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CAPITAL TAX REFORM AND THE REAL ECONOMY: THE EFFECTS OF THE 2003 DIVIDEND TAX CUT*

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ABSTRACT

Policymakers frequently propose to use capital tax reform to stimulate investment and increase labor earnings. This paper tests for such real impacts of the 2003 dividend tax cut—one of the largest reforms ever to a U.S. capital tax rate—using a quasi-experimental design and a large sample of U.S. corporate tax returns from years 1996-2008. I estimate that the tax cut caused zero change in corporate investment, with an upper bound elasticity with respect to one minus the top statutory tax rate of .08 and an upper bound effect size of .03 standard deviations. This null result is robust across specifications, samples, and investment measures. I similarly find no impact on employee compensation. The lack of detectable real effects contrasts with an immediate impact on financial payouts to shareholders. Economically, the findings challenge leading estimates of the cost-of-capital elasticity of investment, or undermine models in which dividend tax reforms affect the cost of capital. Either way, it may be difficult for policymakers to implement an alternative dividend tax cut that has substantially larger near-term effects.

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I Introduction

The Jobs and Growth Tax Relief Reconciliation Act of 2003 reduced the top tax rate on individual dividend income in the United States from 38.6% to 15%. President George W. Bush predicted that the tax cut would provide "near-term support to investment" and "capital to build factories, to buy equipment, hire more people."[1] The underlying rationale finds support in economics: traditional models imply that dividend tax cuts substantially reduce firms' cost of capital (Harberger 1962, 1966; Feldstein 1970; Poterba and Summers 1985), and investment appears highly responsive to the cost of capital (Hall and Jorgenson 1967; Cummins, Hassett, and Hubbard 1994; Caballero, Engel, and Haltiwanger 1995). Similar arguments motivate ongoing proposals to use capital tax reforms to increase near-term output (Ryan 2011; Hubbard, Mankiw, Taylor, and Hassett 2012; Ryan 2012).[2]

However, there is no direct evidence on the real effects of the 2003 dividend tax cut, for the simple reason that real corporate outcomes are too cyclical to distinguish tax effects from business cycle effects. Aggregate investment rose 31% in the five years after the tax cut, but that increase could have been driven by secular emergence from the early 2000s recession. Indeed, aggregate investment rose by 34% in the five years following the early 1990s recession despite no dividend tax cut. As a result, earlier work on the real effects of dividend taxes has relied on indirect evidence such as the goodness-of-fit of alternative structural investment equations (Poterba and Summers 1983).

This paper tests for real effects of the 2003 dividend tax cut by using a set of unaffected corporations to control for the business cycle. Upon incorporating at the state level, U.S. corporations adopt either "C" or "S" status for federal tax purposes. The critical difference between C- and S-status is that C-corporations are subject to dividend taxation while S-corporations are not. S-status typically confers tax advantages, but restrictions on the number and type of shareholders prevent corporations with publicly held stock, with any institutional equity fi-

[1] These quotes refer specifically to the dividend tax cut. The first quote is from the February 2003 Economic Report of the President, p.55; the second is from President Bush's speech on January 7, 2003, introducing the tax cut.

[2] The influential "Ryan Plans" of the U.S. House Committee on the Budget propose to keep capital income tax rates low or to lower them further in order to "provide an immediate boost to a lagging economy by increasing wages, lowering costs, and providing greater returns on investment" (Ryan 2011) and to prevent "raising taxes on investing at a time when new business investment is critical for sustaining the weak economic recovery" (Ryan 2012). Hubbard et al. predicted that Governor Mitt Romney's proposed capital and labor income tax reforms "will increase GDP growth by between 0.5 percent and 1 percent per year over the next decade."

nancing, and with any divisions between ownership and control from enjoying S-status. This paper uses S-corporations (not directly affected by the dividend tax cut) as a control group for C-corporations (directly affected) over time.[3]

The identifying assumption underlying this research design is *not* random assignment of C- vs. S-status; it is that C- and S-corporation outcomes would have trended similarly in the absence of the tax cut. Three facts support this "common trends" assumption. First, C- and S-corporations of the same ages compete in the same narrow industries and at the same scale throughout the United States and are thus subject to similar cyclical shocks. Second, other contemporaneous stimulative tax provisions like accelerated depreciation applied almost identically. Third and perhaps most important, key outcomes empirically trended similarly for C- and S-corporations in the several years before 2003.

This paper uses rich data from U.S. corporate income tax returns from years 1996 to 2008. All publicly-traded corporations, and thus the absolute largest corporations, are C-corporations; I therefore focus on a stratified random sample of private C- and S-corporations with assets between one million and one billion dollars (the 90^{th} and 99.9^{th} percentiles of the U.S. firm size distribution) and revenue between 0.5 million and 1.5 billion dollars. Based on Census Bureau data, firms in this size range employ over half of all U.S. private sector workers. In the tax data, C- and S-corporations in this range are densely populated within fine industry-firm-size bins, and all results flexibly control for time-varying industry-firm-size shocks. This paper's main sample is an unbalanced panel comprising 332,225 annual observations from 73,141 corporations; I obtain qualitatively similar results in balanced panel regressions in which the only firm-level variable changing over time is the outcome of interest.

I find that annual C-corporation investment trended similarly to annual S-corporation investment before 2003 and continued to do so after 2003. The difference-in-differences point estimate implies an elasticity of investment with respect to one minus the top statutory dividend tax rate of .00 with a 95% confidence interval of $-.08$ to .08, equivalent to $-.03$ to .03 standard deviations of investment.[4]

The finding of no significant increase in investment is robust across alternative specifica-

[3] To the extent that an increase in C-corporation investment displaced S-corporation investment, this design would *overstate* the magnitude of the aggregate effect. Switching between corporate types is rare.

