THE EFFICIENCY-EQUITY TRADEOFF OF THE CORPORATE INCOME TAX: EVIDENCE FROM THE TAX CUTS AND JOBS ACT

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Abstract

This paper studies the effects of an historically large federal corporate income tax cut on U.S. firms and workers, leveraging quasi-experimental policy variation from the 2017 law known as the Tax Cuts and Jobs Act. To identify causal effects, we use employer-employee matched federal tax records and an event study design comparing similarly sized firms in the same industry that faced divergent tax changes due to their pre-existing legal status. We find that reductions in marginal income tax rates cause increases in sales, profits, investment, employment, and payrolls. Workers' earnings gains are concentrated in executive pay and in the top 10% of the within-firm income distribution, while workers in the bottom 90% of the distribution see no change in earnings. Interpreted through the lens of a stylized model, the estimates imply that a \$1 marginal reduction in corporate tax revenue generates an additional \$0.41 in output, with 80% of gains flowing to the top 10% of the income distribution.

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I Introduction

We study the effects of corporate income tax cuts on firms and workers in the United States, where in 2017 Congress enacted the most sweeping and significant legislation on American federal business taxation in a generation. Commonly known as the Tax Cuts and Jobs Act (TCJA), the legislation introduced reforms to corporate marginal income tax rates, investment incentives, and taxation of foreign income, among several other provisions of the tax code. Collectively, the breadth of these provisions and the magnitude of the tax rate changes constituted the largest overhaul of American business taxation since the Tax Reform Act of 1986, providing a rare and sharp natural experiment to shed light on contemporary research and policy debates.

Even as governments around the globe have dramatically reduced corporate income tax rates over the past half-century — from an unweighted average country worldwide statutory tax rate of 40% in 1980 to just 23% in 2021 (Tax Foundation 2021) — policymakers and researchers today fiercely debate the costs and benefits of declining corporate tax burdens. Advocates for tax cuts argue that lower rates increase investment, growth, and workers' living standards, while opponents argue they do little to boost growth and primarily benefit the wealthy.

In this paper we bring new evidence to these debates. Our empirical analysis specifically studies the core provisions of TCJA affecting firms' statutory marginal income tax rates, using a rich employer-employee matched panel dataset constructed from large random samples of confidential firm- and worker-level federal tax records. These data allow us to observe a holistic set of firm outcomes — such as sales, profits, shareholder payouts, and investment — and to merge them with worker-level data on employment and annual labor earnings.

Our main empirical strategy leverages an event study design to compare the outcomes of similarly sized firms in the same industry that faced divergent changes in their tax treatment. In particular, TCJA cut the top marginal tax rate for a legal entity type of firms known as C corporations from 35% to 21% (a 40% reduction). At the same time, TCJA cut the implied top marginal tax rate for a separate legal entity type of firms known as S corporations from 39.6% to 37% (about a 7% reduction), and also introduced a new tax deduction that, for many of these firms, further reduced the top marginal rate to 29.6% (for a cumulative 25% reduction).[1] C corporations and S corporations operate in the same industries, overlap in their firm size distributions, and faced broadly similar tax burdens prior to TCJA, inviting a natural comparison between the two.

We exploit the fact that the average C corp received a significantly larger tax cut than the average S corp to provide exhaustive evidence of these corporate tax changes on firms' sales, profits, shareholder payouts, investment, and employment, as well as on workers' annual earnings. As in Yagan (2015), the identifying assumption of this research design is not random assignment of C or S status; rather, it is that outcomes for C and S corps would have trended similarly in the absence of the tax cuts. Event studies indicate that outcomes of comparable C and

[1] As we will discuss, the top marginal tax rate for S corporations is *implied* because, unlike for C corporations, it must be computed as a weighted average of the marginal tax rates faced by each firms' individual owners and cannot be directly inferred from firms' tax records.

S corps were on similar trends prior to TCJA, and we implement extensive robustness checks to validate that the causal estimates are driven by changes in top marginal tax rates rather than other features of the law, superficial tax shifting behaviors, or unrelated economic forces differentially affecting C and S corps at the same time as TCJA.

Our benchmark regression specifications, which compare trends in outcomes of C versus S corps controlling for firm and industry-size-year fixed effects, indicate that corporate income tax cuts cause economically and statistically significant increases in firms' sales, profits, payouts to shareholders, employment, payrolls, and real investment in capital goods. Responses are concentrated in capital-intensive industries, and are not larger for cash-constrained firms, suggesting that effects are driven by a reduction in the cost of capital rather than by liquidity effects.

Our benchmark estimate of the federal corporate elasticity of taxable income, a key parameter for measuring the magnitude of tax distortions, is 0.45 (s.e.=0.11). This elasticity is smaller than most comparable estimates generated from variation in state and local corporate taxes, but larger than most estimates on personal income taxes. Since businesses are less mobile at the federal level than at the state or local level, and since a large literature documents that individual labor supply elasticities tend to be small, we interpret this evidence as consistent with the common economic intuition that tax distortions vary proportionally with factor mobility.

Moving to the evidence on workers, we study impacts on firm wage quantiles and show that annual earnings do not change for workers in the bottom 90% of the within-firm distribution, but do increase for workers in the top 10%, and increase particularly sharply for firm managers and executives. Executive pay increases are only weakly correlated with changes in firm sales, profits, or sales growth relative to other firms in the same industry, suggesting that these increases in compensation are not clearly linked to stronger firm performance.

To evaluate the effects of corporate tax cuts on tax revenue and output, we combine the reduced-form elasticities from the empirical analysis with a stylized model of firm owners and workers. Using the model, we estimate that a \$1 marginal reduction in corporate tax revenue generates an additional \$0.41 increase in output. Corporate tax revenues decline by \$0.85, with behavioral responses of firms and workers modestly blunting mechanical revenue losses, and consistent with the notion that contemporary top corporate marginal income tax rates in the U.S. are below the revenue-maximizing rate.

To assess distributional impacts, we estimate the short-run incidence of corporate tax cuts on several factor groups — firm owners, executives, and high- and low-paid workers — as the share of total output gains accruing to each factor. Combining our reduced form elasticities with moments from the tax data, we find that approximately 49% of gains flow to firm owners, 11% flow to executives, 40% flow to high-paid workers, and 0% flow to low-paid workers. We then go beyond factor incidence to estimate effects across the income distribution, accounting for the empirical fact that many workers are also firm owners (that is, they hold equity portfolios) and many firm owners also work. Using data on the distribution of capital ownership, we find that approximately 80% of the gains from tax cuts accrue to the top 10% of earners and 20% of gains flow to the bottom 90%. Leveraging the empirically observable geographic distribution of workers and income, we further find that these benefits are disproportionately concentrated in the Northeastern and Western regions of the United States, particularly among workers in large and high-income cities.

This paper builds on a large body of research that studies the effects of corporate taxes on profits, investment, shareholder payouts, employment, wages, and executive compensation.[2] Early seminal studies use aggregate or firm-level panel data and estimate two-way fixed effect models to study policy variation across countries or industries (Hall and Jorgenson 1967; Cummins, Hassett, and Hubbard 1994; Cummins, Hassett, and Hubbard 1996; Goolsbee 1998; Hassett and Hubbard 2002). More recent contributions use detailed administrative microdata and modern econometric methods to exploit geographic policy variation (Link, Menkhoff, Peichl, and Schüle 2022; Duan and Moon 2022; Garrett, Ohrn, and Suárez Serrato 2020; Giroud and Rauh 2019; Fuest, Peichl, and Siegloch 2018; Suárez Serrato and Zidar 2016; Becker, Jacob, and Jacob 2013), industry-level variation in exposure to tax deductions or credits (Curtis, Garrett, Ohrn, Roberts, and Suárez-Serrato 2021; Ohrn 2022; Dobridge, Landefeld, and Mortenson 2021; Ohrn 2018; Zwick and Mahon 2017; House and Shapiro 2008), and firm-level policy variation induced by plausibly arbitrary legal or circumstantial distinctions (e.g., Moon 2022; Carbonnier, Malgouyres, Py, and Urvoy 2022; Bachas and Soto 2021; Risch 2023; Alstadsæter, Jacob, and Michaely 2017; Patel, Seegert, and Smith 2017; Yagan 2015; Devereux, Liu, and Loretz 2014).

Despite major advances in recent research, there are natural reasons to question whether existing evidence is generalizable to understanding the effects of corporate tax cuts in the context of TCJA. Evidence from subnational governments, small developing countries, or small firms may have limited applicability to major reforms in a large advanced economy such as the United States (Auerbach 2018). This concern is especially salient with respect to the U.S. federal corporate income tax, where the tax base is broader, top tax rates are higher, revenues are orders of magnitude larger, and factors of production are considerably less mobile. Moreover, economic theory predicts that alternate tax instruments — such as dividend taxes, capital gains taxes, or narrowly targeted corporate tax deductions and credits — have very different effects than the corporate income tax (Auerbach 2002; Hassett and Hubbard 2002). In this light, it is not surprising that, due to differences in both empirical and normative worldviews, debates over the effects of TCJA remain hotly contested by researchers and policymakers (Barro and Furman 2018).

Empirical evidence on the effects of the federal corporate income tax has remained scarce for three reasons. First, federal tax reforms are rare historical events, leaving limited policy variation

[2]Other outcomes studied in the literature include: establishment counts (e.g., Suárez Serrato and Zidar 2016; Giroud and Rauh 2019); consumer prices (Baker, Sun, and Yannelis 2020); innovation and the mobility of inventors (Akcigit, Grigsby, Nicholas, and Stantcheva 2021); international tax competition (Devereux, Lockwood, and Redoano 2008); the location and investment decisions of multinational firms (Becker, Fuest, and Riedel 2012; Devereux and Griffith 2003); tax avoidance and profit shifting (Garcia-Bernardo, Janskỳ, and Zucman 2022; Desai and Dharmapala 2009; Auerbach and Slemrod 1997; Slemrod 1995; Hines and Rice 1994); and macroeconomic performance (Cloyne, Martinez, Mumtaz, and Surico 2022; Zidar 2019; Romer and Romer 2010, Lee and Gordon 2005). These outcomes are beyond the scope of this paper.

for researchers to study. Second, digitized administrative microdata was previously unavailable to researchers, constraining the scope and precision of empirical analyses. Third, even when countries do change their tax rates, it is difficult for researchers to establish credible counterfactuals for causal inference, particularly as the parallel trends assumption underlying cross-country difference-in-difference analyses are challenging to defend in disparate socioeconomic and institutional settings.

This paper overcomes these limitations to provide extensive evidence on the effects of corporate tax cuts on firms and workers. In doing so, we make four main contributions to the literature.

First, we study a rare policy change that generated historically large within-country variation in federal corporate income tax rates, and moreover generated variation even across similarly sized firms in the same industry. As a share of GDP, the TCJA tax cut is orders of magnitude larger than previous studies that focus, for example, on changes in state or local corporate taxes, which tend to have lower rates and a smaller tax base (e.g., Giroud and Rauh 2019; Fuest, Peichl, and Siegloch 2018; Suárez Serrato and Zidar 2016). The large magnitude of the tax cut is relevant on both theoretical grounds (according to the conventional view that tax distortions are proportional to the square of the tax rate, as in Harberger 1964) and on purely empirical grounds (since ex-ante it is unclear whether existing evidence can be extrapolated to the case of an outlier).

Second, we complement the large shock with detailed employer-employee matched tax records that allow us to observe an unusually holistic set of firm- and worker-level outcomes. We build on frontier research that uses employee-level data to provide a nuanced account of corporate tax incidence on different types of workers (Carbonnier, Malgouyres, Py, and Urvoy 2022; Risch 2023; Dobridge, Landefeld, and Mortenson 2021; Fuest, Peichl, and Siegloch 2018), and extend existing work by empirically estimating geospatial incidence and incidence on firm owners. In contrast to studies that do not directly observe profits (e.g., Suárez Serrato and Zidar 2016), the richness of our data allows us to estimate incidence using fewer assumptions than are typically required when data availability are more limited.

Third, we contribute to a growing literature that seeks to understand the effects of TCJA on the U.S. economy. Researchers have studied impacts on macroeconomic performance (Gale and Haldeman 2021; Gale, Gelfond, Krupkin, Mazur, and Toder 2019; Kumar 2019; Barro and Furman 2018; Mertens 2018), international and intertemporal profit shifting (Garcia-Bernardo, Janskỳ, and Zucman 2022; Dowd, Giosa, and Willingham 2020; Clausing 2020), pass-through businesses (Goodman, Lim, Sacerdote, and Whitten 2021), executive compensation (De Simone, McClure, and Stomberg 2022), capital structures (Carrizosa, Gaertner, and Lynch 2020), and regional or local economic outcomes (Kennedy and Wheeler 2022; Altig, Auerbach, Higgins, Koehler, Kotlikoff, Terry, and Ye 2020). Our study differs from existing research in that we specifically study the effects of TCJA's marginal corporate income tax cuts on firm- and worker-level outcomes using rich administrative microdata and a quasi-experimental research design leveraging cross-firm policy variation. Contemporaneously, Chodorow-Reich, Smith, Zidar, and Zwick (2023) also use confidential tax records to study the effects of TCJA, with a primary focus on capital investment. We obtain very similar investment elasticities to theirs, even though we use a different identification strategy and a different sample of firms.

Finally, we contextualize our findings from this historical episode in debates about efficiency and equity in the broader tax and transfer system (Carbonnier, Malgouyres, Py, and Urvoy 2022; Bachas and Soto 2021; Risch 2023; Hendren and Sprung-Keyser 2020; Fuest, Peichl, and Siegloch 2018; Suárez Serrato and Zidar 2016; Devereux, Liu, and Loretz 2014; Arulampalam, Devereux, and Maffini 2012; Gruber and Rauh 2007). With respect to efficiency, our model-based estimates of the marginal output gains from cutting the federal corporate income tax are approximately 1.5 to 2 times as large as the literature-implied marginal gains from cutting personal income or payroll taxes. With respect to equity, our results contrast with much existing research in that we find the incidence of the corporate tax falls heavily on capital and highly paid workers. Assessing incidence across the income distribution, we estimate that corporate income tax cuts are similarly regressive relative to personal income tax cuts, but markedly less progressive than payroll tax cuts. We note that our results capture short-run responses and do not account for potential changes in government spending or after-tax redistribution, which are important considerations for policymakers but beyond the scope of this research.

The rest of the paper proceeds as follows. Section II summarizes key features of the Tax Cuts and Jobs Act, including its legislative history, institutional context, and major policy changes. Section III describes data sources and variable definitions. Section IV details our empirical strategy and presents results. Section V presents a stylized model that we use to estimate the revenue impacts, excess burden, and incidence of TCJA's corporate tax cuts. Section VI concludes with a discussion of the results.

II The Tax Cuts and Jobs Act

II.A Legislative History

In 2017 Congress took on the task of reforming federal business tax policy, with the stated aims of increasing capital investment, economic growth, and international competitiveness.[3] Following several months of political negotiations and policy proposals, in December 2017 Congress and the President enacted Public Law 115-97, more commonly known as the Tax Cuts and Jobs Act, or TCJA. The law included provisions affecting many aspects of the federal business tax code, including corporate income tax rates, investment incentives, and taxation of foreign income. Most policy changes were implemented beginning in tax year 2018, although some provisions, such as the investment incentives that we will later discuss, were applied to tax year 2017. Our aim below is not to exhaustively detail TCJA's numerous reforms — for reviews of significant provisions see Auerbach (2018) and Joint Committee on Taxation (2018) — but rather to illuminate the key

[3]The policy reforms were first proposed in a blueprint document released by Republicans in the House of Representatives in June 2016, available here.

institutional details and policy variation that we leverage in the empirical analysis.

II.B C vs. S corporations

At the heart of TCJA was an overhaul of the income tax schedules facing two legally distinctive types of businesses, known as C corporations and S corporations. Combined, C and S corps account for approximately 70% of total U.S. employment and 74% of total payrolls, with government, non-profits, and non-corporate private businesses comprising the remainder (Census Bureau 2019). Our analysis focuses exclusively on the corporate sector, as other entity types face different tax and regulatory regimes, and are beyond the scope of this paper. Below we describe salient differences between C and S corps.

C Corporations

C corps are required to pay income taxes directly to the federal government, may be private or public, and are subject to both corporate income taxes (paid on corporate profits) and dividend taxes (paid by shareholders on profits distributed as dividends). Prior to TCJA, C corps faced a progressive tax schedule with eight income brackets and a top marginal rate of 35%. After TCJA, these brackets collapsed to a uniform 21% tax rate. Appendix A.1 documents the evolution of top marginal income tax rates for C corps in the United States since 1909, illustrating the historic nature of this large and rare tax cut, and Appendix A.2 details the collapse of the progressive corporate income brackets following TCJA. Appendix A.3 puts the U.S. corporate tax cuts in a global perspective, and Appendix A.4 benchmarks the magnitude of the TCJA corporate tax cut against other recent studies in the literature.

S Corporations

As pass-through entities, S corps do not pay taxes directly to the federal government. Rather, taxable income is passed to the individual owners of the firm, who pay taxes on profits as ordinary income and can deduct losses. S corps may have up to 100 shareholders, all of whom must be U.S. citizens and not businesses or institutional investors, and are not permitted to sell shares on publicly traded stock exchanges. Unlike C corps, S corps do not face corporate income taxes, nor are their distributed profits subject to the dividend tax.

Prior to 2018, owners of S corps faced a top marginal income tax rate of 39.6%. TJCA then provided two distinct types of tax relief to owners of S corps. First, it reduced the top personal income tax rate from 39.6% to 37%. Second, it introduced a 20% tax deduction on qualified business income that further reduced the effective marginal tax rate on S corp income for most high-income taxpayers from 37% to 29.6%. This tax deduction — known as the Qualified Business Income ("QBI") deduction, or as "Section 199A" after the applicable section of the Internal Revenue Code — is claimable by many, but not all, owners of S corps. Since the QBI limitations are complex and not crucial for our empirical analysis, we abstract from details here and provide more information in Appendix A.5.

Entity Type Choice and Switching

The decision of firm owners to choose one corporate form over the other may reflect a variety of considerations, including shareholder preferences for concentrated versus diffuse ownership (since S corps cannot have more than 100 owners), access to capital (since S corps may not be publicly traded), and tax planning (since C corps must pay entity-level taxes and are subject to dividend taxes on distributed profits). Switching entity types is costly, rare, and subject to regulatory restrictions. Thus, a firm's entity type prior to TCJA is strongly related to the tax rate change it faced after TCJA, and endogenous switching is not a concern for our analysis.

II.C Policy Variation in Marginal Income Tax Rates

Figure I shows the evolution of top marginal income tax rates and tax burdens for C and S corps in the years before and after TCJA, illustrating the key policy variation we exploit in the analysis. Panel A shows the sharp reduction in top statutory marginal income tax rates for C corps, as well as the change in implied top statutory marginal income tax rates for S corps depending on whether or not they are eligible for the QBI deduction.

Panel B shows the change in observed marginal tax rates from our analysis sample of firms with at least 50 employees. Entity-level tax rates and taxes paid are estimated for S corps by linking to returns of S corp owners, as we will describe in detail in the following section. Observed average marginal tax rates are lower than top statutory rates for several reasons. First, in any given year some firms will have non-positive taxable income (for example, if they earn zero or negative profits). Second, C corps prior to TCJA faced a graduated tax rate schedule. Third, our measure of the marginal tax rate for S corps is computed as a weighted average of the tax rates faced by their owners, some of whom may not be in the top tax bracket.

III Data

We use a panel of employer-employee matched annual federal tax records from tax years 2013 to 2019. We begin the sample period in 2013, allowing us to compare trends in the outcomes of C and S corps several years before TCJA, and end the sample in 2019, prior to the onset of the COVID-19 pandemic in 2020. Below we describe the data sources and sample construction, provide variable definitions, and present descriptive statistics. We provide additional details about the data cleaning procedures in Appendix B.

III.A Corporate Tax Returns

We study firms in the corporate Statistics of Income (SOI) files produced by the U.S. Internal Revenue Service (IRS). The corporate SOI files include stratified random samples of corporate tax returns from both C corps (from IRS Form 1120) and S corps (from IRS Form 1120-S). IRS produces and cleans these random samples to estimate aggregate statistics and to provide government agencies with essential data for development of legislation and policy analysis. The corporate tax returns allow us to observe firms' domestic sales, costs, profits, investment, and taxes paid, as well as their year of incorporation and industry.[4]

We impose the following sample restrictions on the SOI panel, yielding an analysis sample of approximately 15,800 unique firms and 110,000 distinct firm-year observations.

First, we restrict the sample to large firms, defined as those with at least 50 employees and $1 million in sales in each year of our pre-treatment period from 2013 to 2016. There are two reasons for restricting the sample to large firms. Large firms account for the lion's share of corporate economic activity, comprising approximately 90% of corporate sales, 70% of corporate taxes, and 67% of corporate employment.[5] Moreover, many small C corps faced tax increases (rather than tax cuts) after TCJA due to the flattening of corporate income tax brackets to a uniform 21% rate (Dobridge, Kennedy, Landefeld, and Mortenson 2023). Including smaller firms would thus require significantly complicating our empirical design, which simply compares outcomes of similar C and S corps over time. The large firm restriction both allows us to study the most economically significant firms and to employ a more transparent research design.

Second, we balance the panel and drop firms that ever switch entity types from C to S or from S to C over the course of our sample period. Balancing the panel ensures that our results are not driven by the changing composition of firms in the SOI samples. Because entity-switching is rare, dropping switchers from our sample excludes only approximately 4% of firms, collectively comprising less than 0.5% of corporate sales or profits.

III.B Individual Tax Returns

We complement the sample of corporate tax records with several sources of individual-level administrative records.

First, we merge the sample of corporate tax returns with the universe of worker-level filings of IRS Form W-2, which provides information on workers' annual wage earnings from each of their employers. Employers are required each year to share copies of form W-2 both with their workers and with the IRS, allowing us to observe the earnings of all workers even if they had no federal tax liability or did not file a personal income tax return.

Second, we collect information about the owners of S corps in our sample from the universe of filings of IRS Form 1099-K1, which provides data on the income received by owners of S corps from each of their pass-through businesses each year, including pass-through income from non-corporate partnerships. As we will describe below, we complement this information with data from IRS Forms 1040 to compute implied marginal income tax rates and federal taxes paid for S corporations.

[4] For additional details on construction of the SOI samples, see documentation provided by the IRS here.

[5] Authors' calculations using IRS data.

Finally, we observe individuals' age and gender from the Master Database maintained by the Social Security Administration (SSA). We also observe their residential location using data from Kennedy and Wheeler (2022).

III.C Variable Definitions and Measurement

Our empirical analysis uses information on firm-level tax rates, taxes paid, sales, profits, investment, employment, and shareholder payouts. We also use data on workers' employment and annual wage and salary earnings. We take care to measure these variables consistently over time, such that our outcomes are not affected, for example, by changes in the tax base or in reporting requirements on tax forms. We provide additional details on variable definitions, including specific forms and line item numbers, in Appendix B.

Marginal Tax Rates

Our primary explanatory variable of interest is the marginal income tax rate paid by firms. For C corps, we observe taxable income and directly infer each firm's marginal income tax rate using the federal corporate income tax schedules reproduced in Appendix Table A.1. For S corps, we observe each owner's taxable income from their personal tax returns, and directly infer their personal marginal income tax rate using the federal personal income tax schedules as reproduced in Appendix Table A.1. We then compute the implied corporate marginal tax rate (MTR) for the firm as a weighted average of the marginal personal income tax rates faced by the firms' owners, where the weights are given by the share of ordinary business income distributed to each owner from that firm. For example, if an S corp has two owners who receive an equal share of that firm's business income, facing marginal tax rates on their individual income of 25% and 35%, respectively, then we compute the implied corporate marginal tax rate as $(.5 * .25) + (.5 * .35) = 30\%$. Appendix Figure B.1 shows the sample distribution of corporate MTRs for both S and C corps before and after TCJA.

Taxes Paid

For C corps, we directly observe total tax payments to the federal government on Form 1120. For S corps, which do not pay entity-level taxes, we must estimate tax payments using information from the individual-level tax records of the firms' owners. To do so, we first compute each owner's average tax rate from Form 1040 as total federal tax divided by taxable income. We also record each owner's total net ordinary business income from Form 1040 Schedule E, and estimate total business taxes paid on this income by multiplying it by the owner's average tax rate. We bottom code total business taxes at zero, ensuring in our calculations that owners do not pay tax on business losses. For each owner, we allocate her total business tax payments to each firm that she owns in proportion to the share of ordinary business income received from that business. Finally, we sum up the total tax payments of each firm's owners to record an estimate of total firm-level tax payments. We provide additional details about these computations in Appendix B.

Sales, Costs, and Profits

We measure firm sales as gross receipts. Pre-tax profits are defined as sales minus cost of goods sold, which includes both material and labor inputs. An advantage of this profit measure is that it is simple, transparent, consistent over time, and invariant to tax law and corporate form. As a robustness check, we also construct a harmonized measure of earnings before interest, taxes, depreciation, and amortization (EBITDA), described in Appendix B. After-tax profits are equal to pre-tax profits minus taxes paid.

