.0405)	-0.0649*** (0.0194)	-0.0872*** (0.00969)
2012 fixed effects	-0.0192 (0.0131)	-0.0354*** (0.00980)	-0.114*** (0.0169)	0.337*** (0.0381)	-0.0489*** (0.0176)	-0.107*** (0.00902)
2013 fixed effects	-0.0195 (0.0129)	-0.0717*** (0.00929)	-0.170*** (0.0164)	0.0969*** (0.0359)	-0.128*** (0.0169)	-0.108*** (0.00853)
2014 fixed effects	0.00139 (0.0121)	-0.0212** (0.00879)	-0.139*** (0.0158)	-0.0161 (0.0338)	-0.0963*** (0.0160)	-0.0713*** (0.00871)
2015 fixed effects	-0.0284*** (0.0108)	-0.0364*** (0.00856)	-0.103*** (0.0148)	-0.0701** (0.0311)	-0.0863*** (0.0150)	-0.0555*** (0.00700)
2016 fixed effects	-0.0400*** (0.00963)	-0.0674*** (0.00882)	-0.0340** (0.0140)	-0.0164 (0.0299)	-0.0635*** (0.0153)	-0.0437*** (0.00693)
2018 fixed effects	-0.00247 (0.0131)	-0.0361*** (0.0102)	-0.102*** (0.0213)	-0.108*** (0.0336)	-0.138*** (0.0185)	-0.0502*** (0.00913)
Firm fixed effects	x	x	x	x	x	x
No. observations	26,352	37,591	44,089	27,034	30,867	47,806
No. firms	4,323	6,058	7,133	5,453	5,115	7,491

Notes: Robust standard errors are clustered at the firm level and reported in the parentheses. Income amounts are real in 2017 dollars using the GDP deflator. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels.



were 4 percent greater, compensation of officers was 7 percent greater, interest paid was 3.4 percent greater, bad debt deductions were insignificantly different, and pension and profit-sharing plans were 6 percent greater. Overall, total deductions were 4.4 percent greater in 2017 than in 2016. Deductions were significantly smaller in 2018 than 2017 for all the items except cost of goods, which was indistinguishable from 2017. The TCJA changed the treatment of some related party deductible items for certain taxpayers,⁴⁶ which likely incentivized these taxpayers to recharacterize some of their deductions as cost of goods sold (COGS), which are not captured under the new provision. This could

⁴⁶ The BEAT under section 59A of the Internal Revenue Code.

explain why some deductible items display large decreases from 2017 to 2018, while the 2018 estimate for COGS is indistinguishable from the 2017 estimate.

Figure 2 repeats our previous graphical analysis for these six deduction items. Working our way from left to right and top to bottom, we see that three of the year fixed effects for cost of goods are statistically different from 2017, those being 2010, 2015, and 2016. However, we cannot reject the null hypothesis that the 2017 or 2018 value is indistinguishable from the linear time trend. For interest paid, while all the fixed effect estimates are statistically different from 2017, none are outside of the linear time trend confidence interval. The 2017 value is just within the top bound of the linear time trend confidence interval but above it at a 10 percent confidence level. Compensation of officers follows a similar pattern. Turning to our estimates for bad debt deductions, we see that 2017 is statistically above trend. While it was indistinguishable from the 2016 estimate, it is approximately 25 percent above trend. However, there appears to be a nonlinear component to the trend that might explain a significant portion of the difference from trend. Additionally, our 2018 value for bad debt deductions is also statistically above trend. The 2017 value for pension and profit-sharing deductions is well above all other fixed effects estimates and also statistically significantly different from the estimated trend value. It is 6 percent and 14 percent above the 2016 and 2018 values, respectively, and about 6 percent above the trend for 2017. Further, the 2018 value is not significantly different from the trend. Finally, turning to total deductions, we see that 2018 is right on trend, while 2017 is approximately 4 percent above trend. The 4 percent difference between the fixed effects estimate and the linear time trend estimate for 2017 implies a deduction shifting tax elasticity of 0.08.⁴⁷

VI. CONCLUSION

Through using our two sets of data to investigate the responses of corporations to the enactment of the TCJA, we observe the existence of significant income and deduction shifting behavior in response to a changing tax environment, which was theorized or observed by previous researchers. We also provide a preliminary look at some of the newly enacted international provisions of the TCJA.