[4] Elasticities with respect to the tax rate are 19% smaller in absolute value; one minus the tax rate is the element relevant for theory.

tions (with and without controls), sample frames (unbalanced and balanced panels), investment measures (gross investment and net investment), outlier top-coding (at the 95^{th} and 99^{th} percentiles), and subsamples (defined by size, age, growth, profitability, cash, and debt). I further find a negative point estimate and a 95% confidence upper bound elasticity of .04 (.02 standard deviations) for the related and independently relevant outcome of total employee compensation. When including the 75% of public corporations that fall in this paper's size range, the point estimate on each real outcome becomes more negative with an unchanged upper bound.

To confirm the tax cut's salience and relevance in spite of the lack of detectable real effects, I test for an effect on total payouts to shareholders (dividends plus share buybacks)—the focus of the existing academic debate over the effects of this tax reform (Chetty and Saez 2005; Brown, Liang, and Weisbenner 2007; Blouin, Raedy, and Shackelford 2011; Edgerton 2012). I find that C-corporation payouts spiked immediately in 2003 by 21% relative to S-corporation payouts, with a t-statistic over 5. The payouts effect was large and persistent in percentage terms but small in dollar terms and is consistent with a small dollar-for-dollar displacement of C-corporation investment, or alternatively with a reshuffling of financial claims that had no real effects.

These core results do not necessarily apply to corporations that were smaller or larger than the firm size range analyzed here, so I test for real effects of the tax cut within each firm size decile and ask whether the results suggest that out-of-sample effects were likely different. For each real outcome, I find a zero effect within every firm size decile and no upward or downward trend across deciles. Hence, I do not find evidence suggestive of different out-of-sample results.

Finally, a recent model notes that a dividend tax cut can increase the productivity of investment even if it does not increase its level, by causing poorly-managed C-corporations to reduce wasteful investment and to increase payouts while causing other C-corporations to increase productive investment via increased equity issuance (Chetty and Saez 2010). When dividing the sample by each of six firm characteristics (size, age, growth, profitability, cash, and debt), I find no relationship between the subgroups that increased payouts the most and those that increased equity issuance the least. Thus I do not find evidence in favor of this efficiency-enhancing channel.

This paper complements a large empirical literature that has found substantial real effects of other fiscal policies. Temporary countercyclical policies such as accelerated investment

depreciation (House and Shapiro 2008), personal income tax rebates (Johnson, Parker, and Souleles 2006), and temporary durable goods subsidies (Mian and Sufi 2012) have increased at least some component of aggregate spending. Many studies have shown that labor income taxes reduce labor supply (see Chetty 2012 for a recent review); Q-theory-based regressions suggest that corporate income taxes reduce investment (Cummins, Hassett, and Hubbard 1994); and the pooled effect on near-term output of labor income, capital income, and other tax reforms since World War II was substantial (Romer and Romer 2010). This paper contributes to this literature by documenting that in contrast to numerous other fiscal policies, the 2003 dividend tax cut—one of the largest changes ever in a U.S. capital income tax rate—had no detectable near-term impact on the real outcomes it was intended to improve.

The null result relates to theory and to alternative dividend tax reforms. Economically, the null result rejects the joint hypothesis that the tax cut substantially reduced firms' cost of capital as in traditional models and that investment responded to the cost of capital as much as leading estimates predict. In particular, combining the leading traditional model of dividend taxation (Poterba and Summers 1985) with consensus estimates of the cost-of-capital elasticity of investment (Hassett and Hubbard 2002) would predict a dividend tax elasticity of investment range of 0.21 to 0.41—at least 2.5 times the 95% confidence upper bound of this paper's empirical estimate.

The null result accords instead with the leading class of alternative models in which marginal investments are typically funded out of retained earnings and riskless debt rather than out of newly issued equity or risky debt (King 1977; Auerbach 1979; Bradford 1981). The key mechanism is that a C-corporation's earnings will eventually be subject to dividend taxes regardless of the decision to pay current earnings out to shareholders or to retain them for re-investment within the corporation, and interest payments on bonds are never subject to dividend taxes, so the cost of capital is mostly invariant to the dividend tax rate.

Traditional models of dividend taxation can nevertheless explain the null result as due to particular features of this dividend tax cut and other tax rates, as detailed in Section VI. A bottom line from that discussion is that even in that case, it may be difficult for policymakers to implement an alternative dividend tax cut that substantially increases near-term investment. For example, the 2003 dividend tax cut carried a default expiration date, and it is possible that a permanent dividend tax cut would have substantially increased investment. However,

the United States has never committed to a near-term or long-term path for tax policy so the required longevity may be infeasible to guarantee: the 2003 dividend tax cut has outlasted many tax reforms that had no expiration date, and a majority of G7 countries have revised their dividend tax rates up or down substantially since 2003.

The corporate finance literature on the 2003 dividend tax cut has focused on whether the post-2003 increase in dividend payouts from public corporations (Chetty and Saez 2005) represented an increase in total corporate payouts or was offset by an equal reduction in share buybacks (Brown, Liang, and Weisbenner 2007; Blouin, Raedy, and Shackelford 2011; Edgerton 2012). This paper is the first to show that the tax cut indeed increased total corporate payouts—a finding again made possible by the S-corporation control group because, like investment, share buybacks are very procyclical.