Dividends, Share Buybacks, and Total Payouts

Dividends are defined as total cash and property payments to shareholders. Share buybacks are defined as non-negative changes in treasury stock, and total payouts are measured as the sum of dividends and share buybacks.

Investment

Net investment is defined as the change in the dollar value of capital assets, where capital assets are equal to the book value of tangible investment minus capital asset retirements and accumulated book depreciation. We also report results on new investment, defined as the sum of capital expenditures reported on IRS Form 4562. These tax forms include information on firms' purchases of new capital assets such as machinery, computers, vehicles, office furniture, and structures. Firms report these investments according to the lifespan of the investment, which affects the horizon of capital tax deductions available to the firm. We decompose new investment into "short-life" equipment with depreciation schedules of less than or equal to 10 years (such as light machinery, computers, and vehicles), "long-life" equipment with longer depreciation schedules (such as heavy machinery), and structures (such as new factories or office buildings).

Employment, Earnings, and Executive Earnings

We measure firm employment as the total number of unique individuals with a W-2 issued by the firm. Firms with complex ownership structures often use multiple employer identification numbers, and we use crosswalks to improve the linkage between W-2s and their ultimate parent companies (Joint Committee on Taxation 2022). Workers' annual earnings are defined as Medicare wages from the W-2, which capture wage, tip, and salary income even if it is not taxable. Total firm payrolls are the sum of workers' annual earnings. Employment, earnings, and payrolls are strictly positive in our sample, and so we take logs of these outcomes in the empirical analyses.

We construct a measure of executive compensation as the earnings of the top five highest paid workers in the firm. We also examine compensation of officers on Forms 1120 and 1120-S, although not all firms report this information. Reported compensation captures several but not all components of executive pay, including: wage, salary, and bonus income; stock options and grants, when exercised; and non-qualified deferred compensation. However, this measure does not capture stock options or grants before they are exercised, and does not include incentive stock option plans.[6] The measure thus represents a lower bound on executive compensation.

Additional Firm Characteristics

We group firms into five time-invariant size bins with approximately comparable numbers of observations based on their average employment in the pre-period years prior to 2017, where the bins are: 50-99 employees; 100-199 employees; 200-499 employees; 500-999 employees; and 1000+ employees. We also classify firms into time-variant industries using the NAICS-3 codes they report on Forms 1120 and 1120s. In the resulting data we observe 87 distinct industries and 311 distinct industry-size bins.

Firm age is inferred from the firm's year of incorporation, reported on the 1120. Firms are classified as multinationals if their foreign sales share is greater than 1%, where foreign sales are defined as the sum of gross receipts from all Controlled Foreign Corporations (that is, foreign subsidiaries) reported on Form 5471. We measure capital intensivity at the industry level as capital assets divided by sales. Firms are classified as capital intensive if the mean of this ratio in the pre-period is greater than the sample median, and others are classified as non-capital intensive. Appendix B.3 shows that capital-intensive firms are approximately equally distributed across the firm size distribution.

Measurement

We scale several outcomes — taxes, sales, costs, profits, and investment — by firm sales in 2016, our baseline year prior to the passage of TCJA. While it is common in economic research to estimate elasticities by transforming regression outcomes using logs, doing so in our case is problematic because taxes, profits and net investment are often zero or negative. Scaling firm variables by baseline sales permits a natural interpretation of the regression coefficients in our empirical analyses, allows us to study a range of outcomes such that they can be consistently and easily compared, and is standard in the literature. In accordance with economic theory and prior research, our preferred investment measure is net investment scaled by lagged capital, although for consistency we also report results scaled by baseline sales. We winsorize the top and bottom 0.1% of the scaled outcomes separately for C and S corps in each year to ensure that our results are

[6] Designation of officers is determined by the laws of the state or country where the firm is incorporated. Qualified deferred compensation plans are employer-sponsored retirement savings plans governed by the Employee Retirement Income Security Act of 1974 (ERISA). The most popular of these plans are 401(k) plans, and plans are subject to the legal protections, contribution limits, and regulatory restrictions of the law. Non-qualified deferred compensation plans are not subject to ERISA, generally do not have legal contribution limits, and are at risk if the firms declare bankruptcy, although such losses are empirically rare. Incentive stock option plans have a maximum deferral of $100,000 per year and are taxed as long-term capital gains, and thus are not reported on the W-2.

not driven by outliers or measurement error, and to improve statistical precision. We also show that the empirical results are robust to alternate winsorizing thresholds.

III.D Descriptive Statistics

Panels A and B of Figure II show the distributions of log firm sales and log firm employment in our sample, and illustrate broad overlap in the size distributions of C and S corps. The panels make clear that the firm size distributions are strongly right-skewed, and that this skewness is more pronounced for C corps than S corps. In robustness checks, we show that our empirical results are insensitive to the inclusion or exclusion of very large C corps; since they are qualitatively irrelevant to the results, we include them in the main analysis sample.

Panel C of Figure II shows the NAICS-2 industry composition of the sample, and again reveals broad overlap of C and S corps. Most industries have comparable shares of C and S corps. Some sectors, such as management and professional services, have a relatively higher proportion of C than S corps, while the reverse is true for others, such as construction and retail trade. Because our event study analysis will use industry-size-year fixed effects to compare C and S corps in the same industry and employment size bin, the observed sectoral overlap in the sample is more than sufficient for our empirical design. In robustness checks, we show that results are insensitive to the exclusion of industries in which the firm share of C corps or S corps exceeds 80%.

Table I presents descriptive statistics for our analysis sample from 2016. The mean firm in the sample pays \$13.7 million in federal taxes, has annual sales of \$783.2 million, and makes new real investments of \$50.6 million per year. Mean firm employment is 2,382 workers, and the average worker earns approximately \$65,000 per year. Consistent with Figure II, columns 3-10 underscore the right-skewness of firm size, especially of C corps, such that mean outcomes are significantly higher than medians and outcomes for C corps are higher and more variable than for S corps.[7]

IV Empirical Analysis

IV.A Empirical Strategy

We implement a research design comparing trends in outcomes of C and S corps in the same industry-size bin before and after TCJA. Our event study specification is given by:

$$y_{ft} = \sum_{t \neq 2016} \beta_t C_f * \mathbf{1}(year = t) + \gamma_f + \alpha_{is(f),t} + \epsilon_{ft} \tag{1}$$

where y_{ft} is an outcome for firm f in year t; C_f is a binary variable equal to 1 if firm f is a C corp or 0 if it is an S corp; γ_f is a firm fixed effect; and $\alpha_{is(f),t}$ is an industry-size-year fixed effect, where the industry-size bins are constructed as described in Section III.C. The coefficients of interest, β_t, capture the average differences in outcomes between C and S corps in the same

[7] All medians and other quantile statistics reported in this paper are fuzzed to protect taxpayer privacy; see Appendix B for details.

industry-size bin in year t. We use 2016 as the reference year, allowing us to compare C and S corp trends for several years prior to TCJA and also to observe any potential anticipatory tax-shifting behaviors beginning in 2017. Standard errors are clustered by firm.

The identifying assumption permitting a causal interpretation of the β_t coefficients is that the outcomes of C and S corps would have trended similarly in the absence of TCJA's changes to firms' marginal income tax rates. While this parallel trends assumption is not directly empirically testable, there are several reasons it is likely to hold in this setting. First, legislative passage of TCJA was widely unexpected prior to the 2016 federal elections, and so firms had limited scope to anticipate the reform and to adjust their behavior endogenously prior to the policy changes. Second, the industry-size-year fixed effects imply that we make comparisons among C and S corps that compete in similar product markets and are subject to the same industry-by-size specific supply and demand shocks.[8] Third, Yagan (2015) documents that C and S corp trends in real outcomes were statistically indistinguishable for all years in his sample period from 1996-2008, implying that C and S corps have historically responded similarly to macroeconomic shocks and trends. Fourth, as we will show, our event studies show parallel trends in the outcomes of C and S corps in the years directly prior to the policy reform. Lastly, in Section IV.H, we carefully consider additional identification threats, and present a series of robustness checks to ensure that our causal estimates are not driven by non-MTR features of the law, anticipation effects, superficial tax-shifting behaviors, or unrelated economic shocks differentially affecting C and S corps at the same time as TCJA.

Our goal of quantifying the market distortions and distributional effects of TCJA's corporate tax cuts will require that we obtain elasticities of profits, investment, and earnings with respect to the net-of-tax rate. To estimate these key elasticities, we pool outcomes in the post-period and use two-stage least squares. The reduced form, first stage, and structural equations are given, respectively, by:

$$y_{ft} = \beta C_f * Post_t + \gamma_f + \alpha_{is(f),t} + \epsilon_{ft} \tag{2}$$

$$\Delta \ln(1-\tau_f) * Post_t = \delta C_f * Post + \gamma_f + \alpha_{is(f),t} + \epsilon_{ft} \tag{3}$$

$$y_{ft} = \varepsilon \Delta \ln(1-\tau_f) * Post_t + \gamma_f + \alpha_{is(f),t} + \epsilon_{ft} \tag{4}$$

where $\Delta \ln(1-\tau_f)$ is the 2016 to 2019 log change in the net-of-tax rate for firm f, $Post_t$ is an indicator equal to 1 for years after 2018, and the fixed effects are the same as in equation 1. Intuitively, we instrument for firms' net-of-tax change using their pre-existing entity type status as C or S corps. The identifying assumptions underlying this empirical strategy are well known: exogeneity, relevance, monotonicity, and exclusion. We do not claim strict exogeneity in our setting — that is, we do not claim there is random assignment of C or S status — but rather rely on the

[8]Our main analysis abstracts from market-level adjustments and general equilibrium effects that may reallocate resources among firms within the industry-size-year bins and/or be absorbed by the fixed effects. In Appendix C.2, we discuss these potential channels in detail and provide empirical evidence suggesting such effects are likely to be relatively small within our short-run horizon.

weaker claim of parallel trends in the outcome absent the changes in the tax rate (Conley, Hansen, and Rossi 2012). We examine the relevance and monotonicity conditions below, and return to a discussion of the exclusion restriction when we evaluate mechanisms.

We begin the empirical analysis with a presentation of average responses, and then turn to heterogeneity tests and robustness checks. We conclude the empirical analysis with a discussion of mechanisms, where the focus is naturally related to the task of disentangling the impacts of TCJA's marginal tax rate cuts from other concurrent policy changes. First, however, our goal is more modest: to provide clear evidence on how TCJA differentially affected C and S corps.

IV.B Marginal Tax Rates and Taxes Paid

Figure III plots the β_t coefficients and 95% confidence intervals from estimating equation 1, using the firms' marginal tax rates and taxes paid as outcomes. We scale taxes paid and other outcomes that we will report below by the firm's baseline 2016 sales, for the reasons discussed in Section III.C. The grey lines indicate the average of the coefficients before and after TCJA, and below each panel we report the corresponding difference-in-difference coefficient and standard error estimated from equation 2.

Panel A of Figure III shows that the observed marginal tax rates of C and S corps trended similarly prior to TCJA, but diverged sharply thereafter. On average, the marginal tax rate of C corps fell by approximately -5.0 percentage points (s.e.=0.2) compared to S corps in the sample; relative to the 2016 outcome mean in levels of 25%, this represents a -5.0/25.0 $\approx$ 20.0% decline in the marginal tax rate facing C corps relative to S corps. The panel also shows that firms' tax rates started to decline modestly in 2017, even though the bulk of TCJA's provisions did not take effect until 2018. This pattern provides suggestive evidence that firms engaged in intertemporal shifting behaviors to minimize tax liability, such as reporting costs in 2017 rather than 2018 so that those business expenses could be deducted at a higher tax rate. We discuss shifting behaviors in greater detail later in Section IV.H.

Panel B of Figure III shows an analogous version of Panel A, where the outcome is transformed as the log net-of-tax rate, (1-τ_f^{MTR}). We show this transformation because economic theory predicts that firms respond to the net-of-tax rate when optimizing profits. The figure shows that, on average, C corps saw their net-of-tax rate increase by approximately 6.6% (s.e.=0.2) relative to S corps following TCJA. Below, we use this result to scale other reduced form effects, allowing us to estimate elasticities of key outcomes with respect to changes in the log net-of-tax rate.

Panel C of Figure III shows that the differences in tax cuts also translated into differences in taxes paid, with C corps paying approximately -0.9 percentage points ($\approx$8.3%; s.e.=0.2) less in federal tax in 2019 relative to their baseline sales when compared to S corps. Panel D illustrates that the magnitude of this effect is economically large: on average, C corps paid approximately \$1,700 (s.e.=\$264) less in tax per worker than comparable S corps following TCJA.

Columns 1 to 4 of Table II report the $C \times Post$ estimates produced from estimating equation 2. Similar to the event studies, these coefficients capture the average differences between

C and S corps in the pre- and post-periods for each outcome after controlling for firm and industry-size-year fixed effects.

The results in Figure III and Table II provide evidence of a strong first stage, demonstrating an economically meaningful and statistically powerful differential effect of TCJA on the tax rates and tax payments of C corps versus S- corps. These results also indicate that the relevance and monotonicity assumptions underlying equation 3 are satisfied in this setting.

IV.C Sales, Costs, Pre-Tax Profits, and EBITDA

Figure IV plots the results from estimating equation 1 to assess trends in the sales, costs, and pre-tax profits, and EBITDA of C and S corps over time. The figure shows that trends in these outcomes were statistically similar before TCJA, again lending support to the parallel trends assumption underlying the identification strategy. After TCJA, however, C corps' sales increased relative to S corps by approximately 4.1 percentage points (s.e.=1.2). The effect is precisely estimated and economically significant: using values from Table I, the coefficient implies that the median C corp increased its annual sales by approximately $4 million relative to comparable S corps.

C corps also faced higher costs, as shown in Panel B, although the magnitude of the cost increase is smaller than for sales and is not statistically significant. Later we show evidence that the increase in costs is corroborated by statistically significant changes in real outcomes, including payrolls and capital investment.

Given sharply increasing sales and only modestly increasing costs, Panel C shows that the average pre-tax profits of C corps also increased relative to S corps, by 2.9 percentage points (s.e.=0.7). Panel D shows an alternate measure of pre-tax profits, using the harmonized EBITDA measure, and again reveals a clear increase in the profits of C corps relative to S corps. These results provide initial evidence that firms expanded in response to tax cuts, consistent with the standard notion that taxes induce economic distortions and may generate market deadweight loss.

Columns 1 to 4 of Table III show the $C \times Post$ coefficients associated with the event studies in Figure IV. In column 5, we estimate the elasticity of pre-tax profits with respect to the net-of-tax rate using equation 4. Scaling the reduced form estimate in column 3 by the first-stage estimate from column 2 of Table II yields an approximate elasticity of 0.45 (s.e.= 0.11).

This elasticity of taxable income (ETI) is a key parameter in the analysis. As shown by Feldstein (1999) and reviewed by Saez, Slemrod, and Giertz (2012), under plausible assumptions it is a sufficient statistic that can be used to estimate the welfare impacts and efficiency costs of tax changes. In general, a larger taxable income elasticity implies greater deadweight loss, since it implies a larger distortion of economic activity resulting from the tax.

Our estimate of the federal corporate ETI, 0.45, is on the lower end of corporate elasticities identified from policy variation in small open economies. For example, Giroud and Rauh (2019) estimate an elasticity of establishment growth (a proxy for the tax base) of approximately 0.50 with respect to state corporate taxes in the United States; Suárez Serrato and Zidar (2016) estimate an elasticity of establishment growth of approximately 0.9 for U.S. state corporate taxes over an analogous time horizon to ours; and Bachas and Soto (2021) estimate large taxable income elasticities of 3.0-5.0 for small firms in Costa Rica. On the other hand, our estimate of the corporate ETI is on the higher end of most existing estimates of the ETI for personal incomes, which Saez, Slemrod, and Giertz (2012) find in a literature review ranges from approximately 0.14 to 0.40, with a central estimate of 0.25.

Viewed in the context of other research, we view our corporate ETI estimate as consistent with the common economic intuition that tax distortions vary with factor mobility. Firms and workers are less mobile at the federal level than at the state and local level, mitigating distortions from the federal corporate tax relative to the state and local corporate tax. However, many forms of capital are more mobile relative to workers (Kotlikoff and Summers 1987), suggesting that federal taxes on labor income, the primary source of personal income tax revenue, may be less distortative than the federal corporate tax. In Section IV.H we perform extensive robustness checks on our ETI estimate, and in Section VI we discuss its significance in the context of the broader national tax and transfer system.

IV.D After-Tax Profits and Shareholder Payouts

We use the same empirical strategy to evaluate trends in firms' after-tax profits and payouts to shareholders. Consistent with the increases in pre-tax profits and decline in tax liability, Panel A of Figure V, and Column 1 of Table IV, shows that the after-tax profits of C corps increased relative to S corps following TCJA, by 3.8 percentage points (s.e.=0.7). The magnitude of this effect is economically and statistically significant, and underscores that tax cuts are highly lucrative to firm owners. The elasticity of after-tax profits with respect to the net-of-tax rate, estimated in column 4 of Table IV using equation 4, is 0.58 (s.e.= 0.11). Later, we use this elasticity to assess the incidence of TCJA's tax cuts on firm owners.

We also find that firms returned some of these excess profits to their shareholders via dividends and share buybacks, the sum of which we refer to as total shareholders payouts. Because shareholder payouts are infrequent events (approximately half of the payout observations in our sample are zero), we study both the intensive and extensive margins.

In Panel B of Figure V the outcome is log total payouts (that is, the intensive margin). The figure shows that payouts of C corps relative to S corps increased by 22.0% (s.e.=2.9). The outcome in Panel C is equal to one if total payouts are greater than zero (that is, the extensive margin), and shows an increase of 2.8 percentage points (s.e.=0.5) in the payout probability of C corps relative to S corps following TCJA. Consistent with this increase in shareholder payouts, in Appendix C.1 we find that C corps do not increase their issuance of equity or debt relative to S corps after TCJA. The results are consistent because, if firms need external financing to fund operations, they generally do not simultaneously distribute cash to shareholders.[9]

[9] In assessing the effects of TCJA on shareholder payouts, it is also relevant that enactment of the TCJA levied a one-time, mandatory tax on the previously untaxed foreign earnings of C corporations through section 965 of the Internal Revenue Code. However, our results are robust to inclusion of controls for foreign earnings as well as the exclusion of large multinational firms, suggesting that the repatriation tax not the primary driver of our findings.

Overall, the results from Figure V and Table IV provide evidence that firm owners bear a substantial portion of the short-run economic incidence of the corporate income tax.

IV.E Labor Market Outcomes

We again use equation 1 to examine the labor market outcomes of workers at C and S corps before and after TCJA. Figure VI shows the results from estimating equation 1 to assess trends in log employment, payrolls, and annual earnings for selected groups of workers.

Figure VI shows that the labor market outcomes of C and S corps followed similar trends prior to TCJA. After TCJA, Panel A shows that employment in C corps increased relative to S corps, by 2.2% (s.e.=0.8) on average. Payrolls, shown in Panel B, correspondingly trend upward by 3.3% (s.e.=0.8).

Panels C, D, and E move beyond total payrolls to shed light on the distributional impacts of TCJA on workers' earnings. Panel C shows that the earnings of the median worker at the firm evolved similarly for both C and S corps over the entire sample period, and implies that corporate tax cuts did not have a statistically significant effect on earnings for the typical worker.[10] By contrast, Panels D shows that the earnings of C corp workers at the 95th centile increased sharply relative to their counterparts in S corps, and Panel E indicates that earnings of executives (as proxied by the top five highest paid workers) increase even more. That high-end earnings appear to trend upward in 2017, before TCJA fully took effect, is consistent with firms intertemporally shifting forward executive compensation, perhaps in the form of bonuses, so that these costs could be deducted at a higher tax rate prior to the corporate rate cut beginning in 2018.

To more comprehensively evaluate the effects of TCJA on the distribution of workers' earnings, we estimate specifications of equation 2 where the outcome $y_{ft}(q)$ is log annual earnings of workers in firm f and year t at quantile q. For example, $y_{ft}(q = 50)$ uses log median earnings as the outcome, as shown in Panel C of Figure VI, and $y_{ft}(q = 95)$ uses the 95th percentile of log worker earnings as the outcome, as in Panel D.

Figure VII plots the $C \times Post$ coefficients from these regressions along with their corresponding 95% confidence intervals. The figure shows that the relative earnings of workers in C and S corps below the 90th percentile are statistically identical following TCJA; we cannot reject that the coefficients are statistically distinguishable from zero.

However, the figure reveals a very different pattern for workers in the top 10% of the earnings distribution. On average, workers at the 90th percentile of the within-firm distribution see their relative earnings change by 0.5% (s.e.=0.4), and these impacts grow quantitatively larger and statistically sharper further up the distribution. At the 95th percentile, we estimate a relative earnings increase of 1.3% (s.e.=0.4) for C corp workers, and this magnitude climbs to 5.0% (s.e.=0.7)

[10]Models of perfect labor competition predict that, in response to an increase in labor demand, wages should increase equally for workers of both C and S corps. It is possible that these general equilibrium effects are absorbed in our industry-size-year fixed effects. Our main results abstract from this potential response. We discuss theoretical and empirical strategies for considering potential general equilibrium effects of corporate tax cuts on outcomes such as earnings, profits, and investment in Appendix C.2.

at the 99th percentile.

Panel A of Table V reports the $C \times Post$ coefficients from equation 2, as well as the dependent variable means in the baseline year and implied elasticities with respect to the net-of-tax rate. For workers at the 95th percentile, we estimate an earnings elasticity of 0.20% (s.e.=0.06), and for executives we estimate a larger earnings elasticity of 0.75% (s.e.=0.11). The mean baseline earnings of these workers and executives are high: the average worker in the sample at the 95th percentile of the within-firm distribution earns \$176,373 per year, and the average worker in the top five earns \$989,387 per year. Applying the baseline sample levels, the average firm net-of-tax-rate change in the sample, and the estimated net-of-tax elasticity, the results imply that average executive earnings increased by approximately \$50,000 per year. Similar computations yield that average earnings for workers at the 95th percentile increased by approximately \$1,500 per year, and that earnings changes for workers below the 90th percentile are statistically indistinguishable from zero.

What drives the sharp increases in executive pay? The coinciding increases in the sales, pre-tax and after-tax profits, payrolls, and investment of C corps compared to S corps suggest there is plausible scope for managerial decision making and effort to drive increased firm productivity. Moreover, firms may incentivize managerial effort by explicitly compensating executives on the basis of firm performance metrics (e.g., Bebchuk and Fried 2003; Murphy 1999; Jensen and Murphy 1990). On the other hand, to the extent that executives have significant bargaining power vis-a-vis shareholders, they may be in a position to extract a portion of after-tax profits even in the absence of improvements in managerial productivity.

In Panel B of Table V we perform a series of empirical tests developed by Ohrn (2022) to evaluate the relevance of these competing mechanisms, which are not necessarily mutually exclusive.[11] The outcome in all columns is log compensation. The first column shows the benchmark specification given by equation 2. In the remaining columns, we respectively add controls for three measures of firm performance: sales growth, profit growth, and sales growth relative to other firms in the same industry. To the extent that executive pay is correlated with these performance metrics, we may expect the $C \times Post$ coefficient to shrink as we add the controls.

The results in columns 2-4 show that the $C \times Post$ coefficient on executive pay shrinks only modestly as we add controls for the firm performance metrics. The benchmark estimate of 4.8% declines only very modestly to 4.6% when we add controls for sales growth, and shrinks by a similar amount when controlling for profit growth or sales growth relative to other firms in the same industry.

These tests are not dispositive, as the econometric problems with conditioning on post-treatment outcomes are well-known (e.g., Imbens 2020), and increasing managerial productivity may not be fully reflected in firm performance metrics over this limited two-year time horizon. However, the results are consistent with empirical evidence from Ohrn (2022), who finds that executive pay in publicly traded firms is highly responsive to narrowly targeted corporate tax

[11]In Appendix C.3 we show that these results are robust to alternate measures of executive pay.

breaks, and that pay increases are driven by rent-sharing rather than a higher marginal product of labor. The results are also consistent with Bertrand and Mullainathan (2001), who find that executives are often rewarded for positive shocks to the firm even if those shocks are clearly beyond the manager's control.

To provide additional insight into the distributional impacts of corporate tax cuts on workers' earnings, Panel C of Table V presents descriptive statistics on the individual characteristics of workers in the bottom 90% of the firm wage distribution, in the top 10% of the firm wage distribution, and in top five highest paid workers at the firm. In our sample, 89% of executives are men, and on average these workers are 54 years old and earn over $1.1 million in annual labor income. By contrast, just 55% of workers in the bottom 90% of the distribution are men, and these workers on average are 39 years old and earn less than $40,000 in annual labor income.