We find evidence that taxpayers adjusted their receipt of dividends — excluding the deemed repatriation and GILTI income — by reducing dividends in 2017 and increasing them in 2018. Similarly, taxpayers appear to have reduced other income in 2017 and increased it in 2018. We find that interest received was larger in 2017 and 2018 than we would otherwise expect. We suspect that the elevated level of interest received in 2017 results from increased payments made in that year. However, we are unable to detect significant increases in interest payments by corporations at the 5 percent level.⁴⁸ Two sources of deductions appear to be particularly malleable: bad debt deductions and pension and profit-sharing deductions. According to our data, both deductions

⁴⁷ The two-lag model, as reported in the Online Appendix, results in a deduction shifting tax elasticity of 0.06.

⁴⁸ Albeit we observe a significant increase in interest paid at the 10 percent level. Further research with a larger panel may prove useful here.

increased significantly in 2017. More specifically, we observe corporations increasing pension and profit-sharing contributions in 2017 — a behavior predicted by Gaertner, Lynch, and Vernon (2020) — but we do not necessarily confirm the forecasted decrease in 2018 relative to trend.⁴⁹ Additionally, regarding executive compensation, we do not observe the significant increase in 2017 nor the significant decrease in 2018 predicted by Durant, Gong, and Howard (2020).⁵⁰ Overall, total income was well above the linear forecast for 2018 and total deductions were well above the linear forecast in 2017. These findings are consistent with prior research on the ability of corporations to accelerate deductions into high-tax years and delay income into low-tax years.

We find that a select group of 81 corporations whose physical returns we were able to inspect reported more than \$1 trillion in deemed repatriations. We estimate that their net of FTCs liability on that income was \$46 billion. We also find that the newly enacted GILTI provision captured as much as 24 percent of consolidated worldwide net income as reported on financial statements. Moreover, we estimate that the overall average tax rate — including both foreign and U.S. taxes — on that income was 16 percent.

ACKNOWLEDGMENTS AND DISCLAIMERS

We thank Jeffrey Arbeit, Thomas Barthold, Kimberly Clausing, Melissa Costa, Connor Dowd, Bill Gentry, Rob Harvey, Jared Herman, Laura Power, and Natalie Tucker for helpful comments and discussions. Any remaining errors are our own. This research embodies work undertaken for the staff of the JCT, but as members of both parties and both houses of Congress comprise the JCT, this work should not be construed to represent the position of any member of the Committee. This work is integral to the JCT staff's work and its ability to model and estimate the effects of changes in the tax treatment of U.S. corporations.

DISCLOSURE

The authors have no financial arrangements that might give rise to conflicts of interest with respect to the research reported in this article.

REFERENCES

Arellano, Manuel, and Stephen Bond, 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies* 58, 277–297.

⁴⁹ This subject likely requires a more thorough investigation that uses data at the pension or profit-sharing plan level. Additionally, it is possible that firms shifted pension or profit-sharing contributions to 2017 from other future years beyond 2018.

⁵⁰ Since a major component of Durant, Gong, and Howard's (2020) forecasts regarding executive compensation relates to changes to section 162(m), a more focused study investigating only qualified executives at publicly traded firms is likely required.

Avi-Yonah, Reuven S., 2018. “The International Provisions of the TCJA: Six Results after Six Months.” University of Michigan Law and Economics Research Paper 18-021, doi:<https://dx.doi.org/10.2139/ssrn.3242008>.

Bureau of Economic Analysis, 2020. “GDP and Personal Income,” June 12, https://apps.bea.gov/iTable/index_nipa.cfm.

Clausing, Kimberley A., 2020. “Profit Shifting before and after the Tax Cuts and Jobs Act.” *National Tax Journal* 73 (4), 1233–1266.

Dharmapala, Dhammika, 2018. “The Consequences of the Tax Cut and Jobs Act’s International Provisions: Lessons from Existing Research.” *National Tax Journal* 71 (4), 707–728, doi:<https://doi.org/10.17310/ntj.2018.4.06>.

Dowd, Tim, and Paul Landefeld, 2018. “The Business Cycle and the Deduction for Foreign Derived Intangible Income: A Historical Perspective.” *National Tax Journal* 71 (4), 729–750, doi:<https://doi.org/10.17310/ntj.2018.4.07>.

Durant, Jonathan, James J. Gong, and Jennifer Howard, 2020. “In the Nick of Time: Performance-Based Compensation and Preemptive Responses to the Tax Cuts and Jobs Act.” Unpublished Working Paper.