The remainder of this paper is organized as follows. Section II describes the 2003 dividend tax cut and the distinction between C- and S-corporations. Section III introduces the tax data. Section IV estimates real effects of the 2003 dividend tax cut. Section V validates the design and salience empirically by analyzing payouts. Section VI details economic and policy implications. Section VII evaluates evidence on potential reallocation of investment. Section VIII concludes.

II C- vs. S-Corporations and the 2003 Tax Reform

II.A C- vs. S-Status

After filing incorporation documents at the state level, U.S. corporations elect either "C" or "S" status for federal tax purposes. C-corporations pay the corporate income tax on annual taxable income, and U.S. shareholders pay dividend taxes on dividends and pay capital gains taxes on qualified share buybacks. S-corporations—named after their subchapter of the Internal Revenue Code—have the same legal structure as C-corporations but for tax purposes are flow-through entities that do not pay an entity-level income tax. Instead, taxable income flows through *pro rata* to individual shareholders' tax returns and is taxed as ordinary income in the year it is earned, regardless of whether the income is actually distributed to shareholders that year. When distributed, S-corporation dividends are untaxed.[5]

[5]The tax treatment of C- and S-corporations differ in other, smaller ways. For example, C-corporations can deduct charitable deductions up to only 10% of taxable income whereas S-corporations face limits at the

S-status typically confers tax advantages (detailed in the next subsection), but not all corporations qualify for S-status. The most important restrictions are that the corporation must have no more than 100 shareholders, all shareholders must be U.S. citizens or residents and not business entities, and the corporation must have only one class of stock. Thus all public corporations, corporations financed with venture capital, corporations partially or wholly owned by private equity or other firms, corporations that widely use stock-based compensation, and corporations that use stock classes to divide ownership from control cannot be S-corporations. Despite these restrictions some very large corporations are publicly-known S-corporations such as Fidelity Investments.[6] Corporations can switch status and I account for this in the analysis below, though consecutively switching back and forth is restricted by law and switching is rare empirically.

Except for the very largest corporations which are all publicly traded and are thus C-corporations, C- and S-corporations of the same ages compete in the same narrow industries and at the same scales across the United States. For example, Online Appendix Figure 1a uses data from the full population of U.S. corporate tax returns to plot the distribution of C- and S-corporations by 1-digit NAICS classification for all 396,956 corporations in 2002 that satisfy the size and industry restrictions on this paper, detailed in Section III.B.[7] The figure shows that C- and S-corporations are relatively evenly distributed across major industries. Zeroing in on the 23,891 corporations in the most-common 3-digit NAICS classification (wholesale durable goods trade), Online Appendix Figure 1b shows the even distribution of C- and S-corporations across narrow 4-digit industries. Online Appendix Figure 1c similarly shows substantial overlap in the distribution of firm size. Online Appendix Figure 1d uses entirely public data on two large corporations (Home Depot and Menard Inc., respectively the country's largest and third-largest home improvement retailers) to illustrate a specific example of C- and S-corporations competing in the same narrow industry and in the same locale (the Chicago metropolitan area).

C- and S-corporations differ along some notable dimensions. For example, C-corporations

individual shareholder level. S-corporations are taxed similarly to partnerships; relative to partnerships which were not analyzed for this paper, S-corporations may be a more appropriate control group for C-corporations because, aside from taxes, C- and S-corporations have identical legal rights and responsibilities.

[6] Tax data were not used in any way to acquire or confirm Fidelity's tax status; this information was obtained instead from a recent press report: http://www.boston.com/business/markets/articles/2007/11/03/fidelity_changes_its_corporate_structure.

[7] These unedited population data lack many of the variables necessary for this paper's analysis including the key outcome of investment and so are used only for Online Appendix Figures 1a-1c.

tend to be more asset-intensive and less-profitable than S-corporations after controlling for revenue and industry. Nevertheless, the substantial overlap demonstrated in Online Appendix Figure 1—and below in Figure 1 and Table 1 for the main analysis sample—by industry and size suggests that even if the corporation types differ in the *level* of outcomes, they may share *common trends* because they share any time-varying industry and firm-size shocks. Common trends is the condition required for identification below. Later, I demonstrate empirically that C- and S-corporation outcomes indeed trended similarly before 2003.

II.B The 2003 Tax Reform

On May 28, 2003, President George W. Bush signed into law the Jobs and Growth Tax Relief Reconciliation Act of 2003. The main provision relevant for this paper's analysis is the reduction in the marginal federal dividend income tax rate from 38.6% to 15% for the recipients of most taxable dividends.[8] President Bush proposed the reform on January 7, 2003; it applied retroactively to January 1, 2003; and the dividend tax proposal appears to have been largely unanticipated (Auerbach and Hassett 2007). As the name of the law ("Jobs and Growth") and the paper's introductory quotes from President Bush indicate, the tax cut was explicitly intended to affect real economic outcomes beginning in the near-term.

The tax reform changed three other relevant provisions. It reduced the top capital gains tax rate (the rate assessed on income earned from share buybacks) from 20% to 15%. It instituted temporary accelerated depreciation for equipment investment through 2004, which applied nearly identically to C- and S-corporations.[9] And it accelerated the already-legislated phase-in of reductions in ordinary income tax rates, such as immediately reducing the top rate from 38.6% to 35% rather than waiting for it to fall to 37.6% in 2004 and 35% in 2006. S-corporation income (as well as dividend income until 2003) is taxed as ordinary income, but

[8] The tax reform reduced the marginal tax rate on qualified (i.e. from U.S. or tax-treaty-qualifying foreign corporation stock held for at least sixty days) and taxable (i.e. not from S-corporations or accrued to tax-preferred accounts) dividends for individual taxpayers in the top four ordinary income tax brackets from 27%, 30%, 35%, and 38.6% to 15%, and for taxpayers in the bottom two ordinary income tax brackets from 10% or 15% to 5%. Most taxable dividends accrue to taxpayers in the top ordinary income tax bracket and approximately 90% accrue to taxpayers in the top four. The tax reform did not change the tax treatment of dividends recevied by individuals in tax-favored savings accounts or by nonprofit, corporate, or government entities.