Collectively, the findings from our investigation of labor market outcomes imply that the short-run effects of corporate tax cuts are regressive, increasing earnings only for workers at the top of the within-firm distribution. The results also demonstrate that the distributional impacts of corporate tax cuts do not affect all demographic groups equally.

These results are consistent with studies finding evidence of rent-sharing with high-income workers in response to tax or productivity shocks (Ohrn 2022; Carbonnier, Malgouyres, Py, and Urvoy 2022; Gale and Thorpe 2022; Dobridge, Landefeld, and Mortenson 2021; Kline, Petkova, Williams, and Zidar 2019), and also consistent with Risch (2023), who finds that the incidence of tax hikes on S corps falls mostly on shareholders and high-income workers in the firm. By contrast, our results differ modestly from Fuest, Peichl, and Siegloch (2018), who study municipal corporate tax changes in Germany and find that the incidence of business taxes falls substantially on low-income and marginally attached workers.[12] One possible reconciliation is to note that their findings are driven by wage impacts on workers in small firms with fewer than 10 employees, whom they argue may be relatively immobile in Germany and thus bear a larger share of corporate tax incidence.

We explore additional aspects of heterogeneity in Section IV.G, and return to broader issues of assessing the incidence of the corporate income tax in Section V.

IV.F Investment

Figure VIII shows the results from estimating equation 1 to assess relative trends in real net investment of C and S corps. Panel A shows trends in the investment rate, defined as net investment scaled by the lagged capital stock. We find that C corps increase net investment by 2.9% (s.e.=0.4) relative to S corps after TCJA. For consistency with other previously reported outcomes, in Panel B we also report the event study for net investment scaled by baseline 2016 sales. The figure again shows that investment of C corps increases relative to S corps.

[12] Our results are similar to Fuest, Peichl, and Siegloch 2018 in that we will find in Section V, as they do, that approximately half of the incidence of the corporate tax is borne by firm owners, and half by workers. Our results differ, however, in our finding that high-income workers, rather than low-income workers, bear the incidence.

In Appendix C.4 we report results on new investment, corresponding to new purchases reported by firms on Forms 4562. Table C.4 shows relative increases in short-life new investment (such as computers), but no change in long-life new investment (such as heavy machinery) or structures. That we observe an increase in short-life but not long-life investments is reassuring, since an increase in long-term investments as a result of TCJA would be less likely to materialize over our short-run time horizon.

The elasticity of investment may have implications for economic growth (e.g., Romer and Romer 2010) and for evaluating the incidence of the corporate tax on the owners of capital (e.g., as in Goolsbee 1998). In column 4 of Table VI, we estimate an investment elasticity of 0.44 (s.e.=0.07), implying that a 1% increase in the net-of-tax rate causes an approximately 0.44% increase in investment.[13] Later, we also discuss estimation of the elasticity of investment with respect to the cost of capital. Before doing so, however, we must first investigate whether changes in investment are driven by changes in the cost of capital, as in a standard model, or by others channels such as liquidity effects. We thus now implement a battery of heterogeneity and robustness tests, and then turn to an explicit discussion of mechanisms.

IV.G Firm Heterogeneity

Figure IX presents our benchmark difference-in-difference elasticities (i.e., the ε and 95% confidence intervals from equation 4) across several dimensions of firm heterogeneity, focusing on the following outcomes: pre- and post-tax profits, workers' earnings, and net investment. We focus on these outcomes due to their usefulness in interpreting mechanisms and due to their central role in our quantification of welfare and incidence in Section V.

Existing research has emphasized that the effects of tax changes may vary by firm size (where smaller firms may be better able to engage in tax shifting, as in Giroud and Rauh 2019); by liquidity (where low-cash firms may face borrowing constraints and thus respond more elastically to tax changes, as in Zwick and Mahon 2017 and Saez, Schoefer, and Seim 2019); by factor intensity (where capital-intensive firms may be most responsive to a shock, as in Acemoglu and Guerrieri 2008); by firm profitability (where highly profitable firms may be managed more effectively, as suggested by Bloom and Van Reenen 2007); by unionization rates (where highly unionized firms may reduce firms' profits and investment, as studied in Card, Devicienti, and Maida 2014); and by industry concentration (where highly concentrated firms may be better able to pass the costs of tax increases to their input suppliers, as in Fuest, Peichl, and Siegloch 2018 and Juarez 2022).

Here we focus on heterogeneity across the first three of these characteristics — firm size, liquidity, and capital intensity — and report additional results in Appendix C.5. Firm size is defined using the pre-TCJA employment bins used in our main analysis. We measure cash as the sum of the firm's liquid assets, and classify firms as high-cash if their average cash-to-assets ratio

[13] Chodorow-Reich, Smith, Zidar, and Zwick (2023) study firms' investment responses to TCJA and estimate a domestic tax term elasticity of 0.49. We estimate a very similar elasticity despite using a different empirical strategy and sample of firms.

in the pre-period is greater than the median value for the sample. Capital intensity is defined as in Section III.C. When we test for heterogeneity across firm size we include only industry-year fixed effects in our regression specifications; for all other specifications we include industry-size-year fixed effects. To obtain the point estimates in Figure IX we run the model separately for each subsample of firms.

Looking across the outcomes in Figure IX, we observe no clear patterns in profits, median earnings, or investment with respect to firm size, although there is suggestive evidence that gains for high-income workers are larger in smaller firms. With respect to liquidity, the results suggest that high cash firms are if anything *more* responsive than low-cash firms in our sample, implying that liquidity constraints are unlikely to drive the responses. These results contrast with Zwick and Mahon (2017), who find that small and financially-constrained firms are most likely to increase investment and payrolls in response to bonus depreciation incentives.

Several factors may explain why our findings differ from Zwick and Mahon (2017). First, Zwick and Mahon study countercyclical policies enacted during U.S. recessions, when financial constraints are most likely to be binding. By contrast, TCJA was enacted during a long macroeconomic expansion with low interest rates and favorable financial conditions. Second, Zwick and Mahon find that responses are largest for the smallest firms in their sample. By contrast, our sample includes only medium-to-large sized firms. Finally, Zwick and Mahon use an identification strategy that exploits cross-industry exposure to bonus depreciation incentives. By contrast, our identification strategy exploits within-industry variation in tax policy, and as such our industry-size-year fixed effects may absorb any time-varying policy impacts that affect both C and S corps similarly.

Although firms' responses do not appear to vary systematically with firm size or liquidity, Figure IX shows evidence that they do appear to vary with capital intensity. C corps in capital-intensive industries are more likely than comparable S corps to increase their profits and investment in the years following TCJA, and these differences are both economically and statistically significant. These findings are suggestive of a cost of capital channel, which we explore in greater detail in Section V.

In Appendix C.5 we present additional heterogeneity tests. In general, we do not find clear evidence that the effects of the tax cuts vary with firm profitability, unionization rates, or market concentration, although we find suggestive evidence that impacts are larger in non-tradable sectors.

IV.H Robustness

Having presented the main results, we turn now to assessing their robustness and to addressing potential threats to the identification strategy. The identifying assumption underlying our empirical strategy is that the outcomes of C and S corps would have trended similarly in the absence of TCJA's marginal income tax rate cuts. While this assumption is not directly testable, the event studies above show that C and S corps followed broadly similar trends prior to TCJA, lending support to its plausibility. However, if the differential tax cuts affecting C and S corps following TCJA are correlated with simultaneous supply or demand shocks — for example, due to other provisions of the legislation or external events differentially affecting C and S corps — then our elasticity estimates could be biased. To address concerns about robustness and identification, we present specifications with alternate controls and samples, and explicitly consider how other provisions of TCJA, unrelated external events, anticipation effects, and tax-shifting behaviors may affect our analysis.

Alternate Specifications

Row 1 of Table VII reports the key net-of-tax elasticities obtained from estimating equation 1 using our benchmark specification. We focus on the outcomes that will serve as key inputs in our analyses of welfare, incidence, and mechanisms: pre- and after-tax profits; the earnings of low- and high-paid workers and executives; and net investment. In the remaining rows, we examine the sensitivity of these estimates to alternate modeling choices. Unless otherwise noted, all specifications include firm and industry-size-year fixed effects.

In row 2 we control for cohort-by-year fixed effects, where cohorts are defined using the firms' year of incorporation. This specification implies that the elasticities are identified from comparisons of C and S corps that are the same age.

In row 3 we add controls for state-by-year fixed effects, where a firm's state is defined using the address reported on Form 1120 or 1120-S. In practice, the operations of large or exporting firms may span many states. Therefore, this specification controls for location-specific trends to the extent that firm performance is influenced by time-varying shocks associated with the firm's reported tax address.

Although we do not observe any systematic evidence that C and S corps were on different trends prior to TCJA, in row 4 we nevertheless probe the sensitivity of the estimates to adding pre-trend controls. Specifically, we control for lagged outcomes in 2013, 2014, 2015, and 2016, and interact each of the lagged outcomes with year indicators.

In row 5 we define industries using 6-digit, rather than 3-digit, NAICS codes. In row 6 we show the results using a log transformation of the outcome. These specifications implicitly exclude observations in which the outcome is zero or negative. For outcomes where the benchmark specification was already logged, the results are the same as in row 1. In column 7, we winsorize the outcomes at the 5th and 95th percentiles. In column 8, we weight the regression observations by each firm's 2016 sales, thus providing revenue dollar-weighted elasticities. In general, the elasticity estimates across all specifications and outcomes are stable and within the confidence interval of the benchmark specification.

Alternate Samples

Table VIII shows robustness results for the same outcomes using alternate samples. Row 2 excludes firms with 2016 sales greater than $1 billion or 2016 employment greater than 10,000. This sample restriction effectively excludes C corps that are larger than the largest S corps. Row 3 excludes "mismatched" industries, defined as those in which C corps account for greater than 80% or less than 20% of the firms in the sample. Row 4 excludes manufacturing firms, which may have been more affected, for example, by the U.S.-China trade war that occurred during our sample period (Fajgelbaum, Goldberg, Kennedy, and Khandelwal 2020). Row 5 excludes publicly traded firms, and row 6 uses the unbalanced panel of firms. Across the samples, the magnitudes are within the confidence intervals of the benchmark results in row 1.

Other Provisions of TCJA

Beyond reducing marginal corporate income tax rates, TCJA also introduced several new policies affecting various business tax deductions, the taxation of foreign business income, and capital investment incentives. To assess the extent to which our estimates may be driven by these policy changes rather than by the rate cuts, below we briefly summarize the major provisions of TCJA affecting corporations, and then present several additional robustness checks. For more details on these reforms, see Auerbach (2018) and Joint Committee on Taxation (2018).

- **Net Operating Loss (NOL) Deductions:** TCJA limited NOL deductions to 80% of a corporation's taxable income, eliminated NOL carrybacks, and allowed indefinite NOL carryforwards.
- **Domestic Production Activities Deduction (DPAD):** TCJA repealed DPAD, which provided a tax deduction to corporations that produce manufactured goods within the United States.
- **Alternative Minimum Tax (AMT):** TCJA repealed the corporate AMT, which imposed a minimum tax of 20% on corporations' relevant taxable income in excess of a $40,000 exemption threshold, excluding the firm's AMT foreign tax credit.
- **Interest Deductions**: TCJA limited the net interest payment deductions to 30% of adjusted taxable income.
- **Bonus Depreciation:** TCJA temporarily allowed corporations to immediately deduct 100% of the cost of newly purchased eligible capital investments (known as "full expensing"), an increase from 50% prior to TCJA, but scheduled to phase out beginning in 2023.
- **Taxation of Foreign Income**: TCJA introduced several changes to taxation of corporations' income earned abroad. The most significant changes include: (a) a one-time tax on previously accumulated foreign income and an elimination of tax on repatriated income; (b) a minimum tax on foreign income above a threshold return on tangible assets (known as Global Intangible Low-Taxed Income, or GILTI); (c) a minimum tax on deductible related-party transactions to U.S. subsidiaries — known as the Base Erosion and Anti-Abuse Tax, or BEAT); and (d) a lower tax rate on income earned from foreign sales, known as Foreign Derived Intangible Income, or FDII).

Ex-ante, it may seem unlikely that these other provisions would drive our results, for two reasons. First, because TCJA's other policy changes broadly applied to both C and S corps, our difference-in-difference design implicitly controls for them to the extent that C and S corps were similarly affected. Second, the legislative budget scoring report by the Congressional Joint Committee on Taxation (2017) projected that the rate cuts would do far more than any other business tax provision of TCJA to reduce tax liabilities, making those rate cuts natural suspects.

Nevertheless, these considerations do not rule out that other provisions of TCJA may affect our estimates. For example, if C and S corps were differentially exposed to these policy changes — for example, perhaps because C corps are more likely to earn foreign income than S corps and thus more likely to be affected by the international provisions — then our net-of-tax elasticities may be biased. In the case of bonus depreciation, theory implies that the effect of the tax rate may interact with the expensing rate; we discuss this possibility in greater detail in Section IV.I.

To assess the sensitivity of our estimates to alternate policy changes, in rows 7 to 11 of Table VIII we implement a series of additional robustness tests in which we exclude the firms most likely to be affected by each respective provision of TCJA. In row 7, we exclude industries where net operating losses are most common, defined as those where the share of firms reporting a loss in the pre-period is above the median of the distribution. We similarly define and exclude industries where firms were most likely to claim the DPAD deduction (row 8) or exceed the interest limitation threshold (row 9). In row 10 we exclude industries where firms were most exposed to changes in bonus depreciation, defined as those where the ratio of bonus-eligible investment to sales is greater than the sample median in the pre-period, and in row 11 we exclude the multinational firms in our sample. Across the different samples, the results remain within the confidence interval of the benchmark estimates.

Anticipation Effects

If businesses expected the federal government to cut corporate taxes long before TCJA was formally enacted, they may have adjusted their behavior in anticipation of actual policy changes. In that case, a naive empirical strategy that compares outcomes of firms before and after TCJA risks underestimating the absolute magnitude of treatment effects, since a portion of the treatment effects would be captured in the pre-period data.

However, a careful consideration of the legislative history of TCJA suggests that anticipation effects are unlikely to bias our elasticity estimates. Pre-election polling and betting market spreads, as well as post-election stock market responses and media coverage, indicated that the November 2016 federal election outcome was difficult to predict and largely unexpected by the public.[14] Because members of the two major U.S. political parties generally have different preferences over business tax policy, the fact that the election was widely unexpected implies that firms and workers could not have significantly adjusted their behavior long in advance of TCJA. While it is

[14] For pre-election polling, see a composite of surveys compiled by Real Clear Politics here. For betting spreads, see time series data from PredictIt here. For examples of media coverage, see here. For stock market responses, see here.

possible that our empirical results may capture some anticipations effects during 2017 while policy negotiations were ongoing, in row 12 of Table VIII we exclude tax years 2017 and 2018 from the estimation, and the results are similar.

Profit Shifting and Evasion

Tax-shifting behaviors are strategies employed by firms to minimize their tax burdens without significantly altering their broader economic behavior. Recent research emphasizes that taxable income elasticities must be interpreted with caution to the extent that firms engage in tax-shifting behaviors (e.g., Gorry, Hubbard, and Mathur 2021; Saez, Slemrod, and Giertz 2012). These behaviors may include intertemporal shifting (e.g., firms accelerate deductions or delay income in the years directly before and after a tax cut to minimize their tax burdens, for example as in Dowd, Giosa, and Willingham 2020) or shifting across tax bases (e.g., when owners of pass-through firms shift income between the corporate and individual sectors, for example as in Auerbach and Slemrod 1997 and Slemrod 1995).

In principle, shifting across tax bases is possible across several different margins. For example, firms may change their entity-type, switching from C to S status or vice versa. S corps owners may choose to reclassify their wages as profits to maximize the value of the QBI deduction. The incentive to reclassify wages in this way is strongest for S corps with just one owner: because wage costs are deductible, in firms with more than one owner, this form of shifting comes at the expense of the other owners, who are unlikely to approve of it. Finally, multinational firms may have incentives to book their profits domestically rather than abroad in response to the new international tax provisions.

To evaluate the extent of entity-type switching, Appendix Figure A.4 shows the profit-weighted share of entity-type switchers in each year of our sample both before and after TCJA. The combined switching rate of both C and S corps prior to TCJA was around 0.1%, and this share increased only trivially after TCJA to about 0.3%. Thus, although we document a clear increase in entity-type switching after TCJA, this form of tax shifting is negligible and does not bias our elasticities.

To further assess the sensitivity of our estimates to firms with potentially high shifting or evasion propensities, in Table VIII we run our benchmark specification on samples that: exclude multinational firms (row 11), exclude tax years 2017 and 2018 (row 12), and exclude S corps with only one owner (row 13). The point estimates are statistically indistinguishable from the benchmark specification and do not suggest that income shifting across tax bases is a significant concern in our setting. These findings are also consistent with contemporaneous research. With respect to S corps, Goodman, Lim, Sacerdote, and Whitten (2021) study a large sample of de-identified tax returns of pass-through businesses and find that S corps mostly did not engage in wage-to-profit shifting in response to the QBI deduction. With respect to multinationals, Garcia-Bernardo, Janský, and Zucman (2022) find only small changes in the share of U.S. multinational profits booked abroad following TCJA.

IV.I Mechanisms and the Cost of Capital

In Section IV.G we provided evidence that our empirical results are unlikely to be driven by liquidity effects. In this section we argue that our findings are consistent with theories in which firms are responsive to both current and future changes in the cost of capital. To illuminate these mechanisms, we use a stylized model of the corporate income tax. Suppose firms optimize after-tax profits π:

$$\pi = F(K, L)(1-\tau) - wL(1-\tau) - rK(1-\theta\tau) \tag{5}$$

where τ is the corporate income tax rate, and $\theta \in [0, 1]$ is an expensing rate parameter capturing the share of production costs that are tax deductible. These costs may include fully deductible capital purchases (such as durable equipment eligible for bonus depreciation), partially deductible capital purchases (such as structures), and non-deductible costs (such as managerial effort, to the extent that it is not reflected in cost-deductible compensation). We assume that $F(K, L)$ varies across firms due to heterogeneous productivities, such that some firms are able to produce greater output than others with a fixed set of inputs. The first-order condition for profit maximization with respect to capital yields:

$$\underbrace{\frac{\partial F}{\partial K}}_{\text{MRPK}} = \underbrace{\frac{(1-\tau)}{1-\theta\tau}r}_{\text{cost of capital}} \equiv \phi \tag{6}$$

where the left side of the equation is the marginal revenue product of capital, and the right side expression is defined as the user cost of capital, ϕ. The expression shows that, in general, either decreasing the tax rate τ or increasing the expensing parameter θ lowers the cost of capital ϕ. However, if all production costs are tax deductible (corresponding to the full expensing case where $\theta = 1$), then the tax rate does not affect the cost of capital, and thus does not affect capital demand.

In our setting, TCJA permanently cut the corporate tax rate and, due to the bonus incentives discussed in Section IV.H, also temporarily increased the expensing rate (for some assets, up to 100%). In response to the lower cost of capital, standard models predict that firms will demand more capital (that is, invest more), demand more labor (to the extent that capital and labor are complements), and increase their scale (in part because a higher capital stock may make the firm more productive).

How should we make sense of the simultaneous changes in the tax rate and depreciation allowances in our setting? Which policy instrument is driving the results? Although we cannot rule out that interactions of the changing tax rates and expensing rates played some role, several empirical and theoretical considerations collectively suggest that the tax rate change is the dominant force driving our results.

First, even if $\theta = 1$ by statute, extensive evidence from Kitchen and Knittel (2016) and Joint Committee on Taxation (2021) documents that a large fraction of firms do not claim bonus depreciation even when eligible to do so, implying that changes in the tax rate would remain salient in the cost of capital framework. Second, many costly investments are never fully tax deductible even by statute, such as investments in various forms of intangible capital.[15] Third, as we have previously noted, the change in expensing applied both to C and S corps, and so to the extent that both firm types are similarly exposed and affected, the difference-in-difference design partially controls for its effects. Fourth, exposure to bonus depreciation varies largely *between* industries (Zwick and Mahon 2017), but our empirical strategy is based on comparisons of firms *within* industries due to the presence of industry-size-year fixed effects in our estimating specifications. Finally, expensing should have the largest effects on capital assets that would otherwise be deducted over long time horizons, for which the present value of the accelerated deduction is most valuable (House and Shapiro 2008, Zwick and Mahon 2017). By contrast, we document in Appendix C.4 that our investment results are virtually entirely driven by investments in short-lived assets rather than long-lived ones, implying that the expensing changes are unlikely to be driving the results. These considerations do not imply that TCJA's changes in expensing policy were economically inconsequential; rather, they imply that the effects of bonus depreciation are likely muted by our research design.

A complementary plausible reconciliation of evidence and theory in our setting appeals to richer models that incorporate dynamics and adjustment costs, as in Auerbach and Hassett (1992). In these models, firms respond not only to current tax rates but also to the future path of policy. In the presence of high adjustment costs, firms will be highly sensitive to future policy, since investment will depend not only on the user cost of capital today but on the user cost of capital in the future. Because TCJA's provisions primarily favoring C corps were made permanent (the large corporate rate cut), while the provisions favoring S corps were made temporary (the QBI deduction), and the provisions benefitting both were also temporary (the increase in expensing), our empirical results are consistent with the view that firms considered the future path of tax policy in response to TCJA.

In Appendix C.6, we adopt the Auerbach and Hassett (1992) model and use cost-of-capital estimates from Foertsch (2018) to estimate elasticities with respect to (net of) effective marginal tax rates. The model can flexibly incorporate salient features of firm behavior and of the U.S. business tax provisions before and after TCJA, including: forward-looking expectations; adjustment costs in investment; different tax rates on the income of shareholders of C versus S corps, including individual-level taxes on dividends, capital gains, interest income, and distributions of non-qualified annuities; the expansion and phase-out of bonus depreciation, as well as incomplete take-up of bonus; and the sunsetting of the QBI deduction. Our net-of-tax elasticities using this method are very similar to our benchmark results reported in row 1 of Table VII.

[15] Cochrane (2017) argues: "Starting, organizing, and improving a business, figuring out the intangible organizational capital that makes it a successful competitor, creating a product and a brand name, are all crucial activities for which no investment tax credit will successfully offset a large profits tax."

V Revenue Impacts, Excess Burden, and Incidence

In this section we leverage the reduced form elasticities estimated in Section IV to evaluate the short-run revenue impacts, excess burden, and incidence of TCJA's corporate tax cuts. We adopt a framework in the style of Feldstein (1999), such that elasticities of key outcomes with respect to the net-of-tax rate are sufficient to estimate the aggregate welfare consequences of changes in tax policy. As discussed in Saez, Slemrod, and Giertz (2012), the empirical validity of this approach rests on two key assumptions: (a) negligible income shifting, and (b) negligible income effects. In Section IV.H we presented several empirical tests suggesting that shifting behaviors are unlikely to drive our estimate of the corporate taxable income elasticity. Moreover, our heterogeneity tests in Section IV.G showed that liquidity effects are unlikely to drive our results, suggesting income effects are not a concern.

For clarity and to facilitate comparison with existing literature, when interpreting the results we focus only on the core provisions of TCJA relating to firms' marginal income tax rates, and abstract from issues relating to changes in personal income taxes, deficit financing, public goods provision, consumer prices, and dynamics.

Revenue Impacts

Starting from the firm problem in equation 5, let the corporate tax base B be defined as firm revenues less deductible costs:

$$B = F(K, L) - wL - \theta rK \tag{7}$$

Total corporate tax revenues T are the product of the tax base B and the corporate tax rate τ:

$$T = \tau B \tag{8}$$

In the absence of behavioral responses, mechanical changes in tax revenue from a change in the corporate net-of-tax rate $1 - \tau$ are given by holding the tax base constant:

$$dM = -Bd(1 - \tau) \tag{9}$$

The additional change in tax revenue generated by behavioral responses is given by:

$$dB = \frac{\varepsilon^B B\tau}{1 - \tau} d\tau \tag{10}$$

where $\varepsilon^B = \frac{\partial B/B}{\partial(1-\tau)/(1-\tau)}$ is the elasticity of taxable income with respect to the net-of-tax rate, equivalently called the elasticity of pre-tax profits or the elasticity of the corporate income tax base. Intuitively, the extent to which revenue losses from tax cuts are offset by an expanding tax base is directly proportional to the taxable income elasticity ε^B. The total change in tax revenue is given by:

$$dT \equiv dM + dB = dM\left[1 - \frac{\tau\varepsilon^B}{1 - \tau}\right] \tag{11}$$

where dT is the sum of the mechanical and behavioral responses.[16]

Welfare and Excess Burden

Define aggregate welfare W as the sum of after-tax private income Y and public tax revenues T:

$$W = Y + T \tag{12}$$

where taxes are defined as in equation 8, and Y is the sum of private income received by firm owners (π^K) and different groups of workers (π^{L_j}), indexed by j:

$$Y = \pi^K + \sum_j \pi^{L_j} \tag{13}$$

We use this definition of welfare, which corresponds approximately to GDP or total output, because it is transparent, can be objectively measured in the data, and can be easily compared with existing estimates in the literature. In general, however, changes in output and welfare will not be equivalent if, for example, there is curvature in individuals' utility functions. Rather than welfare, an alternate interpretation of W is that it quantifies the market value of the output distortion from the corporate tax.