Gaertner, Fabio B., Daniel Lynch, and Mary Vernon, 2020. “The Effects of the Tax Cuts & Jobs Act of 2017 on Defined Benefit Pension Contributions.” *Contemporary Accounting Research*, forthcoming.

Gale, William G., Hilary Gelfond, Aaron Krupkin, Mark J. Mazur, and Eric Toder, 2018. “Effects of the Tax Cuts and Jobs Act: A Preliminary Analysis.” *National Tax Journal* 71 (4), 589–611, doi:<https://doi.org/10.17310/ntj.2018.4.01>.

Gravelle, Jane, 2017. “The ‘Better Way’ House Tax Plan: An Economic Analysis.” Congressional Research Service, Washington, DC.

Guenther, David A., 1994. “Earnings Management in Response to Corporate Tax Rate Changes: Evidence from the 1986 Tax Reform Act.” *The Accounting Review* 69 (1), 230–243.

Henry, Erin, George A. Plesko, and Steven Utke, 2018. “Tax Policy and Organizational Form: Assessing the Effects of the Tax Cuts and Jobs Act of 2017.” *National Tax Journal* 71 (4), 635–660, doi:<https://doi.org/10.17310/ntj.2018.4.03>.

Horst, Thomas, 2019. “Preliminary Estimates of the Likely Actual Revenue Effects of the TCJA’s Provisions.” *Tax Notes Today*, September 16.

Joint Committee on Taxation, 2017a. “Estimated Budget Effects of the Conference Agreement for H.R. 1, The ‘Tax Cuts and Jobs Act.’” Joint Committee on Taxation, Washington, DC, December 18, <https://www.jct.gov/publications.html?func=startdown&id=5053>.

Joint Committee on Taxation, 2017b. “Macroeconomic Analysis of the Conference Agreement for H.R. 1, the ‘Tax Cuts and Jobs Act.’” Joint Committee on Taxation, Washington, DC, December 22, <https://www.jct.gov/publications.html?func=startdown&id=5055>.

Joint Committee on Taxation, 2018. "General Explanation of Public Law 115-97." Joint Committee on Taxation, Washington, DC, December 20, <https://www.jct.gov/publications.html?func=startdown&id=5152>.

Joint Committee on Taxation, 2020. "Corporate Tax Receipts and Corporate Tax Liabilities." Joint Committee on Taxation, Washington, DC, February 10, <https://www.jct.gov/publications.html?func=startdown&id=5245>.

Lyon, Andrew B., and William A. McBride, 2018. "Assessing U.S. Global Tax Competitive-ness after Tax Reform." *National Tax Journal* 71 (4), 751–788, doi:<https://doi.org/10.17310/nj.2018.4.08>.

Mertens, Karel, 2018. "The Near Term Growth Impact of the Tax Cuts and Jobs Act." Federal Reserve Bank of Dallas Research Department Working Paper 1803. Federal Reserve Bank of Dallas, Dallas, TX, doi:<https://doi.org/10.24149/wp1803>.

Organisation for Economic Co-Operation and Development, 2020. "Statement by the OECD/G20 Inclusive Framework on BEPS on the Two-Pillar Approach to Address the Tax Challenges Arising from the Digitalisation of the Economy - January 2020." OECD, Paris, <http://www.oecd.org/tax/beps/statement-by-the-oecd-g20-inclusive-framework-on-beps-january-2020.pdf>.

Page, Benjamin R., Joseph Rosenberg, James R. Nunns, Jeffrey Rohaly, and Daniel Berger, 2017. "Macroeconomic Analysis of the Tax Cuts and Jobs Act as Passed by the Senate," December 7, <https://www.urban.org/research/publication/macroeconomic-analysis-tax-cuts-and-jobs-act-passed-senate>.

Saunders-Scott, Molly, and Jennifer Shand, 2019. "Reconciling Data on Transition Tax Payments: An Examination of Tax, Economic, and Financial Sources," November 21, <https://www.cbo.gov/publication/55873>.

Slemrod, Joel, 1995. "Income Creation or Income Shifting? Behavioral Responses to the Tax Reform Act of 1986." *American Economic Review Papers and Proceedings* 85 (2), 175–180.

Statistics of Income, 2014. "2014 Corporation Income Tax Returns." Internal Revenue Service, Washington, DC.