[9] The exception is that owners of S-corporations with current losses could deduct the depreciation allowances from any current wage or other ordinary income on their 1040's, while C-corporations must carry forward the tax benefit to future years' profit. Thus, the 2003 tax reform could in principle have benefited low-profit S-corporations relative to low-profit C-corporations. However, the negative point estimate in Table 3 column 1 row 4 (discussed in Section IV.C) suggests that this was not a relevant confound.

because the small reduction in ordinary income tax rates was merely an acceleration, I make the simplification of considering S-corporation income tax rates to have been unaffected.[10] The tax reform did not change the corporate income tax schedule.

The 2003 dividend tax cut was originally legislated to expire in 2009 but was extended to 2013 and has now been made "permanent" (i.e. with no default expiration date) in nearly its original form. In late 2005 Congress proposed to extend the tax cut until 2011, and President Bush signed it into law in May 2006.[11] In 2010, Congress and President Barack Obama extended it again until 2013. In the first days of 2013, President Obama signed into law a permanent extension of the tax cut for all individuals with taxable income below $400,000 and married couples with taxable income below $450,000, as well as a permanent marginal dividend tax rate of 20% for taxpayers with taxable income above these thresholds. In Section VI.B, I discuss the possible implications of the original default expiration dates.

The OECD (2012) reports that when considering federal and average state tax rates, the 2003 tax reform reduced the top statutory dividend tax rate from 44.7% to 20.8%. In the empirical analysis below, I report elasticities with respect to one minus this top statutory rate. One minus the dividend tax rate is the relevant entity for parameterizing traditional models as I illustrate in Section VI. The vast majority of taxable dividend income accrues to households in the top tax bracket. Shares of private corporations (the focus of this paper) are unlikely to be held by dividend-tax-exempt investors like pension funds or by taxpayers in the lowest dividend tax brackets (whose accounts would likely typically hold public stock). And unlike public company share buybacks, private corporation share buybacks are typically taxed as dividends rather than capital gains (and indeed share buybacks are uncommon in my sample).[12] Readers can apply their own assumed tax change to the raw estimates as they see fit; for example, one could assume that private C-corporation dividends faced the average taxable dividend tax rates for the total U.S. economy, which Poterba (2004) reports fell from approximately 32.1% to 18.5%.

[10] The reduction in ordinary income tax rates was legislated in 2001; as is visually apparent in Figure 2 below, there is no trend break in S-corporation outcomes after 2001.

[11] This law also lowered the bottom dividend tax rate from 5% to 0% beginning in 2008 and was set to expire in 2011 but never did before being made permanent in 2013.

[12] IRS rules require a share buyback to materially change ownership in order to qualify as a capital gain. This may is easier to do with dispersed shareholders who trade their stock in public markets than it is for concentrated shareholders who do not.

III Data

III.A SOI Sample of U.S. Corporate Income Tax Returns

This paper uses a large stratified random sample of U.S. corporate income tax returns from years 1996-2008. Each year the Internal Revenue Service (IRS) Statistics of Income (SOI) division randomly samples corporate income tax returns, edits many variables for accuracy and consistency, and uses them to publish aggregate statistics. The sampling percentages are a function of assets and a measure of net income; corporations with at least $50 million in assets are sampled with probability one and progressively smaller corporations are sampled at progressively smaller rates. Corporations sampled in one year are typically though not always sampled in subsequent years, so the SOI sample constitutes an unbalanced panel.[13] The fine reweighting I detail in subsection E accounts for any differential changes over time in the sampling percentages.

The SOI sample has three key advantages relative to the commonly-used COMPUSTAT database on corporations: it contains data on both C-corporations and S-corporations, it contains data on many young corporations, and it has a much larger sample size even of relatively large corporations. As detailed below, this paper focuses on corporations with between $1 million and $1 billion in assets. Most Compustat corporations fall in this asset range but the SOI sample has contains observations on many more such firms, including in the range $500 million to $1 billion.

III.B Analysis Sample

This paper focuses on corporations in the SOI sample with between $1 million and $1 billion in assets (approximately the 90^{th} and 99.9^{th} percentiles of the U.S. corporation size distribution) and with revenue between $0.5 million and $1.5 billion (i.e. within 50% of either asset threshold) in 2010 dollars, for three reasons. The $1 million lower bound restricts attention to corporations operating at substantial scale and lies comfortably above a reporting threshold that restricts the information available on small corporations.[14] Almost all of the very largest corporations

[13] The sampling is done using a deterministic function of the last four digits of the corporation's employer identification number, so corporations sampled in one year are usually sampled the next as well.

[14] The asset threshold required for reporting detailed balance sheet information has grown over time from $25,000 to $250,000. The $1 million threshold allows corporations to shrink substantially without losing information on them.

are publicly traded and are therefore C-corporations, so the $1 billion upper bound ensures substantial overlap between C- and S-corporations across size bins. And corporations in this size range are quantitatively important: based on the latest data from the Census Bureau, firms in this size range employ over half of all U.S. private sector workers.[15]

The main analysis sample is an unbalanced panel of corporations constructed from the SOI samples. The unbalanced panel includes a corporation's year t tax return if the corporation: (a) had assets in the range $1 million to $1 billion and revenue in the range $0.5 million to $1.5 billion on average between years t-2 and t-1 (so that lagged values can be used for scaling and as regression controls); (b) was private at least until year t-1 (since all S-corporations are private); and (c)—as restricted in earlier work on the 2003 dividend tax cut (Chetty and Saez 2005)—is not a financial company (whose main productive assets are typically not tangible capital) or a utility company (to which unique regulations apply). I further discard any tax returns in which the filing months of consecutive tax years indicate that the tax return did not cover a full twelve month period.