Guided by our empirical results, we classify three groups of workers: low-paid workers, high-paid workers, and executives. Low-paid workers are defined as those in the bottom 90% of the within-firm wage distribution, and high-paid workers as those in top 10%. Workers and executives optimize consumption $C^L = w^j L^j$, where w^j is the wage for workers of type j and L^j is labor supply. The indirect utility function for workers is given by $U^j(w^j) = w^j L^j$, and the change in utility from a change in wages is given by:

$$dU^j(w^j) = L^j dw^j = w^j L^j \varepsilon^{L_j} d(1-\tau) \tag{14}$$

where ε^{L_j} is the elasticity of earnings for workers of type j with respect to the net-of-tax rate. Because firm owners are assumed to optimize their demands for factor inputs, by application of the envelope theorem the change in firm owners' profits is given by:

$$d\pi^K = -d\tau B + \tau dB \tag{15}$$

The first term $-d\tau B$ implies that a reduction in the tax rate increases profits due to paying less tax. The second term captures the gains to firm owners due to an expanding tax base. These adjustments are implicitly embedded in the elasticity of after-tax profits to the net-of-tax rate, which we have estimated in the empirical analysis. We can thus compute the change in welfare for firm owners as:

$$d\pi^K = \pi^K \varepsilon^{\pi} d(1-\tau) \tag{16}$$

where ε^{π} is the elasticity of after-tax profits with respect to the net-of-tax rate, and π represents after-tax profits in the baseline year. The total change in welfare is given by:

[16] For simplicity, here we abstract from the effects of corporate tax changes on personal income tax revenues.

$$dW = dY + dT \tag{17}$$
$$= d\pi^K + \sum_j dU^j + dT$$

We combine the elasticities estimated in Section IV with moments from the tax data to compute the total change in welfare as expressed in equation 17. Finally, the marginal excess burden from the corporate tax cut is given by:

$$\frac{dW}{dT} = \frac{dT + d\pi^K + \sum_j dU^j}{dT} \tag{18}$$

which expresses the marginal welfare loss from raising an additional dollar of corporate tax revenue — or, in our setting, the marginal welfare gain from an additional dollar of foregone tax revenue.

Incidence

To assess distributional impacts of TCJA's corporate tax changes, we adapt the framework developed in Suárez Serrato and Zidar (2016) and Fuest, Peichl, and Siegloch (2018) to estimate the share of productive factors in the total corporate tax burden. Our analysis differs from these studies in two respects. First, the detailed microdata used in this study allow us to observe returns to firm owners, and thus allow us to empirically estimate how these returns are affected by changes in the corporate tax rate. Second, we estimate the effects of corporate tax changes on the full distribution of workers' earnings. Using these two sets of estimates, we evaluate the incidence of corporate taxes using weaker assumptions than are required when these outcomes are not empirically observable.

We also extend our analysis to assess corporate tax incidence not only on factors of production — that is, on firm owners and workers, as is standard in the literature — but also to approximate incidence over the income distribution, taking account of the empirical fact that many low-income workers own capital and most capital owners also work. Doing so allows us to speak directly to research and policy debates about the progressivity of the corporate income tax. Because we observe workers' locations, we further evaluate the geographic incidence of corporate income tax cuts. [17]

In evaluating incidence, we make the standard assumptions of a representative consumer and equal redistribution of tax revenues to all citizens. The former assumption rules out distributional

[17] In the incidence analysis of Fuest, Peichl, and Siegloch (2018) studying workers' wages, the effects of corporate tax changes on returns to firm owners are unobservable, and changes in rental rates are assumed to be negligible. This assumption is likely to be appropriate in their analysis of tax changes in German municipalities, which they characterize as small open economies. In the incidence analysis of Suárez Serrato and Zidar (2016), returns to firm owners are unobservable but inferred via structural estimation. These studies evaluate impacts of corporate tax changes on median and mean worker wages, respectively, but do not directly assess impacts over the earnings distribution.

impacts through changes in consumer prices, which are unobservable in our data. The latter assumption, while strong, allows us to avoid making even stronger alternative assumptions about the future path of fiscal policy. TCJA's corporate tax cuts were deficit financed, and the future trajectory of federal tax policy is always uncertain in a democracy.

We can thus compute the change in welfare for firm owners as:

$$I^F = \frac{d\pi^K}{d\pi^K + \sum_j dU^j} \tag{19}$$

Similarly, the share of workers in the total tax burden, I^{L_j}, is given by replacing the numerator in equation 19 with dU^j.

We expand the traditional analysis of factor incidence along two dimensions. First, we evaluate incidence with respect to the population distribution of income. Estimating distributional incidence allows us to account for the empirical fact that many workers are also firm owners (because they may hold equity portfolios, as emphasized in Auerbach 2006) and that many firm owners also earn labor income (as documented in Smith, Yagan, Zidar, and Zwick 2019). We assume that everyone works, and ascribe firm and capital ownership to workers using data on the distribution of equity and wealth ownership from the Distributional Financial Accounts produced by the Federal Reserve Board (2018). We assume that executives are the top five paid workers, that high-paid workers are the remainder in the 90-99th percentiles, and that low-paid workers comprise the bottom 90%. Letting ω^j represent the capital ownership share of workers of type j, we have:

$$I^{L_j} = \frac{dU^j + \omega^j d\pi^K}{d\pi^K + \sum_j dU^j} \tag{20}$$

which measures incidence across the income distribution for all workers, inclusive of both labor and capital income.

Second, we combine the distributional estimates from equation 20 with the observed locations of workers, inferred from zip codes reported on IRS Form W-2, to estimate the geographic incidence of corporate income tax cuts across Census regions and commuting zones. Letting $\rho^{j(r)}$ represent the share of workers of type j living in region r, and N^r represent the region's population, we compute:

$$\frac{dY^r}{N^r} = \frac{\sum_j \rho^{j(r)}(dU^j + \omega^j d\pi^K)}{N^r} \tag{21}$$

which provides an estimate of the effect of federal corporate tax changes on per capita income in region r. To the extent that firm ownership and employment are unequally spatially distributed across the country, the gains from corporate tax cuts are likely to be unequally geographically distributed as well.

V.A Quantification Moments and Parameters

Table IX summarizes the key inputs that we use to quantify the welfare and incidence implications of TCJA's corporate income tax cuts. Panel A includes information on the empirically observed average tax rates and changes faced by C and S corps in our sample, and Panel B shows their aggregate 2016 levels of tax liabilities, after-tax profits, and payrolls for different groups of workers. Panel C reports the distribution of capital ownership as observed in the Federal Reserve Board's Distributional Financial Accounts data, and Panel D reviews the key net-of-tax elasticities that we estimated in the empirical analysis.

V.B Revenue, Income, and Welfare Impacts

Panel A of Table X shows our estimates of the impacts of corporate income tax cuts on government tax revenues. To generate these estimates, we use the empirically estimated elasticities and key moments from our sample of tax returns. We show estimates of the mechanical effects on tax revenue (that is, holding the tax base constant), as well as estimates of the total effects (taking account of behavioral responses). We present the estimates as dollar values and as a share of 2016 GDP.

Panel A of Table IX shows that, on average, TCJA reduced the marginal tax rate by 10 percentage points for C corps and by 4 percentage points for S corps. In the absence of behavioral responses, Panel A of Table X shows that this would lead to a \$102 billion (35%) reduction in corporate tax revenues, corresponding to approximately 0.48% of 2016 GDP. However, because firms respond to the tax cut by expanding their operations and increasing pre-tax profits, the total reduction in tax revenue is modestly attenuated, instead \$86 billion (29%), or 0.40% of GDP. These results imply that a \$1 corporate income tax cut reduces revenues by approximately \$0.85.

Panel B of Table X shows our estimates of the change in private income from TCJA's corporate tax changes. We estimate that private income increases by \$122 billion, or 0.57% of GDP. Approximately \$60 billion of these gains accrue to firm owners and \$62 billion accrue to workers.

Panel C shows our estimates of welfare and the marginal excess burden of the corporate tax. In the stylized model, welfare increases linearly in private income and public revenues. Private income gains of \$122 billion combined with revenue losses of \$86 billion imply a net increase in total welfare of \$36 billion, or 0.17% of 2016 GDP. Our estimate is of a similar order of magnitude to Barro and Furman 2018, who structurally simulate the effects of TCJA on GDP using a fully parameterized Ramsey model.

Panel C provides our estimate of the marginal excess burden of the corporate income tax, $\frac{dW}{dT}$. We find that a marginal dollar of foregone revenue from corporate income tax cuts generates an additional \$0.41 in output. Viewed through the lens of the model, the results thus imply substantial efficiency gains from corporate tax cuts. However, as we show below, these aggregate gains mask significant distributional effects.

V.C Incidence

Panel A of Table XI shows our estimates of changes in private income for firm owners, executives, and high- and low-paid workers. Combining our reduced form elasticities from Section IV with the moments from the tax data, we find that approximately 49% of the gains from TCJA's corporate tax cuts flow to firm owners; 11% flow to executives; 40% flow to high-paid workers; and 0% of the gains flow to low-paid workers.

Panel B reports our estimates of incidence over the income distribution. When we allocate the gains of firm owners to workers using data from the Distributional Financial Accounts, we find that approximately 24% of the gains from corporate tax cuts accrue to the top 1% of the earnings distribution; 57% accrue to the 90-99th percentiles; and 19% accrue to the bottom 90%. These results highlight the importance of considering the joint impacts of changes on both capital and labor income when assessing the distributional effects of corporate tax changes.

Panel C of Table XI reports our estimates of geographic incidence across Census regions, produced from equation 21.[18] Because firm owners and highly-paid workers are relatively highly concentrated in the Northeast and Western regions of the United States, we find that gains from the corporate tax cuts disproportionately accrue to those regions. For example, our estimate of the per capita income gain for residents of the Northeast ($478) is near double the estimate for residents of the South ($242). The final row of this panel reflects that a significant share of C corp equity, approximately 38% in the 2016 baseline year, is held by foreigners. As a result, we estimate that 16% of the overall gains from the tax cuts flow to foreigners.

Panel A of Figure X maps the variation in our estimates of geographic incidence across commuting zones. Beyond the regional patterns highlighted in Table XI, the map highlights substantial within-region variation, with larger and higher-income commuting zones generally seeing larger gains from the corporate tax cuts. The patterns are most clearly illustrated in Panel B, which plots the estimated change in income against the 2016 average earnings of corporate-sector employees, and where the bubbles are proportional in size to each commuting zone's population. Relative to the median commuting zone gain of approximately $150 per capita, we estimate that gains are approximately 3 times larger in New York City, and 5 times larger in the San Francisco Bay Area. The results imply that corporate income tax cuts not only increase income inequality across workers, but also contribute to growing inequality across regions and commuting zones (Gaubert, Kline, Vergara, and Yagan 2021).

V.D The Efficiency-Equity Tradeoff of the Corporate Income Tax

Our estimate of the corporate taxable income elasticity implies substantial efficiency gains from cutting corporate taxes (or, equivalently, implies substantial losses from increasing the corporate tax rate). However, we also find that corporate tax cuts disproportionately benefit those with high

[18] We classify states into regions using the definitions from the U.S. Census, provided here, with the minor modification of classifying Delaware, DC, and Maryland as belonging to the Northeast rather than to the South. The line for foreigners captures after-tax profit accruing to foreign owners of the equity of C corporations.

incomes, with approximately 80% of the gains flowing to just 10% of the population.

Given that the federal government must raise some level of revenue to finance its operations, how should we interpret our results on the corporate income tax in the context of the broader national tax and transfer system? In Figure XI, we benchmark our findings against estimates from the literature on personal income and payroll taxes — the two other largest sources of federal tax revenues in the United States. The X-axis shows $-\varepsilon^B$, where ε^B is the elasticity of the tax base to an increase in the net-of-tax rate for each policy instrument. A larger magnitude of ε^B implies a larger distortion from the tax. The Y-axis shows the share of tax burden borne by the top 10% of the income distribution, where higher shares imply that the tax is more progressive.

The estimates of ε^B for the personal income tax (0.25) and payroll tax (0.21) are from Saez, Slemrod, and Giertz (2012) and Saez, Schoefer, and Seim (2019), respectively. The former is based on a literature review of the voluminous empirical evidence on personal income taxes, while the latter is based on evidence of employment effects from a payroll tax reform in Sweden (to our knowledge, the best available estimate for payroll taxes in the literature). We compute estimates for the share of personal and payroll tax burdens borne by the top 10% and top 1% of the income distribution using data from the Congressional Budget Office (2021).

Viewed in the context of the literature, the results in Figure XI suggest that the corporate income tax is approximately two times less efficient than the personal income tax. In Panel A, where our measure of equity is the share of the tax burden borne by the top 10%, the corporate income tax is similarly progressive to the personal income tax. In Appendix Figure C.3, we use a more extreme measure of equity, the share of the tax burden borne by the top 1%, and find that the corporate income tax is both less efficient and less progressive than the personal income tax. In either case, the corporate tax appears 3-4 times more progressive than the payroll tax, although it is twice as inefficient. These results suggest that, on the margin, adjusting the composition of federal revenues toward a larger share of personal income taxes and a lower share of corporate income taxes may yield efficiency gains without sacrificing much in progressivity.

VI Conclusion

This paper analyzes the short-run impacts of an historically large federal corporate income tax cut on large U.S. firms and their workers. Exploiting tax policy variation that allows us to compare trends in outcomes of similarly sized firms operating in the same industry, we find that tax cuts cause firms to increase their sales, profits, labor demand, and investment. Labor earnings increase for workers in the top 10% of the within-firm earnings distribution, and rise particularly sharply for executives, but do not change for workers in the bottom 90%. We do not find evidence that firms' responses are driven by liquidity effects, and interpret the results as consistent with models in which firms are responsive to changes in the cost of capital.

We empirically estimate key elasticities of firm- and worker-level outcomes, and combine these elasticities with a stylized model to estimate the revenue impacts, welfare gains, and incidence of TCJA's corporate tax changes. We find that private incomes increase by \$122 billion and tax revenues decline by \$86 billion, implying a net aggregate output gain of \$36 billion, equivalent to approximately 0.17% of GDP. In the model, reducing corporate tax revenues by \$1 generates an additional \$0.41 in output, implying substantial output gains from corporate tax cuts.

We also find that the gains from corporate tax cuts disproportionately flow to those with high incomes. We estimate that approximately 49% of the gains accrue to firm owners, 11% accrue to executives, 40% accrue to high-paid workers, and 0% flow to low-paid workers. When we adjust these calculations to allow for the empirical fact that many workers hold equity portfolios, we estimate that 81% of the gains flow to the top 10% of the earnings distribution, and 19% flow to the bottom 90%.

We conclude with important caveats. These results do not well capture the responses of the very largest C corps, which have no clear analogues in the pass-through sector. Nor do the results capture a range of potentially important channels through which corporate tax cuts may affect welfare. For example, in the long run, higher investment may increase productivity, lower consumer prices, and broadly increase workers' real wages. While we estimate zero effect on low-income workers' earnings, it is possible that such gains may materialize over a longer time horizon. On the other hand, reductions in tax revenues may lead to a deterioration in the provision of public services (such as education, health, or infrastructure spending), or reduce redistributive transfers, with potentially adverse implications for equity and efficiency. We believe these are important topics for future research.

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Tables and Figures

Tables

TABLE I: SUMMARY STATISTICS

	All Firms		C Corporations				S Corporations			
	(1) Mean	(2) SD	(3) Mean	(4) SD	(5) p50	(6) p90	(7) Mean	(8) SD	(9) p50	(10) p90
Taxes										
Marginal Tax Rate	0.249	0.160	0.213	0.168	0.340	0.350	0.311	0.121	0.379	0.396
Federal Tax (mil)	13.7	142.8	20.4	178.1	0.4	16.6	2.4	33.4	0.5	4.6
Federal Tax Per Worker	6,236	12,176	6,551	13,036	1,118	18,263	5,706	10,551	1,941	15,442
Sales and Profits										
Sales (mil)	783.2	4,622.3	1,128.9	5,792.4	104.2	1,608.5	201.3	562.7	86.2	403.4
Costs (mil)	473.3	3,201.7	669.0	4,014.2	44.3	837.8	144.0	459.5	51.9	299.9
Pre-Tax Profit (mil)	294.3	1,625.9	435.0	2,034.8	34.6	669.7	57.4	188.2	23.1	112.2
After-Tax Profit (mil)	280.6	1,538.4	414.6	1,924.5	32.8	641.6	54.9	186.4	21.8	107.9
EBITDA (mil)	118.6	1,069.3	179.3	1,345.9	7.4	188.4	16.3	52.7	5.8	33.1
Shareholder Payouts										
Dividends (mil)	26.6	383.0	37.3	482.4	0.0	8.7	8.6	35.0	2.1	17.6
Share Buybacks (mil)	14.6	302.2	23.2	381.2	0.0	0.2	0.3	4.1	0.0	0.0
Total Payouts (mil)	41.2	613.3	60.4	773.3	0.0	15.0	8.8	35.3	2.2	18.1
Real Investment										
Net Investment (mil)	12.9	368.9	19.9	465.6	0.0	16.0	1.1	13.1	0.0	4.3
Net Investment / Lagged Capital	0.06	0.25	0.06	0.26	0.00	0.39	0.06	0.24	0.00	0.40
New Investment (mil)	50.6	1,418.7	77.5	1,790.5	1.9	52.3	5.2	30.9	0.8	10.2
Employment and Earnings										
Employment	2,382	19,851	3,368	24,825	327	4,518	722	3,950	244	1,218
Payroll (mil)	133	834	194	1,045	20	303	30	103	13	60
Mean Annual Earnings (thous)	65.0	52.6	69.3	49.9	57.9	115.2	57.6	56.0	50.8	87.2
Median Annual Earnings (thous)	48.0	28.2	51.7	31.1	44.5	88.9	41.7	20.9	39.4	64.6
Executive Pay										
Executives' Earnings (thous)	4,506	23,018	5,977	28,390	1,254	10,498	2,031	7,440	819	4,200
Mean Top 5 Earnings (thous)	989	2,933	1,261	3,554	379	2,598	531	1,218	303	974
Firm Characteristics										
Firm Age	34	22	32	23	28	62	37	21	34	64
Multinational	0.16		0.22				0.07			
Private	0.88		0.80				1.00			
Capital Intensive	0.50		0.55				0.42			
N Firms	15,777		9,897				5,880			

Notes: Table shows summary statistics from 2016 for firms in the analysis sample. Medians and centile statistics are fuzzed to protect taxpayer privacy. For data sources and variable definitions see Section III.

TABLE II: MARGINAL TAX RATES AND TAXES PAID

	(1) τ_f^{MTR}	(2) $\ln(1-\tau_f^{MTR})$	(3) Tax/Sales$_{2016}$	(4) Tax Per Worker
C × Post	-0.050***	0.066***	-0.009***	-1743.238***
	(0.002)	(0.002)	(0.002)	(263.512)
2016 Outcome Mean	0.25	-0.31	0.06	6,236
Firm FE	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes
R2	0.73	0.73	0.79	0.60
N	110,439	110,439	110,439	110,439
N Firms	15,777	15,777	15,777	15,777

Notes: The unit of analysis is a firm-year. The table shows the $C \times Post$ coefficients from equation 2. These coefficients estimate average differential changes in outcomes between C and S corps before and after TCJA, controlling for firm and industry-size-year fixed effects. The outcome in column 1 is the firm's marginal tax rate, τ_f^{MTR}, and the outcome in column 2 is the log net-of-tax rate, $\ln(1-\tau_f^{MTR})$. The outcome in column 3 is tax scaled by the firms' baseline 2016 sales, and the outcome in column 4 is tax per worker, reported in nominal dollars. Marginal tax rates for S corps are defined as the weighted average of the shareholders' individual marginal tax rates, where the weights are given by the ownership shares. See Section III for details on the measurement of tax payments for S corps. Standard errors are clustered by firm.

Table III: Sales, Costs, and Pre-Tax Profits

	(1) Sales	(2) Costs	(3) Pre-tax π	(4) EBITDA	(5) Pre-tax π
C $\times$ Post	0.041***	0.012	0.029***	0.083***	
	(0.012)	(0.007)	(0.007)	(0.010)	
$\Delta \ln(1-\tau_f)\times$ Post					0.445***
					(0.108)
2016 Outcome Mean	1.00	0.53	0.47	0.30	0.47
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes	Yes
R2	0.39	0.63	0.61	0.84	n.a.
N	110,439	110,439	110,439	110,439	110,439
N Firms	15,777	15,777	15,777	15,777	15,777
First-Stage F					559.1

Notes: The unit of analysis is a firm-year. Columns 1-4 show the $C \times Post$ coefficients from equation 2. These coefficients estimate average differential changes in outcomes between C and S corps before and after TCJA, controlling for firm and industry-size-year fixed effects. All outcomes are scaled by 2016 baseline sales. Sales are gross receipts. Costs are equal to cost of goods sold, including both material and labor costs. Pre-tax profits are sales minus costs. EBITDA is a harmonized measure of earnings before interest, taxes, depreciation, and amoritization. Column 5 reports the elasticity corresponding to equation 4. Standard errors are clustered by firm. For additional information on data sources and variable definitions see Section III and Appendix B.

TABLE IV: AFTER-TAX PROFITS AND SHAREHOLDER PAYOUTS

	(1) Post-Tax π	(2) Log Payouts	(3) Payouts (0/1)	(4) Post-Tax π
C $\times$ Post	0.038***	0.220***	0.028***	
	(0.007)	(0.029)	(0.005)	
$\Delta \ln(1-\tau_f) \times$ Post				0.581***
				(0.110)
2016 Outcome Mean	0.41	1.14	0.54	0.41
Firm FE	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes
R2	0.62	0.86	0.76	n.a.
N	110,439	58,071	110,439	110,439
N Firms	15,777	9,997	15,777	15,777
First-Stage F				559.1

Notes: The unit of analysis is firm-year. Columns 1-3 show the $C \times Post$ coefficients from equation 2. These coefficients estimate average differential changes in outcomes between C and S corps before and after TCJA, controlling for firm and industry-size-year fixed effects. Post-tax profits are defined as pre-tax profits minus tax, and are scaled by 2016 baseline sales. In column 2 the outcome is log shareholder payouts (i.e., the intensive margin). In column 3 the outcome is an indicator equal to 1 if shareholder payouts are positive (i.e., the extensive margin), where payouts are defined as the sum of cash and property distributions to shareholders. Column 4 reports the elasticity of after-tax profits with respect to the net-of-tax rate, estimated from equation 4. Standard errors are clustered by firm. For additional information on data sources and variable definitions see Section III and Appendix B.

TABLE V: LABOR MARKET OUTCOMES

Panel A: Labor Market Outcomes

	(1) Emp	(2) Payroll	(3) p50	(4) p95	(5) Executives
C × Post	0.022***	0.033***	-0.001	0.013***	0.049***
	(0.008)	(0.008)	(0.004)	(0.004)	(0.007)
2016 Outcome Mean	2,382	133	47,973	176,373	989,387
ε^{NTR}	0.33	0.50	-0.01	0.20	0.75
s.e.	0.12	0.12	0.06	0.06	0.11
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes	Yes
R2	0.96	0.97	0.94	0.93	0.92
N	110,439	110,439	110,439	110,439	110,439
N Firms	15,777	15,777	15,777	15,777	15,777

Panel B: Executive Compensation

	(1) Benchmark	(2) Sales	(3) Profit	(4) Relative Sales
C × Post	0.049***	0.046***	0.046***	0.048***
	(0.007)	(0.007)	(0.007)	(0.007)
Firm FE	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes
R2	0.92	0.92	0.92	0.92
N	110,439	110,439	110,439	110,130
N Firms	15,777	15,777	15,777	15,777

Panel C: Worker Characteristics

	Bottom 90	Top 10	Executives
Mean Wage (2016)	39,215	174,216	989,387
Female (Share)	0.45	0.30	0.12
Age (Years)	39.5	46.7	53.8
N Workers	33,452,750	4,046,898	78,885

Notes: Unit of analysis is firm-year. Panel A reports the $C \times Post$ coefficients obtained from estimating equation 2, where the outcomes are log employment, log payroll, log annual earnings of workers at the median and 95th percentile of the within-firm distribution, and log executive pay as proxied by the mean earnings of the top 5 highest paid workers at the firm. These coefficients estimate average differential changes in outcomes between C and S corps before and after TCJA, controlling for firm and industry-size-year fixed effects. The corresponding net-of-tax elasticities are shown as well, as estimated from equation 4. Panel B estimates variations of equation 2 where the outcome is log top 5 pay, and adds time-varying controls for several measures of firm performance; Appendix Standard errors in Panels A and B are clustered by firm. Panel C presents descriptive statistics for the individual characteristics of workers in the bottom 90% of the distribution, in the top 10%, and of the top five highest paid workers, where we use the latter as a proxy for executives.

TABLE VI: NET INVESTMENT

	(1) I_t/K_{t-1}	(2) I_t/Sales$_{2016}$	(3) I_t/K_{t-1}
C × Post	0.029***	0.010***	
	(0.004)	(0.003)	
$\Delta\ln(1-\tau_f)\times$ Post			0.443***
			(0.070)
2016 Outcome Mean	0.06	0.01	0.06
Firm FE	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes
R2	0.21	0.24	n.a.
N	110,439	110,439	110,439
N Firms	15,777	15,777	15,777
First-Stage F			559.1

Notes: The unit of analysis is a firm-year. Columns 1-3 report the $C \times Post$ coefficients from equation 2. These coefficients estimate average differential changes in outcomes between C and S corps before and after TCJA, controlling for firm and industry-size-year fixed effects. Standard errors are clustered by firm. Net investment is defined as the change in book value of depreciable capital assets minus accumulated book depreciation. The outcomes in columns 1 and 2 are net investment scaled by lagged capital and by baseline 2016 sales, respectively. Column 3 reports the elasticity of net investment with respect to the net-of-tax rate, computed from equation 4.

Table VII: Robustness to Alternate Specifications

Specification	(1) ε^B π	(2) ε^π $\pi(1-\tau)$	(3) $\varepsilon^{w_{p50}}$ p50 w	(4) $\varepsilon^{w_{p50}}$ p95 w	(5) $\varepsilon^{w_{exec}}$ Exec w	(6) ε^I I_t/K_{t-1}
1. Benchmark	0.445	0.581	-0.008	0.203	0.747	0.443
s.e.	(0.108)	(0.110)	(0.055)	(0.063)	(0.107)	(0.070)
N	110,439	110,439	110,439	110,439	110,439	110,439
2. Age Controls	0.351	0.488	-0.026	0.170	0.625	0.449
s.e.	(0.103)	(0.106)	(0.054)	(0.062)	(0.101)	(0.068)
N	110,439	110,439	110,439	110,439	110,439	110,439
3. Location Controls	0.401	0.538	-0.012	0.205	0.747	0.445
s.e.	(0.107)	(0.110)	(0.056)	(0.063)	(0.107)	(0.070)
N	110,439	110,439	110,439	110,439	110,439	110,439
4. Pre-Trend Controls	0.490	0.614	-0.021	0.198	0.727	0.443
s.e.	(0.101)	(0.105)	(0.054)	(0.061)	(0.104)	(0.070)
N	110,439	110,439	110,439	110,439	110,439	110,439
5. Industry = NAICS6	0.459	0.595	-0.008	0.202	0.738	0.445
s.e.	(0.109)	(0.111)	(0.055)	(0.063)	(0.107)	(0.070)
N	110,075	110,075	110,075	110,075	110,075	110,075
6. Log Outcome	0.364	0.684	-0.008	0.203	0.747	0.745
s.e.	(0.127)	(0.145)	(0.055)	(0.063)	(0.107)	(0.399)
N	109,676	108,718	110,439	110,439	110,439	54,376
7. Winsorize 5-95	0.252	0.276	0.002	0.186	0.657	0.252
s.e.	(0.046)	(0.045)	(0.033)	(0.044)	(0.089)	(0.059)
N	110,439	110,439	110,439	110,439	110,439	110,439
8. 2016 Sales Weights	0.381	0.399	-0.033	-0.068	-0.315	0.348
s.e.	(0.089)	(0.089)	(0.079)	(0.083)	(0.337)	(0.145)
N	110,439	110,439	110,439	110,439	110,439	110,439

The table shows net-of-tax elasticities for outcomes estimated from variations on equation 4. Unless otherwise indicated, all specifications include firm and industry-size-year fixed effects. The outcomes in columns 1 and 2 are scaled by baseline 2016 sales, the outcomes in columns 3-5 are logged, and the outcome in column 6 is scaled by lagged capital. Row 1 shows the benchmark specification. Row 2 controls for firm age by including cohort-by-year effects, where cohorts are defined as the firms' year of incorporation. Row 3 controls for state-by-year fixed effects, using the firm's reported address on its tax return. Row 4 controls for pre-trends, interacting the lagged pre-TJCA outcomes with year indicators. Row 5 defined the industries used in the fixed effects as six-digit NAICS codes (rather than 3-digit codes). Row 6 shows a log transformation of the outcome rather than scaling by baseline sales; for columns 3-5, these results are the same as in row 1. Row 7 winsorizes the outcomes at the 5th and 95th percentiles. Row 8 weights the results by 2016 sales, producing revenue dollar-weighted elasticities. Standard errors are clustered by firm.

TABLE VIII: ROBUSTNESS TO ALTERNATE SAMPLES

Sample	(1) ε^B π	(2) ε^π $\pi(1-\tau)$	(3) $\varepsilon^{w_{p50}}$ p50 w	(4) $\varepsilon^{w_{p95}}$ p95 w	(5) $\varepsilon^{w_{exec}}$ Exec w	(6) ε^I I_t/K_{t-1}
1. All Firms	0.445	0.581	-0.008	0.203	0.747	0.443
s.e.	(0.108)	(0.110)	(0.055)	(0.063)	(0.107)	(0.070)
N	110,439	110,439	110,439	110,439	110,439	110,439
2. Exclude Large C-Corps	0.436	0.587	-0.002	0.247	0.802	0.443
s.e.	(0.116)	(0.119)	(0.058)	(0.067)	(0.110)	(0.073)
N	99,386	99,386	99,386	99,386	99,386	99,386
3. Exclude Mismatch Industries	0.373	0.519	-0.028	0.180	0.656	0.444
s.e.	(0.105)	(0.107)	(0.051)	(0.059)	(0.102)	(0.069)
N	101,766	101,766	101,766	101,766	101,766	101,766
4. Exclude Mfg Industries	0.524	0.711	0.054	0.258	0.861	0.511
s.e.	(0.140)	(0.143)	(0.072)	(0.081)	(0.135)	(0.088)
N	78,881	78,881	78,881	78,881	78,881	78,881
5. Exclude Public Firms	0.194	0.335	-0.018	0.182	0.515	0.421
s.e.	(0.096)	(0.103)	(0.055)	(0.062)	(0.100)	(0.069)
N	96,703	96,703	96,703	96,703	96,703	96,703
6. Unbalanced Panel	0.320	0.443	0.026	0.224	0.667	0.669
s.e.	(0.102)	(0.102)	(0.042)	(0.051)	(0.089)	(0.146)
N	179,571	177,721	181,061	181,061	181,061	179,513
7. Exclude NOL Industries	0.306	0.496	-0.071	0.180	0.438	0.295
s.e.	(0.111)	(0.115)	(0.054)	(0.062)	(0.106)	(0.075)
N	55,000	55,000	55,000	55,000	55,000	55,000
8. Exclude DPAD Industries	0.474	0.695	0.035	0.229	0.638	0.469
s.e.	(0.158)	(0.164)	(0.081)	(0.089)	(0.140)	(0.094)
N	57,967	57,967	57,967	57,967	57,967	57,967
9. Exclude High-Debt Industries	0.981	1.262	0.054	0.488	1.204	0.591
s.e.	(0.221)	(0.229)	(0.097)	(0.111)	(0.186)	(0.119)
N	56,642	56,642	56,642	56,642	56,642	56,642
10. Exclude Bonus Industries	0.331	0.367	0.048	0.220	0.686	0.459
s.e.	(0.101)	(0.100)	(0.066)	(0.076)	(0.141)	(0.096)
N	58,008	58,008	58,008	58,008	58,008	58,008
11. Exclude Multinationals	0.333	0.493	0.001	0.227	0.723	0.437
s.e.	(0.095)	(0.098)	(0.058)	(0.066)	(0.110)	(0.073)
N	92,526	92,526	92,526	92,526	92,526	92,526
12. Exclude 2017-2018	0.477	0.545	0.026	0.271	0.891	0.839
s.e.	(0.137)	(0.138)	(0.076)	(0.088)	(0.141)	(0.099)
N	78,885	78,885	78,885	78,885	78,885	78,885
13. Exclude Single-Owner S-Corps	0.429	0.545	-0.024	0.210	0.732	0.383
s.e.	(0.100)	(0.102)	(0.055)	(0.063)	(0.104)	(0.066)
N	101,762	101,762	101,762	101,762	101,762	101,762

The table shows net-of-tax elasticities for key outcomes estimated from equation 4 using alternate samples. All specifications include firm and industry-size-year fixed effects. The outcomes in columns 1 and 2 are scaled by baseline 2016 sales, the outcomes in columns 3-5 are logged, and the outcome in column 6 is scaled by lagged capital. Row 1 shows the benchmark specification. Row 2 excludes firms with 2016 employment of greater than 10,000 or 2016 sales greater than \$1 billion. Row 3 excludes industries where the firm share of C corps is less than 20% or greater than 80%. Row 4 excludes manufacturing industries. Row 5 excludes publicly owned firms, and row 6 shows results using the unbalanced panel of firms. Row 7 excludes industries where net operating losses are most common in the pre-period. Row 8 excludes industries most likely to claim the Domestic Production Activities Deduction in the pre-period. Row 9 excludes industries where firms are highly leveraged. Row 10 excludes industries most likely to claim bonus depreciation. Row 11 excludes multinational firms. Row 12 excludes years 2017 and 2018. Row 13 excludes S corps with only a single owner.

Table IX: Moments and Parameters

	All Corps	C-Corps	S-Corps
Panel A: MTRs (Sales-Weighted)			
Mean 2016 τ	0.25	0.24	0.31
Mean $\Delta\tau$	-0.09	-0.10	-0.04
Mean $\Delta\tau/\tau_{t-1}$	-0.33	-0.47	0.33
Mean $\ln(1-\tau)$	0.13	0.14	0.06
Panel B: Firm Aggregates (bil)			
Tax	294	254	40
Taxable Income	1,162	913	249
After-Tax Profit	859	659	200
Executive Payroll	153	104	49
Top 10 Payroll	1,150	929	221
Bottom 90 Payroll	2,128	1,683	444
Panel C: Distribution of Capital			
Top 1	0.27		
91-99	0.34		
Bottom 90	0.39		
Foreign Share		0.38	0.00
Panel D: Net-of-Tax Elasticities			
Pre-Tax Profit	0.45		
After-Tax Profit	0.58		
After-Tax Profit	0.75		
Top 10 Earnings	0.34		
Bottom 90 Earnings	0.00		

Table shows the moments and parameters that we use to quantify the revenue, income, and welfare imapcts of TCJA's corporate tax cuts. Data in Panels A and B are directly observed in our sample of tax records, and data in Panel C are from the 2018 Federal Reserve Board Distributional Financial Accounts. The parameters in Panel D are estimated in the empirical analysis.

TABLE X: REVENUE AND WELFARE ESTIMATES

	bil	% GDP	%
Panel A: Tax Revenues			
Mechanical, dM	-101.7	-0.48	
Total, dT	-86.4	-0.40	
Panel B: After-Tax Private Income			
Total Income, dY	122.0	0.57	
Capital Income, $d\pi^K$	60.3	0.28	
Labor Income, $d\pi^L$	61.7	0.29	
Panel C: Welfare and Excess Burden			
Welfare, dW	35.6	0.17	
Marginal Excess Burden, dW/dT			41.2

This table shows estimated revenue, income, and welfare impacts from TCJA's changes in marginal corporate income tax rates. Outcomes are scaled in billions of dollars in column 1. Outcomes in column 2 are scaled as a percent of GDP. The marginal excess burden is defined as the ratio of the change in welfare to the change in tax revenues. See Section V for details.

TABLE XI: INCIDENCE ESTIMATES

	USD	% Incidence
Panel A: Factors ($ bil)		
Firm Owners	60.3	49
Executives	13.2	11
High-Paid Workers	48.6	40
Low-Paid Workers	0.0	0
Panel B: Distributional ($ bil)		
Top 1%	29.4	24
91-99th%	69.1	57
Bottom 90%	23.5	19
Panel C: Geographic ($ per capita)		
Northeast	478	30
Midwest	288	18
South	242	15
West	339	21
Foreigners	—	16

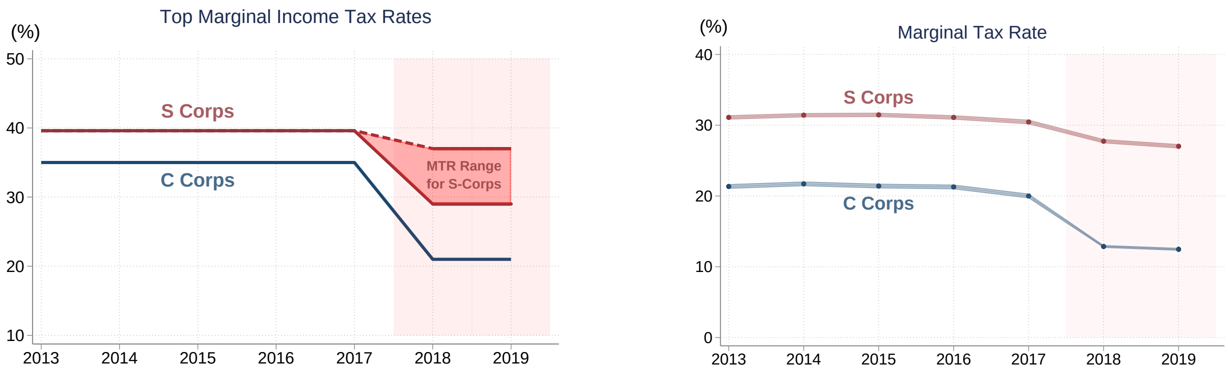
Table shows the estimated incidence of corporate tax cuts on firm owners, executives, and high- and low-paid workers. To compute distributional incidence, we allocate gains of firm owners using data on capital ownership, including by foreigners, from the Federal Reserve Distributional Financial Accounts.

Figures

FIGURE I: MARGINAL INCOME TAX RATES AND TAXES PER WORKER

(A) TOP MTR (STATUTORY)

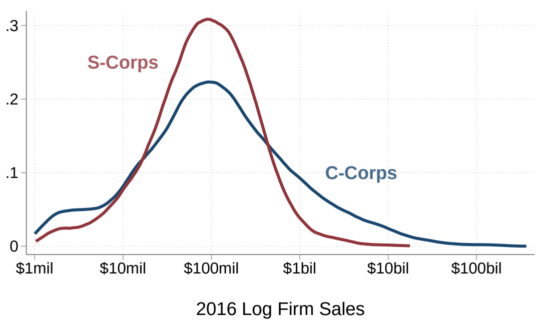
(B) AVERAGE MTR (OBSERVED)



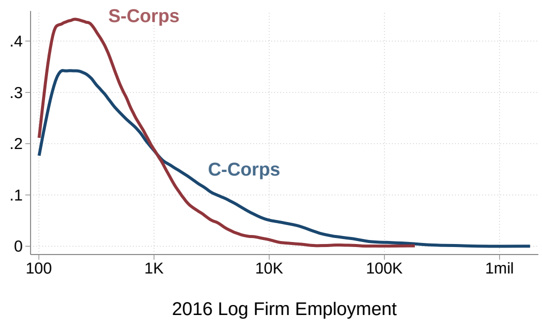
Notes: Panel A shows top statutory marginal income tax rates for C and S corps before and after enactment of TCJA. Panel B shows the average MTRs observed in our data analysis sample. For details on the data construction and variable definitions see Section III.

Figure II: Firm Size Distributions and Industry Composition

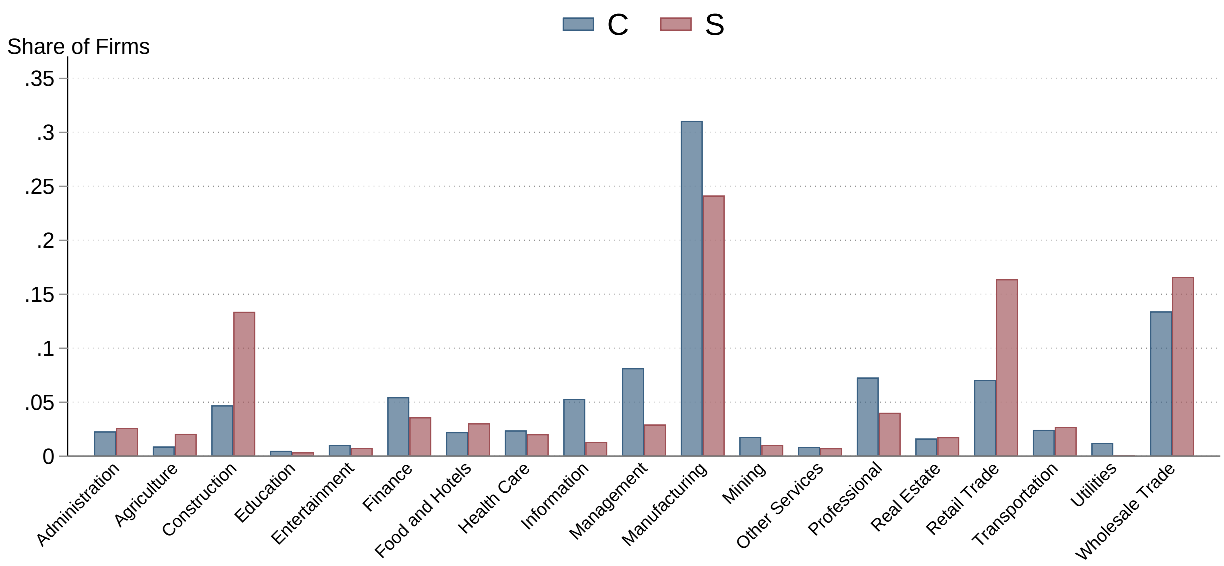
(a) 2016 Sales



(b) 2016 Employment



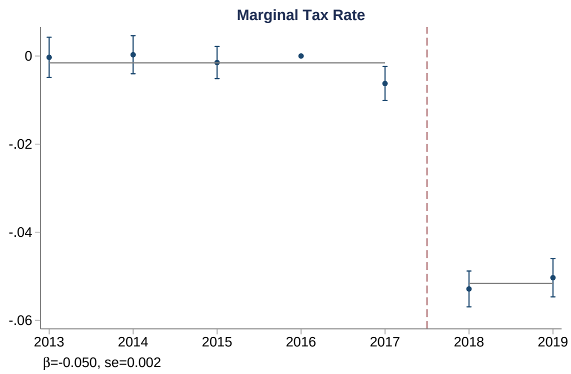
(c) Industry Composition



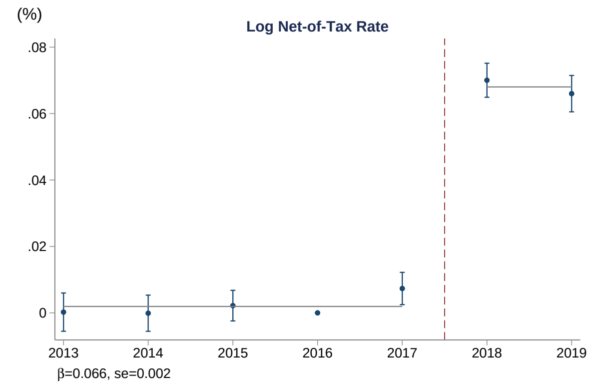
Notes: Panels A and B show the distribution of 2016 log firm sales and employment, respectively, for C and S corps in the analysis sample. Panel C shows the NAICS-2 industry composition of firms in the sample.

Figure III: Event Studies: Marginal Tax Rates and Taxes Paid

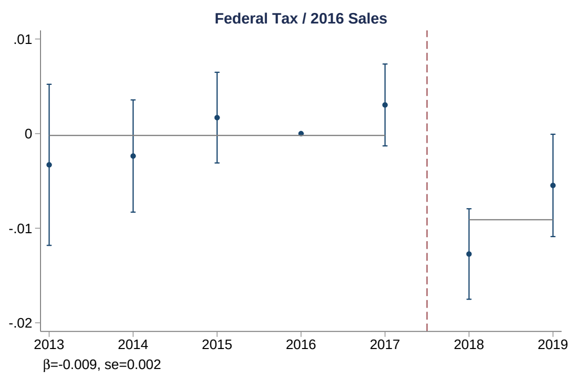
(a) Marginal Tax Rate



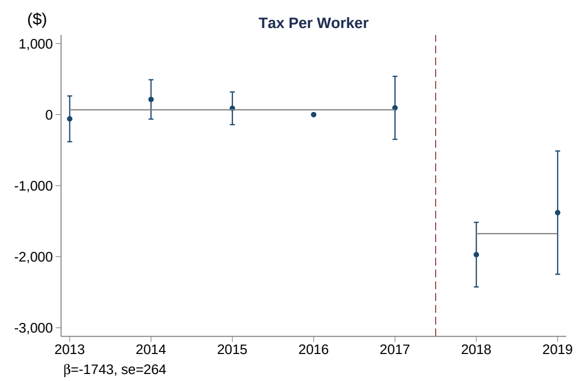
(b) Log net-of-tax Rate



(c) Tax / 2016 Sales



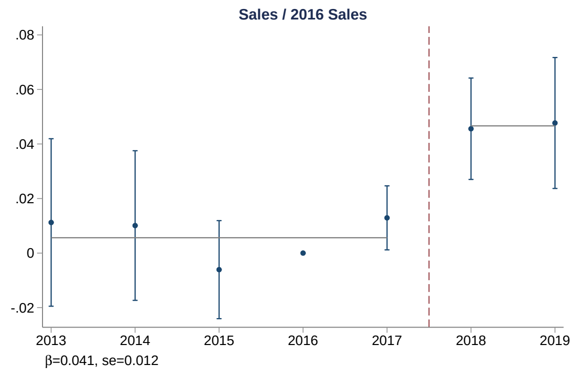
(d) Tax Per Worker



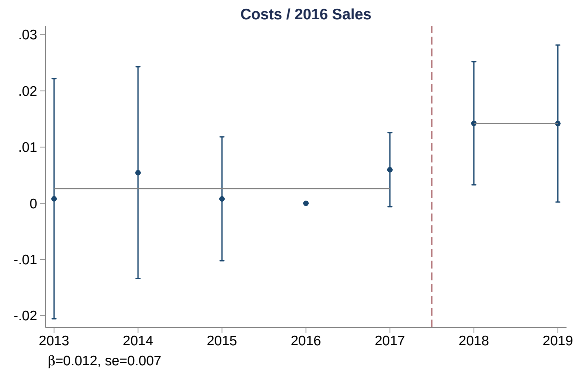
Notes: The unit of analysis is a firm-year. The panels plot the β_t coefficients estimated from equation 1. These coefficients capture average differences in outcomes between C and S corps over time after controlling for firm and industry-size-year fixed effects. Standard errors are clustered by firm and error bands show 95% confidence intervals. The grey lines show the average of the coefficients in the pre- and post- periods, and the corresponding DiD coefficient and standard error are shown in the bottom left of each panel. The outcome in Panel A is the firm's marginal tax rate, τ_f^{MTR}, and the outcome in Panel B is the log net-of-tax rate, $\ln(1-\tau_f^{MTR})$. The outcome in Panel C is tax scaled by the firms' baseline 2016 sales, and the outcome in Panel D is tax per worker, reported in dollars. Marginal tax rates for S corps are defined as the weighted average of the shareholders' individual marginal tax rates, where the weights are given by the ownership shares. See Section III for details on the measurement of tax payments for S corps. For data sources and variable definitions see Section III.