I use the unbalanced panel for all main results due to its simplicity and inclusiveness. However, it has the potential disadvantage of a changing composition over time. I therefore repeat all analyses using a balanced panel constructed similarly to the unbalanced panel except that it includes the same corporations in every year. The balanced panel comprises annual observations on corporations that: (a) filed tax returns in all years 1996-2008; (b) had assets in the range $1 million to $1 billion and revenue in the range $0.5 million to $1.5 billion average over years 1996-1997; (c) were private through 1997; and (d) are outside the financial and utilities industries. As I describe in Section IV.B, the balanced panel allows me to conduct the regression analysis such that the outcome of interest is the only firm-level variable changing from year to year. However, the balanced panel carries the obvious drawbacks of omitting corporations that are young in the post-2003 era and of requiring survival through 2008.

[15] Corporate income tax returns do not include employment. In the most recent Census Bureau release with employment statistics by firm revenue, 45.2% of private sector employees were employed by firms with between $500,000 and $100 million in revenue (http://www.census.gov/econ/susb/data/susb2007.html). Employment at firms with revenue between $100 million and $1.5 billion is not reported separately. When applying Census employment ratios to either the number of IRS corporations or to the total revenue of IRS corporations with between $100 million to $1.5 billion in revenue, I estimate that an additional 5.3% to 18.5% of private sector employees are employed at firms with between $100 million and $1.5 billion in revenue.

III.C Variable Definitions

The SOI data contain the variables necessary for this paper's analysis: assets, revenue, investment, tangible capital assets, net investment, employee compensation, dividends, total payouts to shareholders, equity issued, profit margin, cash, debt, NAICS industry classification, and age. All variables are constructed from annual corporate income tax returns filed by the corporation. This section defines variables in economic terms; Online Appendix A defines them in terms of line items on tax forms.

C-corporations file the corporate income tax Form 1120 and S-corporations file the similar Form 1120S. Year t refers to the corporation's tax filing that covered July of calendar year t. Each observation's C- vs. S-status is defined as of its filing in year t-2; this means, for example, that a spike in C-corporation payouts in 2003 refers to corporations that filed a Form 1120 in 2001. Results are insensitive to this choice.

Investment equals the purchase price of all newly installed capital assets logged on Form 4562, filed alongside the corporate income tax return in order to claim depreciation deductions. The U.S. tax code permits a corporation to deduct the purchase price of newly acquired capital assets (i.e. both new and used capital assets as long as they are new to the corporation) from its taxable income. The corporation typically cannot deduct the entire amount immediately and instead must make a sequence of depreciation deductions over several years, computed each year using Form 4562. To a close approximation, investment eligible for depreciation comprises the same capital goods included in NIPA private fixed non-residential investment statistics; see House and Shapiro (2008), Kitchen and Knittel (2011), and IRS Publication 946 for more details.[16]

Tangible capital assets (shortened to "capital" in table headings) equals the book value of all tangible (e.g. excluding patents) capital assets owned by corporation at the end of the tax year, net of accumulated book depreciation. I compute net investment as the annual dollar change in tangible capital assets, which equals new tangible investment less tangible capital asset

[16]Kitchen and Knittel (2011) demonstrate that SOI Form 4562 aggregates approximate NIPA investment statistics. Software, equipment, and structures are included; land and depletable assets (e.g. oil deposits) are not. New purchases of patents and certain other intangible assets can be logged as new investment. If the investment purchase is only partially used by the firm, only a portion is logged as new investment on Form 4562. U.S.-based corporations with foreign operations typically establish wholly-owned foreign entities that are regarded as separate entities; property placed into service in separate entities do not appear on Form 4562 and are thus excluded from my investment measure.

retirements and accumulated book depreciation. Employee compensation equals the sum of wages and salaries paid to non-officer employees, payments for employee benefit programs (e.g. health insurance), and contributions to pension or employee-profit-sharing plan contributions.

Dividends equals the sum of cash and property distributions to shareholders. Total payouts to shareholders (sometimes shortened to "payouts") equals dividends plus share buybacks—where share buybacks are defined as non-negative annual dollar changes in treasury stock, the primary method used in Blouin, Raedy, and Shackelford (2007), Skinner (2008), and Edgerton (2012). Equity issued equals non-negative annual changes in total paid-in capital.

Assets equals total book assets. Revenue equals operating revenue. I use tax fields to define operating profit margin (sometimes shortened to "profit margin") homogeneously for C-corporations and S-corporations. Operating profit margin equals operating revenue less cost of goods sold and all components of total deductions except interest, depreciation, domestic production activities, and officer compensation deductions.[17] Cash equals the sum of all liquid current assets. Debt equals the sum of all non-equity liabilities. For each corporation, 2-digit NAICS classification equals the first two digits of the 6-digit NAICS classification code reported on the corporate income tax return observed for each corporation that was filed nearest to 2003. There are nineteen valid 2-digit NAICS classifications. Age is defined similarly, using the date incorporation field reported on the return filed nearest to 2003.