Figure IV: Event Study: Firm Sales, Costs, and Pre-Tax Profits

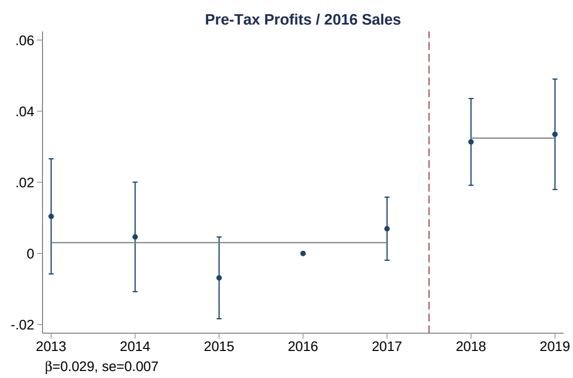
(a) Sales



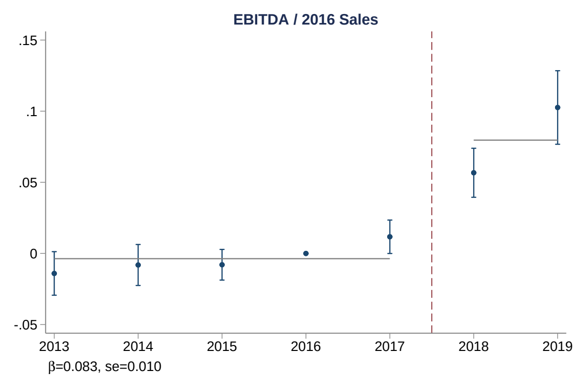
(b) Costs



(c) Pre-Tax Profit



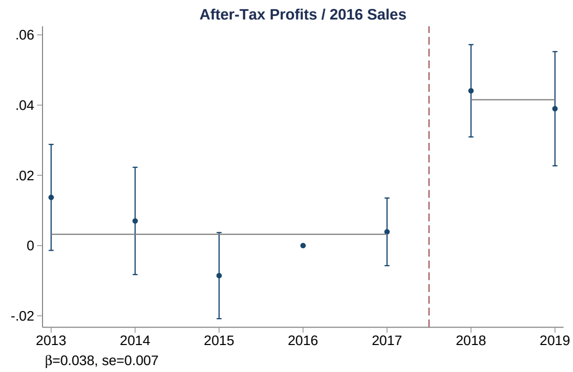
(d) EBITDA



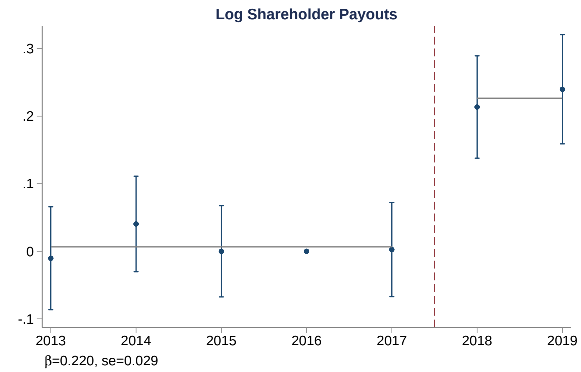
Notes: Unit of analysis is firm-year. The panels plot the β_t coefficients estimated from equation 1. These coefficients capture average differences in outcomes between C and S corps over time after controlling for firm and industry-size-year fixed effects. Standard errors are clustered by firm, and error bands show 95% confidence intervals. The grey lines show the average of the coefficients in the pre- and post- periods, and the corresponding DiD coefficient and standard error are shown in the bottom left of each panel. Sales are gross receipts. Costs are equal to cost of goods sold, including both material and labor costs. Pre-tax profits are sales minus costs. EBITDA is a harmonized measure of earnings before interest, taxes, depreciation, and amoritization; see Section III and Appendix B for details.

FIGURE V: EVENT STUDY: AFTER-TAX PROFITS AND SHAREHOLDER PAYOUTS

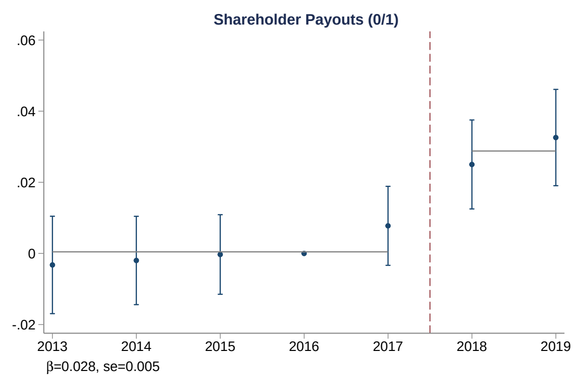
(A) AFTER-TAX PROFITS



(B) PAYOUTS (INTENSIVE MARGIN)



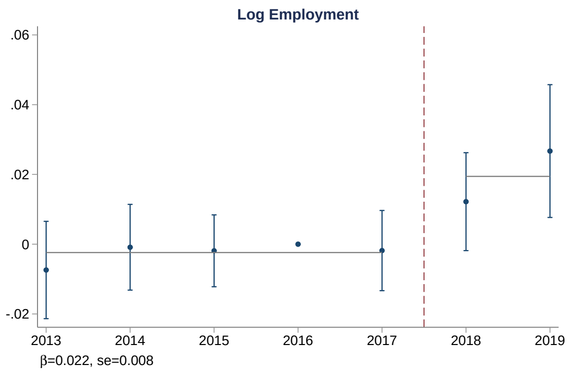
(C) PAYOUTS (EXTENSIVE MARGIN)



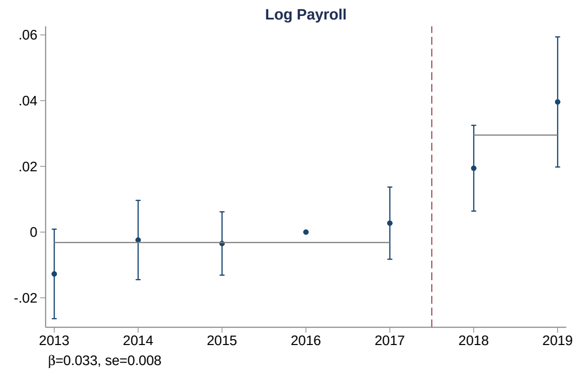
Notes: The unit of analysis is a firm-year. The panels plot the β_t coefficients estimated from equation 1. These coefficients capture average differences in outcomes between C and S corps over time after controlling for firm and industry-size-year fixed effects. Standard errors are clustered by firm and error bands show 95% confidence intervals. The grey lines show the average of the coefficients in the pre- and post- periods, and the corresponding DiD coefficient and standard error are shown in the bottom left of each panel. In Panel A, after-tax profits are defined as pre-tax profits minus tax, and are scaled by 2016 baseline sales. In Panel B, the outcome is log shareholder payouts (i.e., the intensive margin). In Panel C, the outcome is an indicator equal to 1 if shareholder payouts are positive (i.e., the extensive margin), where payouts are defined as the sum of cash and property distributions to shareholders. For additional information on data sources and variable definitions see Section III and Appendix B.

Figure VI: Event Studies: Labor Market Outcomes

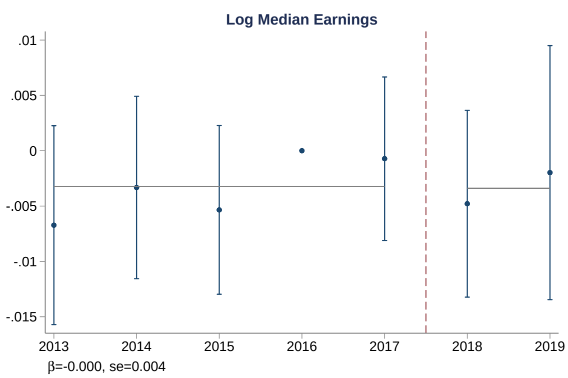
(a) Log Employment



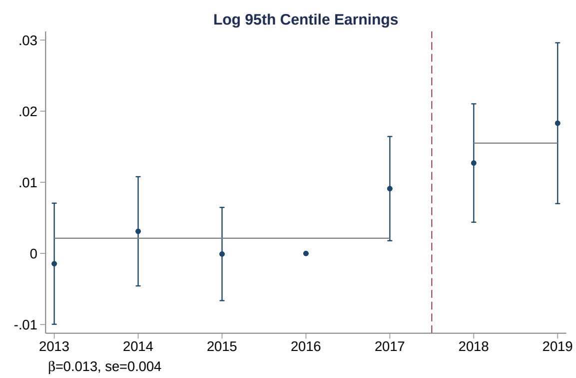
(b) Log Payroll



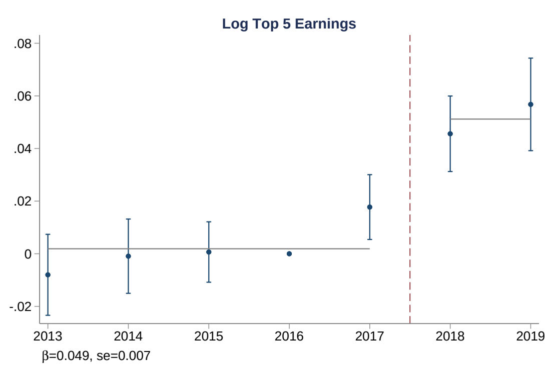
(c) Log Median Earnings



(d) Log 95th Centile Earnings



(e) Log Top 5 Earnings



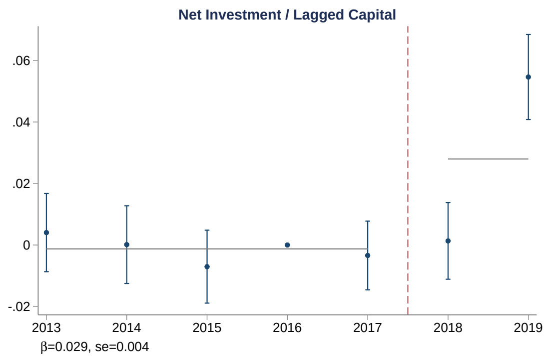
Notes: Unit of analysis is firm-year. The panels plot the β_t coefficients estimated from equation 1. These coefficients capture average differences in outcomes between C and S corps over time after controlling for firm and industry-size-year fixed effects. Standard errors are clustered by firm and error bands show 95% confidence intervals. The grey lines show the average of the coefficients in the pre- and post- periods, and the corresponding DiD coefficient and standard error are shown in the bottom left of each panel. Employment, payrolls, and annual earnings are computed by matching worker-level W-2's with firm-level tax returns. For additional details on data sources and variable definitions see Section III.

FIGURE VII: EARNINGS QUANTILE RESPONSES

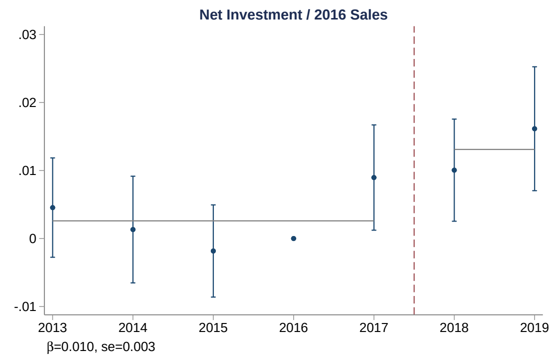
Notes: Unit of analysis is firm-year. Figure plots the β coefficients from equation 2, where the outcomes are centiles of the distribution of workers' wages within the firm. For example, centile 50 measures the annual earnings of the median worker within the firm, and centile 90 captures the annual earnings of the worker at the 90th percentile of the within-firm earnings distribution. We exclude the bottom 20% of the distribution, which is imprecisely estimated due to the presence of part-time workers. For additional details on data sources and variable definitions, see Section III. Standard errors are clustered by firm and error bands show 95% confidence intervals.

Figure VIII: Event Studies: Investment

(a) Net Investment Rate



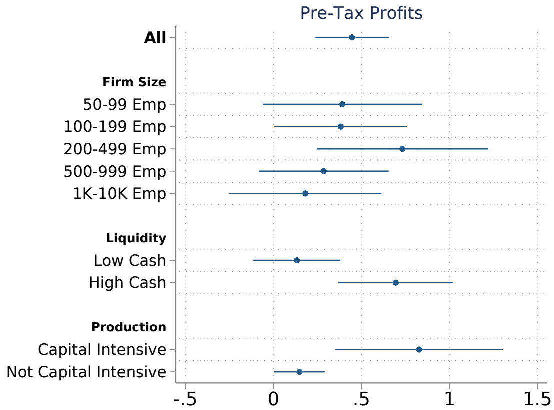
(b) Net Investment



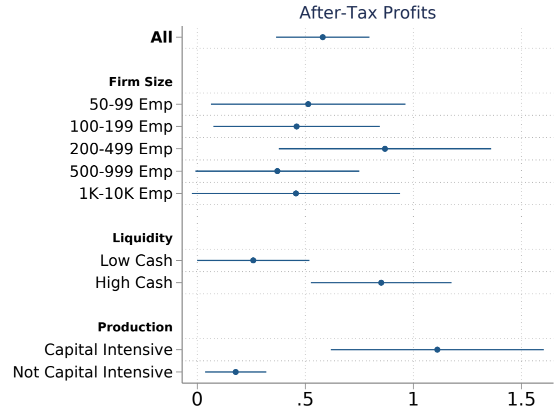
Notes: Unit of analysis is firm-year. The figure plots the β_t coefficients estimated from equation 1. These coefficients capture average differences in outcomes between C and S corps over time after controlling for firm and industry-size-year fixed effects. Standard errors are clustered by firm and error bands show 95% confidence intervals. The grey lines show the average of the coefficients in the pre- and post- periods, and the corresponding DiD coefficient and standard error are shown in the bottom left of each panel. Net investment is defined as the change in book value of depreciable capital assets minus accumulated book depreciation. The outcomes in Panels A and B are net investment scaled by lagged capital and by baseline 2016 sales, respectively. For data sources and variable definitions see Section III.

FIGURE IX: FIRM HETEROGENEITY

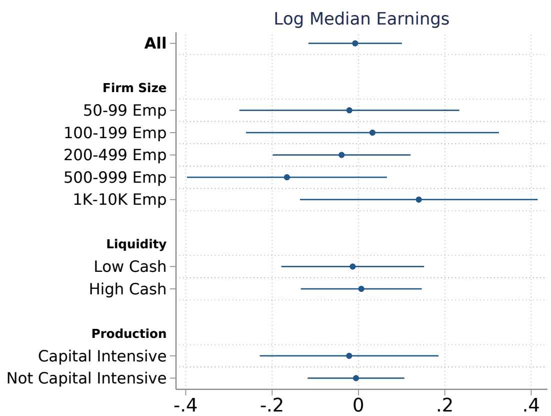
(A) PRE-TAX PROFIT



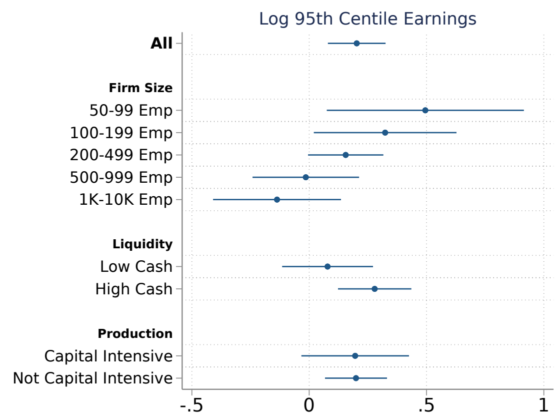
(B) AFTER-TAX PROFIT



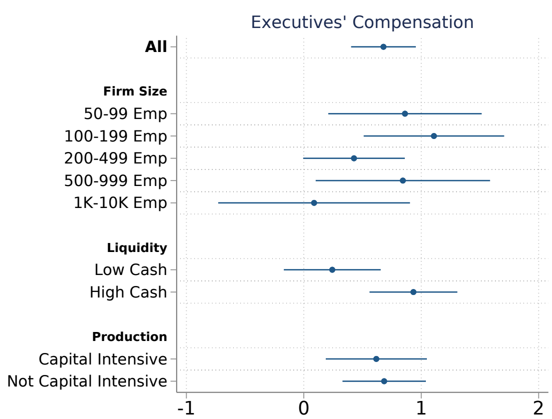
(C) MEDIAN EARNINGS



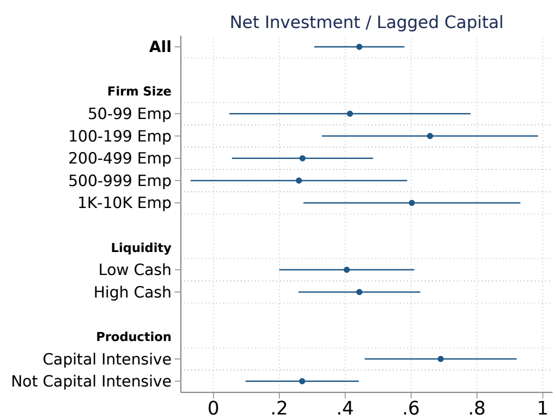
(D) 95TH CENTILE EARNINGS



(E) EXECUTIVE EARNINGS



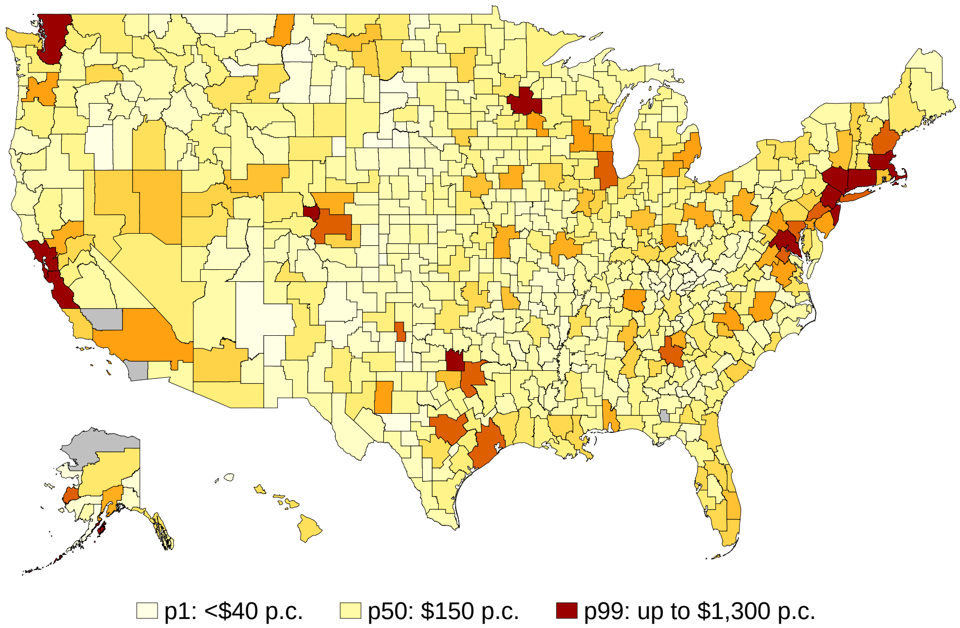
(F) NET INVESTMENT



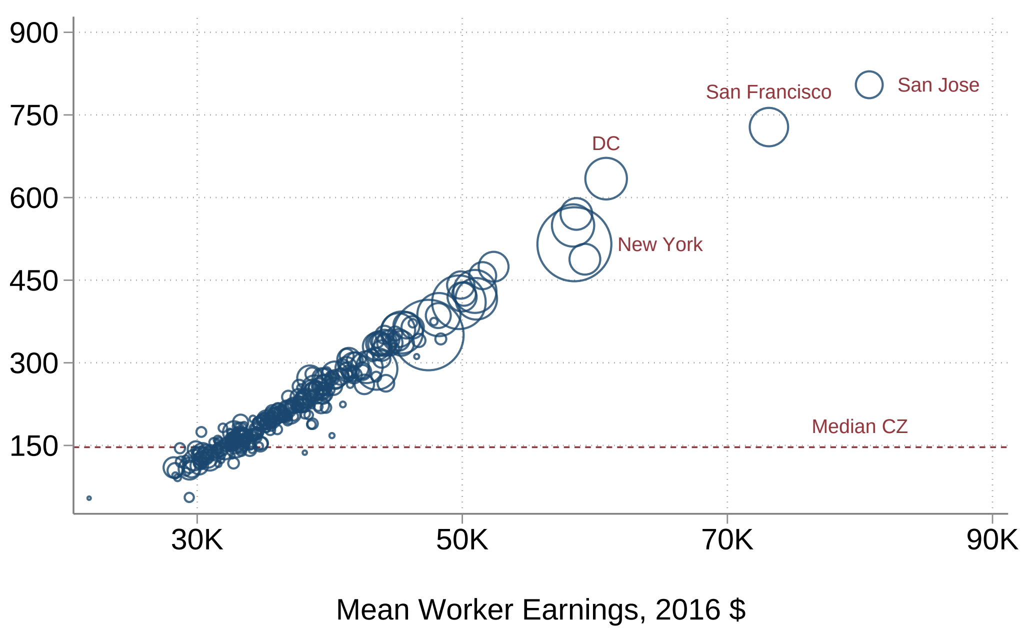
Notes: The unit of analysis is a firm-year. The table reports heterogeneity in the net-of-tax elasticities from equation 4 using different samples of firms. The specifications split by firm size include firm and sector-year fixed effects. Firms are classified as high cash if their mean ratio of liquid assets to assets in the pre-period is greater than the sample median, and otherwise as low cash.

FIGURE X: GEOGRAPHIC INCIDENCE

(A) CHANGE IN PER CAPITA INCOME ACROSS COMMUTING ZONES

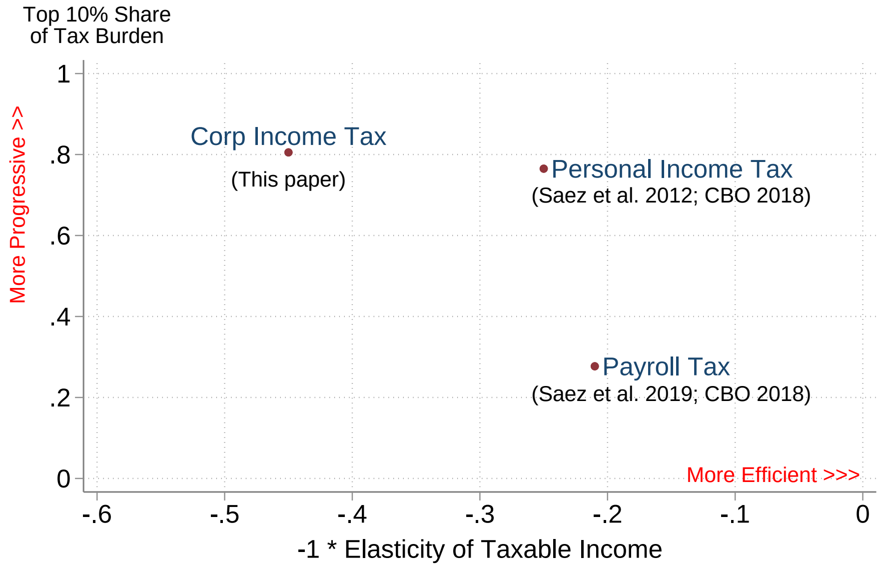


(B) CHANGE IN PER CAPITA INCOME VS. INITIAL WORKER EARNINGS



The unit of analysis is a commuting zone. Panel A illustrates geographic variation in our estimates of changes in per capita private income due to the corporate tax cuts, generated from equation 21. Income gains are proportional to color intensity in the map, with darker colors representing larger gains. Panel B plots the estimated change in income for each commuting zone against the 2016 average earnings of corporate-sector workers. The size of the bubbles is proportional to each commuting zone's 2016 population.

FIGURE XI: THE EFFICIENCY-EQUITY TRADEOFF IN CONTEXT



The figure contextualizes our results on the corporate income tax, compared here with the personal income and payroll taxes, the two other largest sources of federal tax revenue in the United States. The elasticity of the tax base, shown on the X-axis, is a measure of the market value of tax distortions. The share of the tax burden borne by the top 10% of the income distribution, shown on the Y-axis, is a measure of progressivity. The estimates for the corporate income tax are from this paper. The ETI estimates for the personal income and payroll tax are from Saez et al. (2012) and Saez et al. (2019), respectively, and the progressivity estimates are from CBO (2021).

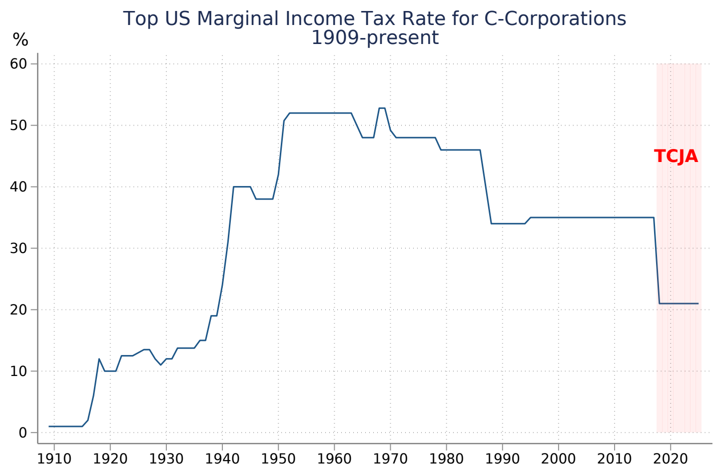
Appendix Figures and Tables

A Appendix to Section II: Setting and Institutional Details

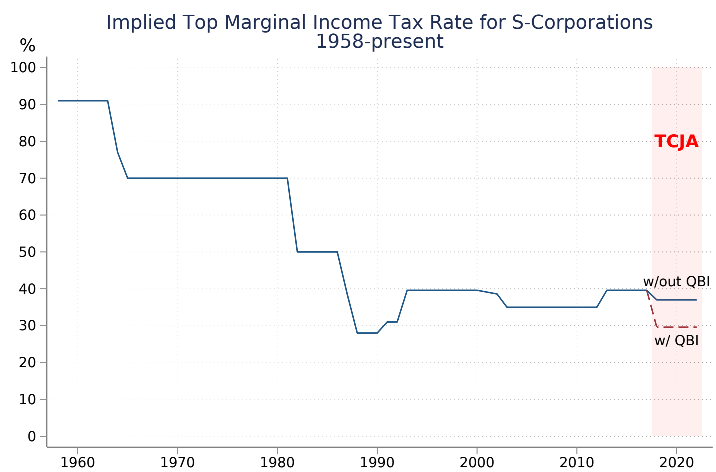
A.1 Historical Statutory Federal Top Marginal Income Tax Rates

FIGURE A.1: TOP MARGINAL INCOME TAX RATES IN HISTORICAL CONTEXT

Panel A: Top Marginal Tax Rate for C corporations



Panel B: Implied Top Marginal Tax Rate for S corporations



Notes: Data from the Tax Foundation. Panel A shows the evolution of the top statutory marginal corporate income tax rate facing C corporations throughout U.S. history. Panel B shows the implied top statutory marginal income tax rate facing S corporations, which equal to the top rate facing individuals.

A.2 Marginal Income Tax Rates and Brackets Before and After TCJA

TABLE A.1: MARGINAL INCOME TAX BRACKETS BEFORE AND AFTER TCJA

Panel A: Tax Brackets for C corporations

Income Bracket	Upper Income Threshold ($)	Pre-TCJA MTR	Post-TCJA MTR	Firm Share	Emp Share	Sales Share
0	0	0	0	0.916	0.659	0.477
1	50,000	0.15	0.21	0.061	0.026	0.012
2	75,000	0.25	0.21	0.006	0.006	0.004
3	100,000	0.34	0.21	0.003	0.004	0.002
4	335,000	0.39	0.21	0.007	0.013	0.010
5	10,000,000	0.34	0.21	0.005	0.043	0.047
6	15,000,000	0.35	0.21	0.000	0.008	0.009
7	18,000,000	0.38	0.21	0.000	0.003	0.005
8	>18,000,000	0.35	0.21	0.001	0.240	0.433

Panel B: Implied Tax Brackets for S corporations (Married Joint Filers)

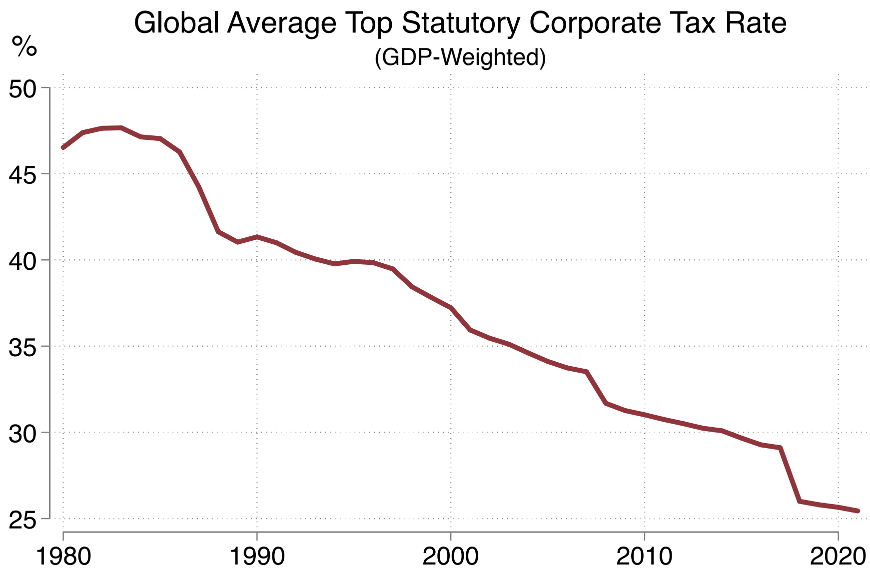
Income Bracket	Upper Income Threshold 2017 ($)	2017 MTR	Upper Income Threshold 2019 ($)	2019 MTR
1	18,650	.1	19,400	.1
2	75,900	.15	78,950	.12
3	153,100	.25	168,400	.22
4	233,350	.28	321,450	.24
5	416,700	.33	408,200	.32
6	470,700	.35	612,350	.35
7	>470,700	.396	>612,350	.37

Notes: Panel A reports the statutory marginal income tax brackets facing C corps before and after TCJA. The firm, employment, and sales shares are calculated in tax year 2016 using SOI data. Panel B illustrates an example of the implied statutory marginal income tax brackets facing S corp owners. This schedule varies depending on the taxpayer's filing status. For illustrative purposes, the schedule shown here is for married joint filers, although in practice we use the corresponding tax schedules for different filer types.

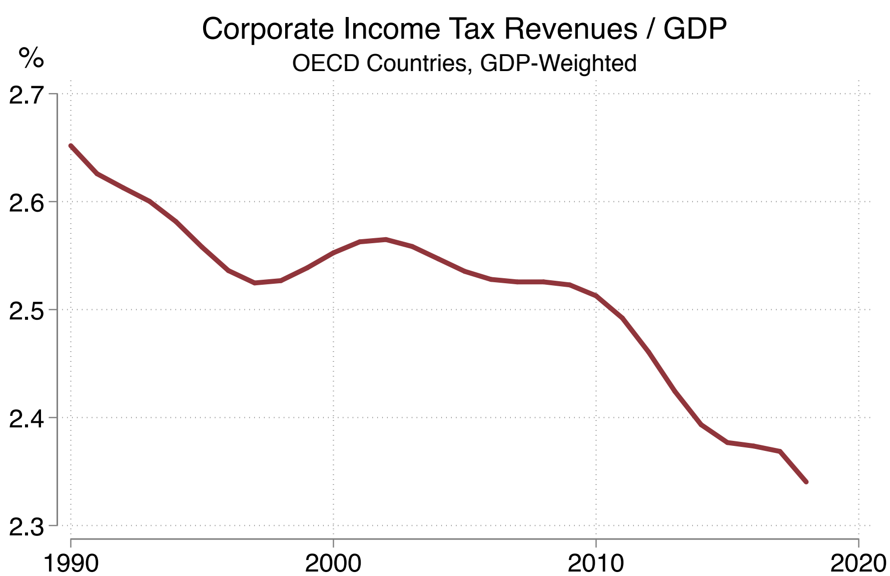
A.3 A Global Perspective on Corporate Income Taxes

FIGURE A.2: CORPORATE TAXES IN GLOBAL PERSPECTIVE

Panel A: Average Global Corporate Tax Rates



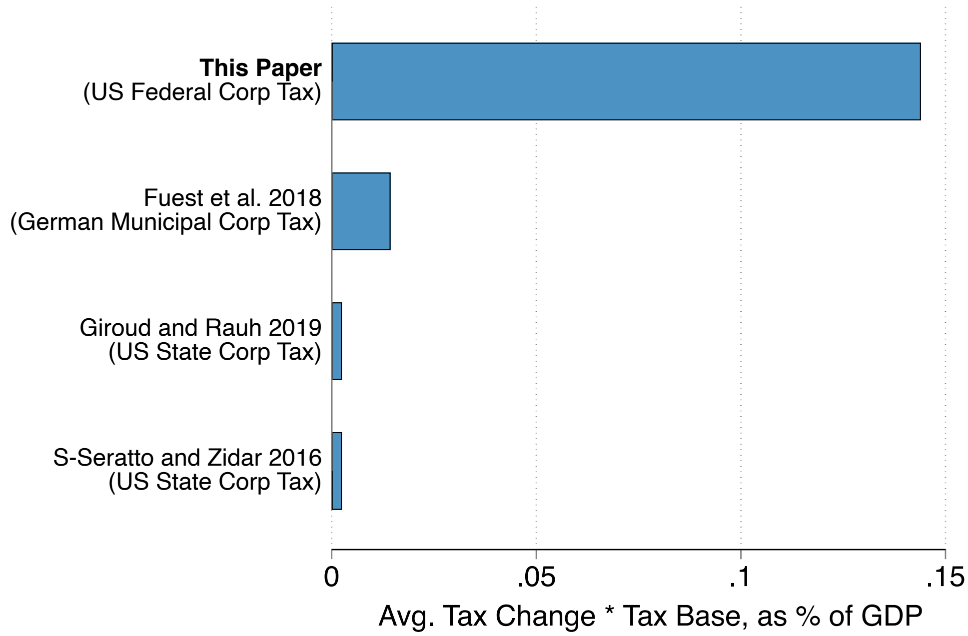
Panel B: Average Corporate Income Taxes in OECD Countries as a Share of GDP



Notes: Panel A shows the GDP-weighted global average top statutory corporate income tax rate since 1980, using data from the Tax Foundation. Panel B shows the lowess-smoothed GDP-weighted ratio of corporate income tax revenues to GDP since 1990 for OECD countries, using data from the OECD tax database (data are not available for this series before 1990).

A.4 TCJA Tax Cut in the Context of Recent Literature

FIGURE A.3: TCJA TAX CHANGE VS. OTHER RECENT STUDIES



Notes: The figure shows the average tax change studied in several recent papers, multiplied by the tax base and scaled by GDP. The average tax change in Fuest et al. (2018) is 0.9 percentage points, and the LBT tax base is approximately 1.6% of GDP (see OECD/UCLG 2019). The average tax change in Suárez Serrato and Zidar (2016) and Giroud and Rauh (2019) is 1.0 percentage point, and the state corporate tax base is approximately 0.25% of GDP (Census 2019). The average tax change in this study is 9.0 percentage points, and the 2016 federal corporate tax base is approximately 1.6% of GDP (OMB 2022).

A.5 The QBI Deduction

Here we broadly summarize the Qualified Business Income (QBI) deduction enacted in TCJA. For comprehensive details, see documentation from the IRS here.

Commonly referred to as "Section 199A" after the corresponding section of the tax code, the QBI deduction is potentially available to S corporations, as well as other pass-through businesses not included in our analysis sample, and is not relevant for C corporations. The deduction amount is equal to the minimum of:

1. 20% of taxable income, where taxable income is calculated prior to assessing the QBI deduction, minus net capital gains; or,

2. The sum of of both:

   (a) 20% of the aggregate qualified real estate and investment trust (REIT) dividends and publicly traded partnership (PTP) income; and

   (b) Deductible amounts from qualified trades or businesses.

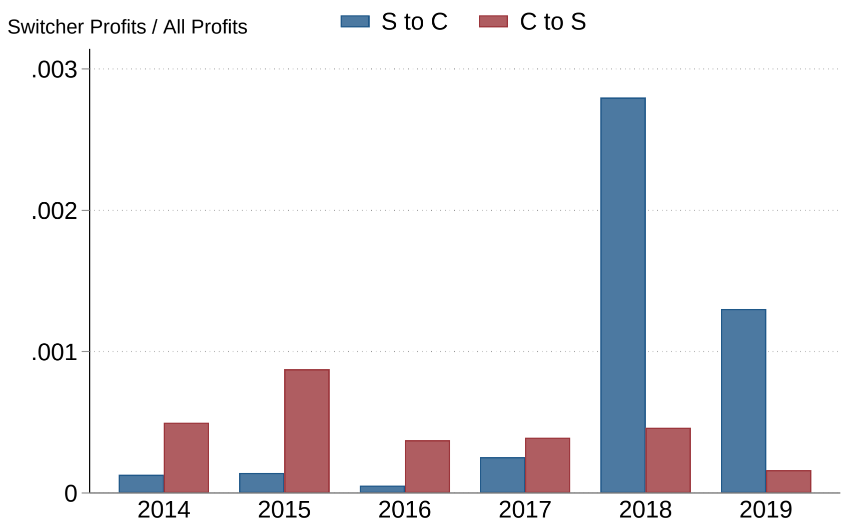
Moreover, the deduction amount is subject to an adjusted gross income limitation after which the deduction amount phases out. The limitation amounts for tax year 2019 where $321,000 for married taxpayers, and $161,000 for single taxpayers. If a taxpayer exceeds these limitations, then two additional tests apply:

- Qualified business income must not be from a service specialized trade or business, otherwise the deduction amount is phased out; and

- The deduction amount is limited to 50% of the firm's allocated W-2 wages.

A.6 Entity-Type Switching

FIGURE A.4: CORPORATE ENTITY-TYPE SWITCHING, 2013-2019



Notes: Figure shows the profit-weighted share of firms that switch their legal entity type from C-to-S or from S-to-C over the sample period.

B Appendix to Section III: Data Sources, Variable Definitions, and Measurement

B.1 Variable Definitions

Taxes Paid

Taxes paid are defined for C corporations as Form 1120: Schedule L, line 31. For S corps, taxes paid are measured using the following methodology:

1. Match S corp owners to their 1040s
2. Use 1040s to compute each owner's average tax rate (ATR) and total taxes paid on pass-through income
   (a) Calculate ATR for a tax unit: ATR = Taxes Paid / Taxable Income
   (b) Record net ordinary business income: NET_OBI = Line 32 from 1040 (from schedule E)
   (c) Compute taxes paid on business income: BIZ_TAX_PAID = min(max{ATR*(NET_OBI),0},total tax paid on 1040)
   (d) Save table unique by TIN-year
3. Compute total non-negative pass-through income from 1120s and 1065s by owner
   (a) Append all K1s and from 1120s and 1065s with positive OBI (drop K1s with OBI<$0)
   (b) Sum up OBI by TIN-year; call the sum OBI_SUM
   (c) Save table unique by TIN-year
4. Merge table 2 and 3 by TIN-year
5. Compute the OBI share of each pass-through business in the owner's portfolio
   (a) Append all K1s from 1120s with positive OBI
   (b) Match m:1 by TIN with table 4; new table is unique by TIN-K1-year
   (c) Compute share of each K1 in total OBI, call it W = OBI / OBI_SUM
   (d) Allocate tax_paid in proportion to the shares: S_TAX = W*BIZ_TAX_PAID
   (e) Sum up S_TAX by firm-year, final table is unique by EIN-year

Sales, Costs, and Profits

Sales are defined for C and S corporations as Form 1120: line 1c and Form 1120-S: line 1c, respectively.

Costs of goods sold are defined for C and S corporations as Form 1120: line 2 and Form 1120-S: line 2, respectively.

Pre-tax gross profits are defined as sales minus costs of goods sold.

After-tax gross profits are defined as gross profits minus taxes paid.

Earnings before interest, taxes, depreciation, and amortization (EBITDA) is defined as net income plus net interest expense plus depreciation. Net income is defined for C corporations as Form 1120: line 28. For S corporations, net income is defined as Form 1120-S: line 21 combined with Form 1120-S Schedule K: lines 2 – 14. Depreciation is defined for C and S corporations as Form 1120: line 20 and Form 1120-S: line 14, respectively. Net interest expense is defined for C corporations as the maximum of zero and Form 1120: line 18 minus line 5. For S corporations, net interest expense is defined as Form 1120-S: line 12 plus Form 1120-S Schedule K: line 12b minus line 4.

Shareholder Payouts

Dividends are defined for C corporations as Form 1120: Schedule M-2, line 5a plus line 5c. For S corporations, dividends are defined as Form 1120-S: Schedule K, line 17c.

Share buybacks are defined as the non-negative annual dollar change in the treasury stock; treasury stock is defined for C corporations as Form 1120: Schedule L, line 27(d) and for S corporations as Form 1120-S: Schedule L, line 26(d).

Total payouts are defined as dividends plus share buybacks.

Investment

Capital assets is defined for C and S corporations as buildings and other depreciable assets less accumulated depreciation, as measured on Form 1120: Schedule L, line 10b(d) and Form 1120-S: Schedule L, line 10b(d), respectively.

Net investment is defined as the annual dollar change in capital assets.

Short-life new investment is defined for C and S corporations as the sum of Form 4562: lines 19a(c) to 19c(c).

Long-life new investment is defined for C and S corporations as the sum of Form 4562 lines 19d(c) to 19i(c) plus the sum of lines 20a(c) to 20c(c) plus the sum of line 14, line 15, and line 16.

Total new investment is defined as short-life new investment plus long-life new investment.

Employment and Earnings

Employment for C and S corporations is defined as the total number of unique individuals with a W-2 issued by the firm.

Worker earnings are measured for C and S corporation employees from Form W-2, box 5 (Medicare Wages).

Payroll is defined as the sum of workers' annual earnings.

Executive compensation is defined for C corporations as Form 1120: line 12 and for S corporations as Form 1120-S: line 7.

Top-5 compensation is defined for C and S corporations as the combined annual W-2 earnings of the top five highest paid workers at the firm.

Other Firm Characteristics

Age is defined as tax year minus year of incorporation, where year of incorporation for C corporations and S corporations is defined as Form 1120: box C and Form 1120-S: box E, respectively.

Multinational firms are defined as those whose foreign sales share is greater than 1%, where foreign sales are defined as the sum of gross receipts from all Controlled Foreign Corporations (that is, foreign subsidiaries) reported for each foreign subsidiary on Form 5471 Schedule C: line 1c.

Capital intensity is defined at the industry level as total capital assets divided by total sales. C and S corporations are classified as capital intensive if the mean of this ratio in the pre-period (2013 to 2016) is greater than the sample median.

Industry is defined for C corporations as the first three digits of Form 1120: Schedule K, line 2a and for S corporations as the first three digits of Form 1120-S: Schedule B, line 2a.

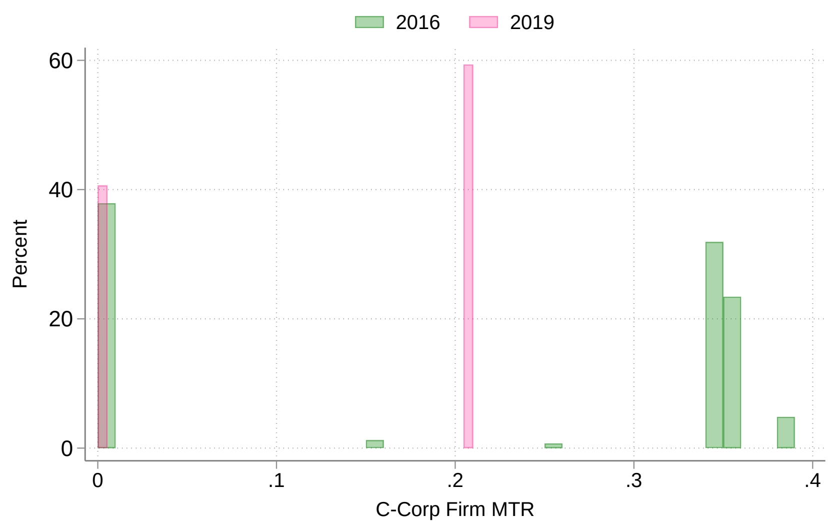
Fuzzed Centile Statistics

When reporting centile statistics, we compute averages of all observations within a quantile range rather than report the singular centile observation in the data. For example, rather than report the true median, we report the average of all observations in the 50th quantile of the distribution. We take these measures to ensure and protect taxpayers' privacy in compliance with IRS policy.

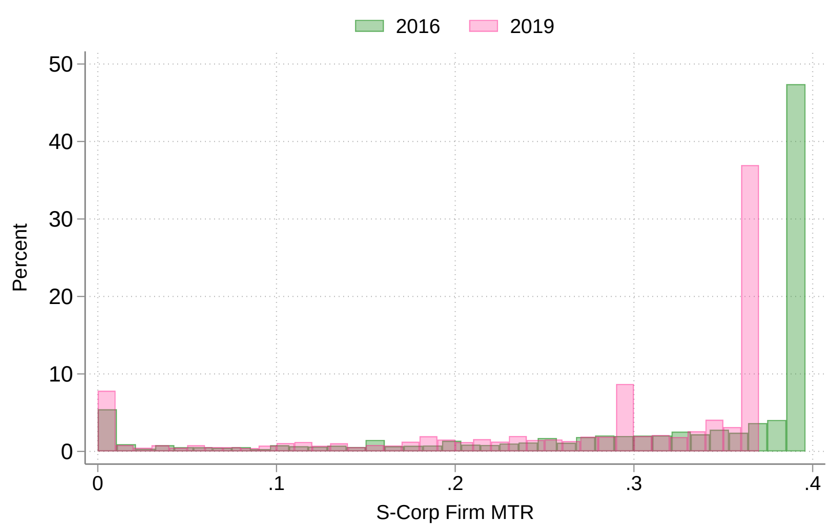
B.2 Sample Distribution of Firms' Statutory Marginal Income Tax Rates Before and After TCJA

FIGURE B.1: SAMPLE DISTRIBUTION OF C CORP STATUTORY MTR'S

Panel A: Marginal Income Tax Rates for C corporations



Panel B: Implied Marginal Income Tax Rates for S corporations

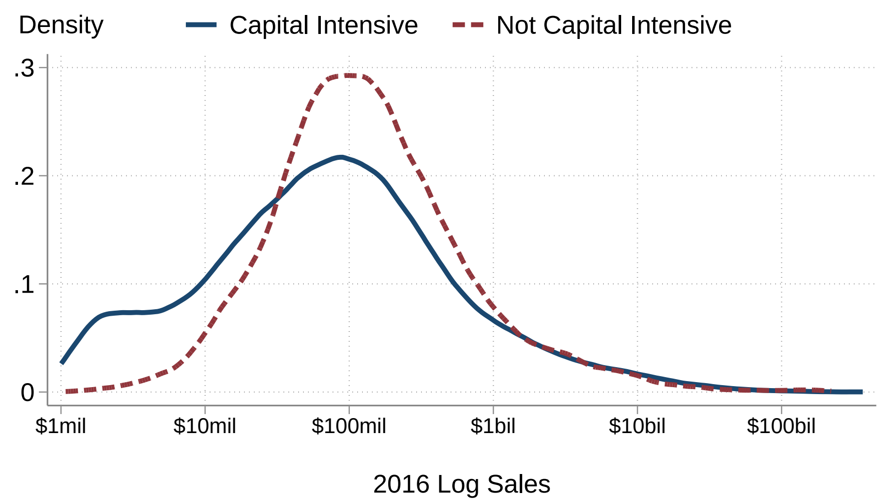


Notes: Panels A and B show the sample distribution of statutory marginal income tax rates for C corps and S corps, respectively, before and after TCJA.

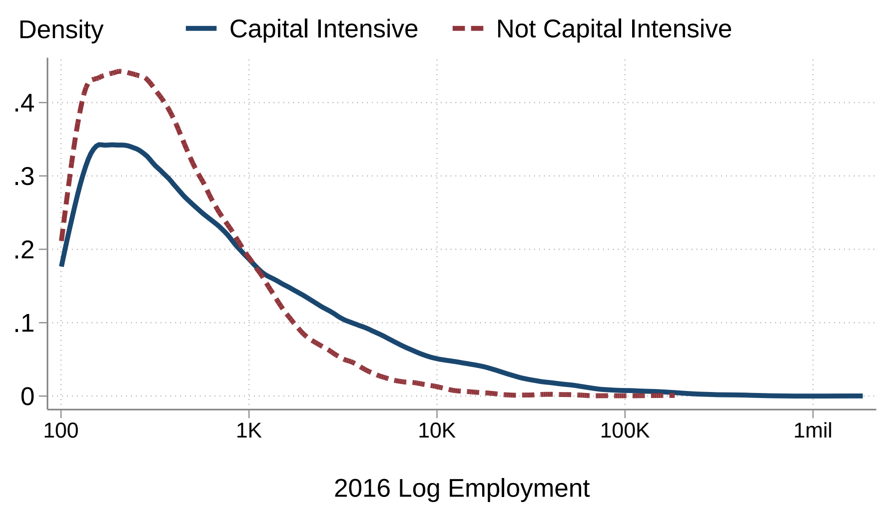
B.3 Size Distribution of Capital-Intensive Industries

FIGURE B.2: SIZE DISTRIBUTIONS OF FIRMS, BY CAPITAL INTENSITY

Panel A: 2016 Sales



Panel B: 2016 Employment



Notes: Panels A and B show the distribution of 2016 log firm sales and employment, respectively, for capital-intensive and non-capital-intensive firms in the sample.

C Appendix to Section IV: Empirical Results

C.1 Equity and Debt Issuance

TABLE C.1: EQUITY AND DEBT ISSUANCE

	(1) New Equity (0/1)	(2) Log New Equity	(3) New Debt (0/1)	(4) Log New Debt
C $\times$ Post	-0.002	0.091	0.006	-0.001
	(0.005)	(0.109)	(0.007)	(0.010)
2016 Outcome Mean	0.27	1.13	0.60	3.70
Firm FE	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes
R2	110439	27062	110439	110025
N	15,777	6,016	15,777	15,771

Notes: Table shows results from estimating equation 2 to assess if TCJA caused increases in equity or debt issuance of C corps relative to S corps. Columns 1 and 3 show the extensive margins, and columns 2 and 4 show the intensive margins.

C.2 Market-Level Analysis

Our firm-level empirical analysis leverages the fact that C and S corps on average received differently-sized tax cuts to identify causal effects. However, in the firm-level difference-in-differences design, it is possible that general equilibrium effects, operating through market-level adjustments impacting both C and S corps, are absorbed by the industry-size-year fixed effects. In this case, firm-level "micro" elasticities may diverge from market-level "macro" elasticities. The firm-level elasticity captures the effect of treating a single firm within a market relative to other firms; the market-level elasticity captures the effect of treating some non-trivial (sales or employment- weighted) share of firms in a market, relative to other markets where different shares of firms are treated.