III.D Summary Statistics

Table 1 displays summary statistics for the main analysis sample (the unbalanced panel) by C- and S-status. All values are annual and all monetary amounts are in 2010 dollars. The sample comprises 332,225 annual observations on 43,958 C-corporations and 137,546 annual observations on 32,090 S-corporations. The average observation has lagged revenue of $72 million, investment of $2.1 million, and employee compensation of $12 million. The S-corporation sample contains on average larger corporations of approximately the same ages. Figure 1 shows that there is substantial overlap across C- and S-corporations by industry and size; in the next subsection, I explain how I flexibly account for any differences along these dimensions. The size distribution of corporations is right-skewed, reflecting the right-skewness of the population firm

[17] I exclude interest, depreciation, and domestic production activities deductions because they are not operating costs. I exclude officer compensation because private corporations may have leeway in the timing and form of compensating owner-managers.

size distribution. Fewer than 4% of firms ever switched between C and S status.

III.E Weighting and Winsorizing

I weight observations in two ways. First, I weight each observation according to its revenue, averaged over the previous two lags. Thus each observation contributes to all graphs and regression estimates according to its economic scale, making the parameter estimates "dollar-weighted" in this sense.

Second, Figure 1 shows substantial balance between C-corporations and S-corporations across industry and firm size categories. However, the industry and firm size distributions are not identical, and an important concern is that time-varying shocks to specific industries or firm sizes could confound the difference-in-differences below. For example, the S-corporation sample has a slightly greater share of large construction firms than the C-corporation sample; a post-2003 demand shock that caused large construction firms to increase investment could therefore bias the results. I control for industry fixed effects and firm size quartics in every graph and regression, but I additionally control for any such time-varying shocks more finely and less parametrically using the reweighting method of DiNardo, Fortin, and Lemieux (1996) that is commonly used in labor economics when data sets are large enough to support it.

Specifically, after initially weighting observations by their lagged revenue, I bin each corporation into one of 190 (= 19 two-digit industries $\times$ 10 within-industry size deciles) bins according to the within-industry size-decile distribution of C-corporations in 2002. Then within each corporation type and year, I inflate or deflate each bin's weight so that each bin carries the same relative weight as the 2002 distribution of C-corporations. This ensures, for example, that time-varying shocks to large construction firms will not influence the results because large construction firms will contribute to the results equally for each corporation type and in every year. See Online Appendix B for the formula for each observation's final weight. Empirically, this reweighting turns out to be a careful precaution that makes little difference in most specifications, perhaps unsurprisingly given the industry and size balance across C- and S-corporations illustrated in Figure 1.[18]

Finally and except for the lagged revenue control (which has no outliers due to the sample

[18] When not reweighting, effects on investment and employee compensation remain statistically insignificant with 95% confidence elasticity upper bounds of 0.10 and 0.05, respectively—very close to the respective upper bounds of 0.08 and 0.04 reported below in Section IV and Table 2.

restrictions), I winsorize (top-code) most values—both scaled outcomes (e.g. investment divided by lagged tangible capital assets) and controls (e.g. revenue growth)—at the 95^{th} percentile unless otherwise specified. By "winsorize", I mean that any observations with values above the 95^{th} percentile are assigned the 95^{th} percentile value. Winsorizing is standard practice in corporate finance and labor economics in order to remove the influence of data coding errors, which are occasionally present even in the edited SOI samples. Moreover even when data errors are absent, the distribution of corporate outcomes can be very skewed; in such cases, winsorizing can be optimal when estimating means in finite samples as one trades off bias with minimizing mean squared error (Rivest 1994).

I carefully winsorize observations differently for the time series graphs of Figure 2 than I do for the regressions. The graphs are intended to illustrate how investment and other outcomes change year-by-year and especially around the passage of the 2003 dividend tax cut; thus for the graphs, I do not allow the winsorization percentiles to vary over time and in particular use the pre-2003 distribution of the outcome to compute winsorization levels. However, as will be evident in the payouts graph, the distribution of the outcome can shift over time; thus for the regressions, I winsorize pre-2003 observations using the pre-2003 distribution of the outcome and I winsorize 2003-and-beyond observations using the 2003-and-beyond distribution of the outcome. In each case, I compute percentiles separately for C-corporations and S-corporations to account for level differences in the outcome. When I use only the pre-2003 distribution to winsorize, all qualitative results remain unchanged but the payouts effect size is approximately two-thirds as large and still very statistically significant.

IV Effect on Investment and Employee Compensation

I first test whether the 2003 dividend tax cut caused C-corporations to increase investment—a key real behavioral response suggested by policymakers and by economic theory. I begin by presenting visual evidence and regression estimates of the effect of the tax cut on investment. I then present extensive robustness checks, tests for effects on employee compensation, and heterogeneity analyses.

IV.A Investment

Figure 2a plots the time series of mean investment for C-corporations and S-corporations in the unbalanced panel, net of a rich set of controls as done in Chetty et al. (2011). As is standard in corporate finance, I first scale each corporation's annual investment by its lagged tangible capital assets and top-code observations at the 95^{th} percentile as described in Section III.E. Then within each year, I regress scaled investment on a C-corporation indicator and this paper's standard set of controls: indicators for two-digit NAICS industry classification and quartics in age, lagged revenue, lagged profit margin, and revenue growth from the second to the first lag.[19] I then construct the two series shown in the figure by setting each year's difference between the two lines equal to that year's regression coefficient on the C-corporation indicator and setting the weighted average of that year's data points equal to the year's sample average. To be concrete, the 2002 C-corporation data point indicates that the average C-corporation in 2002 invested \$0.21 per dollar of its lagged capital assets, net of controls.