In theory, market-level elasticities could be either larger or smaller than firm-level elasticities. Consider the effects of corporate tax cuts on investment and profits. At the firm level, we estimate that C corps increased their investment and pre-tax profits relative to S corps following TCJA. However, if the supply of capital is constrained, it is possible that investors may divert investment away from S corps and toward C corps in response to the tax cut. Deploying a higher stock of productive capital, C corps may then increase their pre-tax profits at the expense of competitor S corps. In this case, the market-level investment and profit elasticities would be smaller than the corresponding firm-level elasticities, because increases in investment and profits for C corps are offset by declines for S corps.

In the case of workers' wages, if corporate tax cuts lead firms to increase labor demand, and if workers are substitutable across firms as in a model of perfectly competitive labor markets, then the wages of both C and S corp workers would be predicted to increase by an equal amount. In this case, the market-level earnings elasticity would be positive, even as the firm-level earnings elasticity is zero.

Estimating the market-level effects of corporate tax cuts is empirically challenging, for several reasons. First, variation in corporate tax cuts at the market level is generally smaller than at the micro level: sharp policy variation in tax changes *within* industries often nevertheless yields attenuated policy variation in tax changes *across* industries. The attenuated policy variation, as well as the more limited number of industries (relative to the number of firms in a firm-level regression), reduces statistical precision. Second, the parallel trend assumption necessary to estimate a market-level elasticity is more challenging to defend at the market level than at the firm level. For example, while it may be plausible to suppose that firms within the same industry are subject to common supply and demand shocks, it may be less plausible to suppose that different industries provide suitable counterfactuals for causal inference. Third, general equilibrium effects often unfold over longer time horizons, but our study only studies short-run responses. These challenges naturally limit researchers' capacity to precisely estimate market-level elasticities.

Nevertheless, we consider two types of evidence that may be informative about market-level adjustments: time series evidence and market-level event studies. We first consider the time-series evidence. Figure C.1 reports mean outcomes in levels for C and S corps in our sample, without any fixed effects or controls. Guided by the economic intuition described above, we focus on four key outcomes: mean and median worker earnings; pre-tax profits, and investment. Panels A and B do not suggest evidence of trend breaks consistent with the predictions of a perfect competition labor market; that is, the plots do not show that earnings increased faster for workers of both C and S corps following TCJA, relative to the pre-TCJA trend. Moreover, Panels C and D do not suggest obvious evidence of a reallocation of profits or investment from S to C firms; that is, profits and investment of S firms do not decline (relative to trend) at the same time that profits and investment increase for C corps. This evidence does not rule out that such general equilibrium effects were present, but it does suggest that they were likely to be economically small over our limited time horizon.

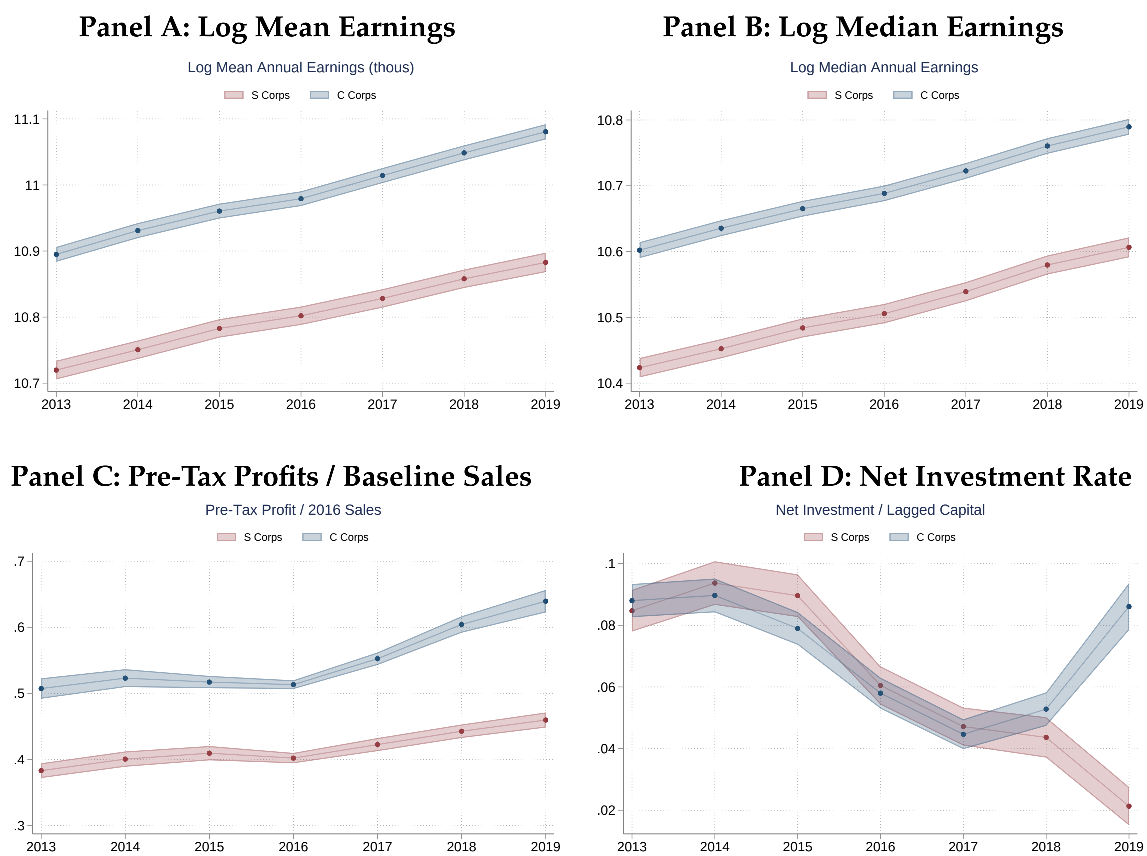
To further investigate general equilibrium responses, we implement a market-level analysis. To do so, we construct market-level MTR shocks, defined as the sales-weighted average 2016 to 2019 change in the marginal tax rates of firms within the same NAICS3 industry, commuting zone, or corporate entity type (C or S). We then estimate the following specification at the industry level:

$$\ln y_{mt} = \sum_{t \neq 2016} \eta_t \ln(Z_m) * \mathbf{1}(year = t) + \gamma_m + \alpha_t + \epsilon_{it} \tag{22}$$

where y_{mt} indexes outcomes in market m in year t; Z_m is the sales-weighted market-level share of C corps in a market; γ_m is a market fixed effect; and α_t is a year fixed effect. The coefficients η_t capture the average market-level elasticity of the outcomes with respect to the industry-level net-of-tax MTR change introduced by TCJA in year t. The fixed effects γ_m and α_t control, respectively, for time-invariant market characteristics and market-invariant macroeconomic trends correlated with the outcome. The reference year is 2016, and standard errors are clustered by industry. This specification corresponds to the reduced form of a shift-share design instrumenting the (sales-weighted) net-of-tax change with the (sales-weighted) share of C corps in a market.

The results and the implied net-of-tax elasticities, ε^{NTR}, are reported in Table C.2. (The absence of standard errors in the entity type-level analysis reflects that the data are aggregated with only a single observation for C and S corps per year.) Although the implied taxable income elasticities are highly imprecisely estimated, the magnitudes are within the confidence interval of the firm-level elasticities, consistent with the notion that any market-level adjustments are likely to be relatively economically small over our time horizon.

FIGURE C.1: TIME SERIES EVIDENCE FOR C AND S CORPS



Notes: Figure plots mean outcomes for C and S corps over the sample period, without fixed effects or controls.

Table C.2: Market-Level Elasticities

Panel A: Industry-Level Elasticities

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln $(1-\tau)$	Pre-Tax π	I_t/K_{t-1}	LnW_{p50}	LnW_{p99}	Ln Emp
$Z_i \times 2019$	0.246**	0.058	0.316	-0.070	0.177	0.165
	(0.100)	(0.213)	(0.327)	(0.126)	(0.251)	(0.263)
ϵ^{NTR}		0.238	1.333	-0.288	0.776	0.722
s.e.		0.861	1.513	0.467	1.154	1.151
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.85	0.95	0.28	0.99	0.98	0.99
N	609	609	609	609	609	609

Panel B: Commuting Zone-Level Elasticities

	(1)	(2)	(3)	(4)	(5)
	Ln $(1-\tau)$	Ln Wage	p50	p99	Ln Emp
$Z_{cz} \times$ 2019	0.064***	-0.000	0.056	-0.051	0.086
	(0.017)	(0.046)	(0.073)	(0.096)	(0.085)
ϵ^{NTR}		-0.002	0.872	-0.805	1.349
s.e.		0.715	1.130	1.574	1.395
CZ FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R2	0.90	0.95	0.91	0.94	1.00
N	4,963	4,963	4,963	4,963	4,963

Panel C: Entity Type-Level Elasticities

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln $(1-\tau)$	Pre-Tax π	I_t/K_{t-1}	LnW_{p50}	LnW_{p99}	Ln Emp
$Z_e \times 2019$	0.074	0.038	0.051	0.025	0.110	0.036
	(.)	(.)	(.)	(.)	(.)	(.)
ϵ^{NTR}	1.000	0.511	0.693	0.338	1.486	0.481
N	14	14	14	14	14	14

Notes: Unit of analysis is a market-year. Standard errors are missing for entity-level regressions because data are aggregateed to the level of one observation per entity type per year. See above for details.

C.3 Executive Compensation

TABLE C.3: OFFICER COMPENSATION

Panel A: Alternate Measures of Executive Pay

	(1) Top5	(2) Officers	(3) p99
C × Post	0.049***	0.048***	0.050***
	(0.007)	(0.010)	(0.007)
2016 Outcome Mean	989,387	5,080,718	684,185
ε^{NTR}	0.75	0.68	0.75
s.e.	0.11	0.14	0.11
Firm FE	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes
R2	0.92	0.92	0.87
N	110,439	97,440	110,439
N Firms	15,777	14,394	15,777

Panel B: Executive Pay, Controlling for Firm Performance

	(1) Benchmark	(2) Sales	(3) Profit	(4) Relative Sales
C × Post	0.048***	0.043***	0.043***	0.045***
	(0.010)	(0.010)	(0.010)	(0.010)
Firm FE	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes
R2	0.92	0.92	0.92	0.92
N	97,440	97,440	97,440	97,180
N Firms	14,394	14,394	14,394	14,392

Notes: Unit of analysis is firm-year. Panel A reports results from estimating variations of equation 2 using alternate measures of log executive pay. The outcome in column 1 is our benchmark measure of the top 5 highest paid workers. The outcome in Column 2 is officer comepensation as reported on Forms 1120 and 1120s (although this is not reported for all firms). The outcome in Column 3 is pay at the 99th percentile of the firm. Standard errors are clustered by firm. In Panel B, the outcome is log officer compensation from Form 1120. Column 1 shows the benchmark specification, and columns 2-4 adds time-varying controls for several measures of firm performance.

C.4 Additional Investment Results

TABLE C.4: NEW INVESTMENT

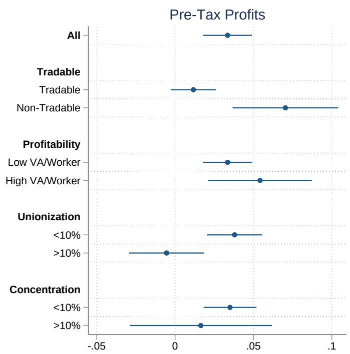
	(1) Total	(2) Short-Life	(3) Long-Life	(4) Structures
C $\times$ Post	0.005**	0.004***	0.000	0.001
	(0.002)	(0.001)	(0.000)	(0.001)
2016 Outcome Mean	0.06	0.04	0.01	0.01
Firm FE	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes
R2	0.58	0.62	0.49	0.36
N	110,439	110,439	110,439	110,439
N Firms	15,777	15,777	15,777	15,777

Notes: Table shows results for new investment from Form 4562, scaled by baseline sales. See Section III for variable definitions.

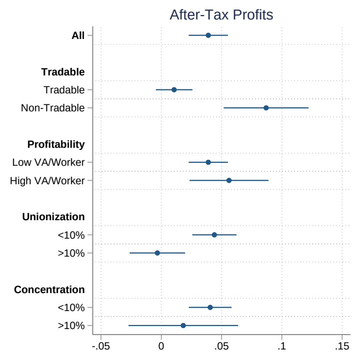
C.5 Firm Heterogeneity

FIGURE C.2: ADDITIONAL FIRM HETEROGENEITY

(A) PRE-TAX PROFIT

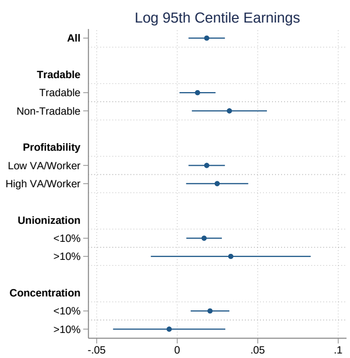


(B) AFTER-TAX PROFIT

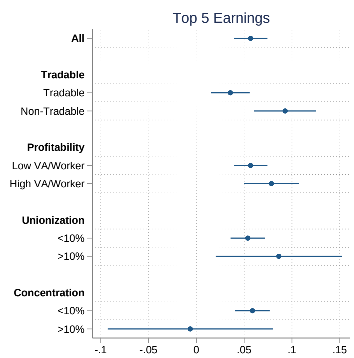


(C) MEDIAN EARNINGS

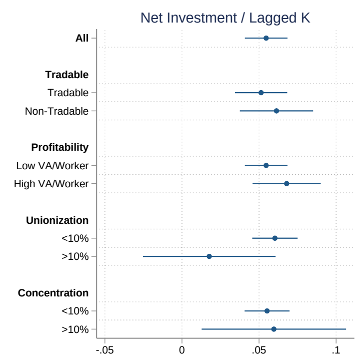
(D) 95TH CENTILE EARNINGS



(E) EXECUTIVE EARNINGS



(F) NET INVESTMENT



Notes: The unit of analysis is a firm-year. The table reports heterogeneity in the net-of-tax elasticities from equation 4 for different samples of firms. The specifications include firm and sector-year fixed effects. Non-tradable industries are defined as NAICS codes 23, 51-56, 61, 62, 71, 72, 81, and 92; all others are defined as tradable. Profitability is defined as value added per worker in the pre-period, and the sample is split at the median. Unionization rates are estimated at the industry level using data from the Current Population Survey. We approxiamte market shares as the share of sales by the firm in an industry.

C.6 The Cost of Capital and Elasticities WRT Effective Marginal Tax Rates

We use a model of the corporate income tax based on theoretical work by Auerbach and Hassett (1992) and using data from Foertsch (2018). The Auerbach-Hassett model can flexibly incorporate salient features of firm behavior and of the U.S. business tax provisions before and after TCJA, including: forward-looking expectations; adjustment costs in investment; different tax rates on the income of shareholders of C versus S corps, including individual-level taxes on dividends, capital gains, interest income, and distributions of non-qualified annuities; the expansion and phase-out of bonus depreciation, as well as incomplete take-up of bonus; and the sunsetting of the QBI deduction. In the model, firms optimize the present discounted value of after-tax profits:

$$\max \mathbb{E}\left\{ \sum_{s=t}^{\infty}(1+\rho)^{-(s-t)}\left[\frac{F_s(K_s,L_s))(1-\tau_s)}{(1-r)} - w_sL_s(1-\tau_s) - C_s(I_s)I_s(1-\Gamma_s)\right] + A_t\right\} \tag{23}$$

where $\mathbb{E}$ is the expectations operator; ρ is the shareholders' discount rate; $F(K,L)$ is the firm's production function, which uses capital and labor as inputs; τ is the corporate income tax rate, which varies for C and S corps; r is the risk-free rate of return; w is the market wage, which may be generalized to include several types of workers and corresponding wage rates; I is new investment net of depreciation; $C(I)$ is a quadratic convex investment cost function capturing adjustment costs; Γ is the present discounted value of savings due to investment tax credits k and depreciation allowances:

$$\Gamma_s = k_s + A_s$$

and where A is the present discounted value of tax benefit from investment depreciation allowances D per dollar of investment:

$$A_s = \sum_{z=s}^{\infty}(1+r)^{-s(z-s)}\tau_s D_{z-s}$$

We assume that $F(K,L)$ varies across firms due to heterogeneous productivities, such that some firms are able to produce greater output than others given a fixed set of inputs. The first-order condition for profit maximization with respect to capital yields:

$$\underbrace{\frac{\partial F_s}{\partial K_s}}_{\text{MRPK}} = \underbrace{\left(\frac{(1-\Gamma_s)}{1-\tau_s}\right)\left(\frac{r+\delta+(\Gamma_{s+1}-\Gamma_s)}{1-\Gamma_s}\right)}_{\text{user cost of capital}} \equiv \phi_s \tag{24}$$

Auerbach-Hassett show that, in the presence of adjustment costs, optimization implies that firms' investment is a function of a weighted average of current and future user costs, given by:

$$\phi_t = \sum_{s \geq t} w_{s-t} \phi_s \tag{25}$$

where ϕ_s is the user cost of capital in period s, and w_{s-t} represents weights that sum to one and reflect adjustment costs. If adjustment costs are low, the weights assigned to future periods are low, and current investment is less sensitive to future user costs. Conversely, if adjustment costs are high, then the weights assigned to future periods are high, and investment is highly responsive to future user costs.

Foertsch (2018) parameterizes equation 24 separately for C corporations and pass-through businesses (including S corps) for 54 NAICS industry codes.[1] The data are from the Bureau of Economic Analysis (BEA) and cover 76 distinct depreciable assets (covering both equipment and structures), land, inventories, and intangibles (such as research and development, advertising, and artistic works). Foertsch then computes user costs at the entity type-level weighting by asset type and by industry, and computes effective marginal tax rates as follows:

$$EMTR_t = \frac{\phi_t - S}{\phi_t} \tag{26}$$

where S is a weighted average of the after-tax return on corporate equity and corporate debt. Effective marginal tax rates (EMTR's) measure the difference between the pre-tax and after-tax return on an investment, divided by the pre-tax return. In theory, a higher EMTR implies a larger distortion on firms' investment decisions. Foertsh (2018) reports EMTR's separately for C corps and pass-through firms for each year in the ten-year period from 2018-2027, as well as EMTR's in a counterfactual scenario where TCJA was not enacted. Cohen, Hansen, and Hassett (2002) formulate the weights in Equation 25 using the parameter Ω:

$$w_0 = 1 - \Omega \tag{27}$$

$$w_{s-t} = w_{s-t-1} * \Omega, \forall s > t$$

[1] Here we broadly summarize the methodology in Foertsch (2018), and refer readers to that article for exhaustive details.

such that $\sum_{s \geq t} w_{s-t} = 1$. The expression implies that, if $\Omega = 0.5$, the weights in each successive year are half as large as the prior year, and the successive year's user costs are half as important.

To estimate elasticities with respect to effective marginal tax rates, we use the actual and counterfactual (that is, pre-TCJA) EMTR's reported by Foertsch and, as in the baseline case of Cohen, Hansen, and Hassett (2002), apply an adjustment cost parameter of $\Omega = 0.5$. We also perform sensitivity analyses using Ω values of 0.3 (low adjustment costs) and 0.7 (high adjustment costs). Finally, we compute the TCJA shock to EMTR's separately for C and S corps as the difference in the resulting actual and counterfactual EMTR's, and estimate corresponding net-of-tax elasticities using equation 4.

The first row of Table C.5 reports our benchmark net-of-tax elasticities using the marginal income tax rates reported in the main text. Rows 2-4 report elasticities with respect to the (net-of) effective marginal tax rates, computed as described above, and varying the adjustment cost parameter. In the baseline adjustment cost case, $\Omega = 0.5$, the resulting elasticities are nearly identical to the benchmark elasticities reported in the main text (and in row 1). In the case with low adjustment costs, $\Omega = 0.3$, the elasticities are modestly higher. The modestly higher elasticities reflect that the tax wedge between C and S firms in the years immediately following TCJA was smaller relative to the latter end of the ten-year window, when the bonus expensing provisions are scheduled to phase out and several individual provisions (including the QBI) are scheduled to sunset. In this case, the reduced form coefficients (from equation 2) will be scaled by a smaller first-stage coefficient (from equation 3), generating a larger elasticity. The reverse holds for the high adjustment cost case where $\Omega = 0.7$, generating modestly smaller elasticities. In all cases, the estimated elasticities with respect to effective marginal tax rates remain within the confidence intervals of the benchmark estimates. Table C.6 reports cost of capital elasticities.

Table C.5: net-of-tax Elasticities

Specification	(1) ε^{B} π	(2) ε^{π} $\pi(1-\tau)$	(3) $\varepsilon^{w_{p50}}$ p50 w	(4) $\varepsilon^{w_{p50}}$ p95 w	(5) $\varepsilon^{w_{exec}}$ Exec w	(6) ε^{I} I_t/K_{t-1}
Benchmark	0.445	0.581	-0.008	0.203	0.678	0.443
	(0.108)	(0.110)	(0.055)	(0.063)	(0.141)	(0.070)
$\Omega = 0.5$	0.409	0.533	-0.007	0.186	0.667	0.407
	(0.097)	(0.098)	(0.051)	(0.057)	(0.135)	(0.062)
$\Omega = 0.3$	0.511	0.665	-0.009	0.232	0.832	0.508
	(0.121)	(0.122)	(0.063)	(0.071)	(0.168)	(0.077)
$\Omega = 0.7$	0.325	0.423	-0.006	0.148	0.529	0.323
	(0.077)	(0.078)	(0.040)	(0.045)	(0.107)	(0.049)
N	110,439	110,439	110,439	110,439	110,439	110,439

Notes: Row 1 reports benchmark net-of-tax elasticities using the marginal income tax rates reported in the main text. Rows 2-4 report elasticities with respect to the (net-of) effective marginal tax rates, computed as described above, and varying the adjustment cost parameter, Ω. See above for details.

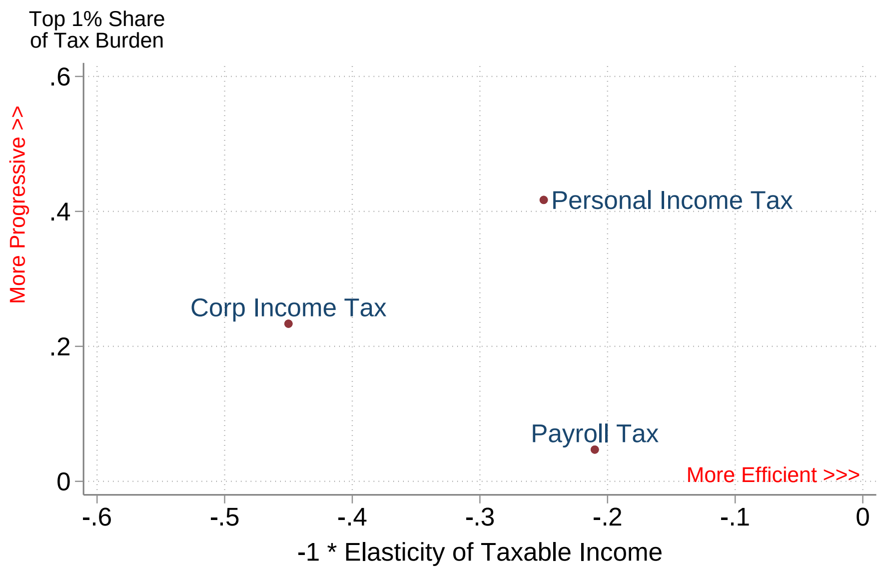
Table C.6: Cost of Capital Elasticities

	(1) π	(2) $\pi(1-\tau)$	(3) w_{p50}	(4) w_{p95}	(5) w_{exec}	(6) I_t/K_{t-1}
ε^{ϕ_f}	-0.441***	-0.574***	0.008	-0.200***	-0.739***	-0.438***
	(0.105)	(0.107)	(0.055)	(0.061)	(0.102)	(0.068)
2016 Outcome Mean	0.47	0.41	47,973	176,373	989,387	0.06
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Size-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R2	-0	-0	-0	-0	-0	-0
N	110,439	110,439	110,439	110,439	110,439	110,439
N Firms	15,777	15,777	15,777	15,777	15,777	15,777

Notes: Table reports cost-of-capital elasticities. See above for details.

C.7 The Efficiency-Equity Tradeoff

FIGURE C.3: THE EFFICIENCY-EQUITY TRADEOFF IN CONTEXT



Notes: The figure contextualizes our results on the corporate income tax against the personal income and payroll taxes, the two other largest sources of federal tax revenue in the United States. The elasticity of the tax base, shown on the X-axes, is a measure of the market value of the tax distortions. The share of tax burden borne by the top of the income distribution is a measure of progressivity. The ETI estimates for the personal income and payroll tax are from Saez et al. (2012) and Saez et al. (2019), respectively, and the progressivity estimates are from CBO (2021).