The figure shows that the time series of C-corporation investment tracked the time series of S-corporation investment closely in the several years before 2003, suggesting that the two time series would have continued to track each other in the absence of the 2003 dividend tax cut. The two series in fact continued to track each other after 2003, suggesting that the tax cut had little or no effect on C-corporation investment.

Table 2 formalizes this visual evidence by reporting estimates of the following difference-in-differences (DD) regression that uses the same definitions, scaling, and controls underlying the figure:

$$(1) \quad INVESTMENT_{it} = \alpha_1 CCORP_{i,t-2} + \alpha_2 CCORP_{i,t-2} \times POST_t + \mathbf{X}_{i,t-2}\boldsymbol{\beta} + \mathbf{YEAR}_t\boldsymbol{\gamma}$$

where $INVESTMENT_{it}$ denotes scaled payouts for firm i in a year t between 1998 and 2008 and $CCORP_{it-2}$ denotes an indicator for whether firm i was a C-corporation in t-2, $POST_t$ denotes an indicator for year t being 2003 or later, $\mathbf{X}_{it-2}$ denotes a possibly empty vector of lagged firm controls, and $\mathbf{YEAR}_t$ denotes a vector of year fixed effects. The coefficient α_2 represents the mean effect of the tax cut on annual C-corporation investment and is my statistic of interest. Standard errors clustered by firm are reported below each estimate.

[19] "Lagged" denotes "averaged over the previous two lags".

Column 2 of Table 2 reports that when controlling for the full set of controls used in the graph, the 2003 dividend tax cut is estimated to have had an insignificantly negative effect on C-corporation investment: a change of −$0.0001 per dollar of lagged tangible capital assets with a standard error of $0.0043, relative to a pre-2003 mean of $0.2429 and standard deviation of $0.2514. The 2003 dividend tax cut reduced the top statutory dividend tax rate from 44.7% to 20.8% (see Section II.B), so these estimates imply an elasticity of investment with respect to one minus the top statutory dividend tax rate of 0.00 with a 95% confidence interval of −0.08 to 0.08.[20] The confidence interval in standard-deviation terms is −0.03 to 0.03. Column 1 reports similar estimates when omitting the firm-level controls.

IV.B Robustness

I conduct several robustness checks. First, columns 4-5 of Table 2 replicate columns 1-2 when top-coding at the 99^{th} percentile. Second, Online Appendix Table 1 replicates Table 2 while allowing for differential pre-2003 trends.[21] Third, Online Appendix Table 2 replicates Table 2 when scaling investment by lagged revenue. Online Appendix Table 3 replicates Table 2, restricted to years 1998-2004 in order to omit years in which the controls and scaling variable use potentially endogenous post-2003 values. All report more negative point estimates than Table 2, with 95% confidence upper bounds (unadjusted for multiple hypothesis testing) closer to or below zero.

Additionally, I replicate the analysis in the balanced panel of corporations; this sample comes at the obvious cost of omitting corporations that are young in the post-2003 era and requiring survival through 2008, but it permits regressions in which the only firm-level characteristic changing from year to year is investment. Column 3 of Table 2 reports results from estimating equation (1) in the balanced panel, with three changes relative to column 2: each corporation's C- vs. S-status is defined as of 1996, each corporation's annual investment value is scaled by its mean tangible capital assets over years 1996-1997, and I replace the lagged firm-level controls

[20] The elasticity is computed as the percent change in C-corporation investment divided by the percent change in one-minus-the-tax-rate: $(\hat{\alpha}_2/\overline{investment})/(.239/.553)$, where $\overline{investment}$ equals mean pre-2003 C-corporation investment and is reported in Table 2. The elasticity bounds are computed similarly, replacing $\hat{\alpha}_2$ in the above formula with $\hat{\alpha}_2$ plus or minus 1.96 times the standard error.

[21] For this table, I estimate: $INVESTMENT_{it} = \alpha_1 CCORP_{i,t-2} + \alpha_2 CCORP_{i,t-2} \times POST_t + \alpha_3 CCORP_{i,t-2} \times t + \alpha_4 CCORP_{i,t} \times POST_t \times t + \mathbf{X}_{i,t-2}\boldsymbol{\beta} + \mathbf{YEAR}_t\boldsymbol{\gamma}$. I report the effect of the tax cut on investment averaged across the post-period, equal in this regression to $\alpha_2 + 2005.5\alpha_4$ since 2005.5 is the mid-point of the post-period.

with firm fixed effects. The resulting estimate is negative and statistically insignificant.

Finally, Figure 2b replicates Figure 2a for the related outcome of net investment, equal to the real annual dollar change in the corporation's stock of tangible capital assets as reported on the balance sheet. Arithmetically, net investment equals investment less tangible capital asset retirements and book depreciation. The figure shows no relative change in C-corporation net investment after the 2003 tax cut. Columns 7-9 of Table 2 repeat the specifications underlying columns 1-3 for the net investment outcome. The unbalanced panel point estimates are positive while the balanced panel point estimate is negative, and none is statistically significantly different from zero.[22] Online Appendix Tables 1-3 repeat these analyses using the same alternative specifications described above for investment, with similar results.

IV.C Employee Compensation

Figure 2c replicates Figure 2a for the outcome of employee compensation. Each firm's level of employee compensation is scaled by lagged revenue; trends are less stable when scaling by tangible capital assets, but Online Appendix Table 2 shows that the results are robust to scaling by tangible capital assets instead. The figure shows no relative change in C-corporation employee compensation after 2003.[23]

Columns 10-12 of Table 2 repeat the specifications underlying columns 1-3 for the employee compensation outcome. Column 11 lists the results from equation (1) using the set of lagged controls. The point estimate is a change of −\$0.0012 per dollar of lagged revenue with a standard error of \$0.0020, relative to a pre-2003 mean of \$0.1648 and standard deviation of \$0.1415. This corresponds to an elasticity of −0.02 with 95% confidence interval of −0.07 to 0.04. The confidence interval in standard-deviation terms is −0.04 to 0.02. The balanced panel point estimate is positive but is similarly not statistically significantly different from zero. Online Appendix Tables 1-3 repeat these analyses using the same alternative specifications described above for investment and with similar results.

[22] Elasticity confidence intervals for net investment are larger than those for investment because the base level of net investment is closer to zero than the base level of investment. Standard-deviation confidence intervals are similar.

[23] Note that the downward trend in scaled employee compensation after 2005 is due in part to rising lagged revenue (the scaling variable).

IV.D Heterogeneity Analysis

Although the above results indicate no statistically significant impact of the divided tax cut on C-corporation investment, it is possible that this overall result obscures a particular spike in investment at, for example, large C-corporations relative to small C-corporations. To investigate this in a compact way, I estimate six triple-difference regressions, one for each of six prominent firm-level traits: firm size (lagged revenue), age, revenue growth, lagged profitability, lagged cash (liquid assets as a fraction of total assets), and lagged leverage (debt as a fraction of total assets).[24]

In order to avoid strong parametric assumptions such as whether these traits should enter the regressions linearly or in logs, I divide corporations along these traits by their ranks. To explain the general procedure, consider the example of firm size. For each corporation i and year t, I first compute the corporation's mean lagged revenue. I then compute the 20^{th} and 80^{th} percentiles of the pooled C-corporation distribution, drop all corporations in the middle quintiles (between the 20^{th} and 80^{th} percentiles), and define an indicator equal to one if and only if the corporation's mean lagged revenue lies in the top quintile (above the 80^{th} percentile). I then estimate the triple-difference analogue of equation (1):

$$\begin{aligned}(2) INVESTMENT_{it} &= \alpha_1 CCORP_{i,t-2} + \alpha_2 CCORP_{i,t-2} \times POST_t + \alpha_3 TRAIT_{i,t-2} \\ &\quad + \alpha_4 CCORP_{i,t-2} \times TRAIT_{i,t-2} + \alpha_5 TRAIT_{i,t-2} \times POST_t \\ &\quad + \alpha_6 CCORP_{i,t-2} \times TRAIT_{i,t-2} \times POST_t + \mathbf{X}_{i,t-2}\boldsymbol{\beta} + \mathbf{YEAR}_t\boldsymbol{\gamma}\end{aligned}$$

where $TRAIT_{i,t-2}$ is the top-quintile indicator defined above, $\mathbf{X}_{i,t-2}$ denotes the vector of lagged firm characteristics used in column 2 of Table 2, and all other variables retain the definitions used above. The triple-difference coefficient α_6 represents the quantity of interest: the effect of the 2003 dividend tax cut on large C-corporations relative to small C-corporations and relative to S-corporations.[25]

Columns 1-3 of Table 3 reports the results for investment, net investment, and employee compensation. Each cell reports the point estimate of the triple-difference coefficient and its

[24] As before, "lagged" denotes "averaged over the previous two lags", and revenue growth is computed as revenue growth from the second to the first lag.

[25] Note that the coefficient on the uninteracted trait indicator (α_3) is not the coefficient of interest; hence, there is no need to omit from $\mathbf{X}_{i,t-2}$ the un-interacted quartics in age, lagged revenue, lagged profit margin, and revenue growth.

standard error from a separate regression in which the trait indicator is defined using the trait listed in the row heading. For example, the upper left cell indicates that large C-corporations increased investment by a statistically insignificant \$0.0110 per dollar of lagged tangible capital assets more than small C-corporations. All coefficients are small relative to the standard deviation of the outcome (displayed in Table 2 columns 2, 8, and 11, respectively) and are statistically insignificant even when not accounting for the large number of hypotheses being tested simultaneously.

IV.E External Validity

The above results are local to the sample and do not necessarily apply to public corporations and to corporations that were smaller or larger than the size range analyzed here. I therefore conduct two additional analyses to test for suggestive evidence of different out-of-sample results.

First, recall that public corporations were excluded from the main sample because all publicly-traded corporations are C-corporations and thus may have no reasonable S-corporation counterparts. I nevertheless repeat the regressions of Table 2 when including the 75% of public corporations matched to tax data that also satisfy this paper's firm size restrictions.[26] Note that public corporations are relatively large and that all regressions are weighted by firm size, so these new estimates disproportionately weight public C-corporations relative to others. Online Appendix Table 4 reports the results: the estimate on the main specification for each real outcome (columns 2, 8, and 11) is more negative than in Table 2 and remains statistically insignificant with a nearly unchanged upper bound.

In a second test, Figures 3a-c display heterogeneity in the main overall difference-in-differences effects on investment, net investment, and employee compensation, respectively, by firm size decile. The graph is constructed by computing the deciles of the pooled C-corporation distribution of lagged revenue, using them to divide all corporations into size deciles, estimating equation (1) within each decile using the full set of lagged controls, and plotting the resulting regression coefficients, 95% confidence intervals, and the best unweighted linear fit through the coefficients. Each graph's y-axis is centered at zero and has total height equal to one standard deviation of the outcome used in the regression (reported in columns 2, 8, and 11 of Table 2).

[26] Nearly all public corporations are large enough to be sampled by SOI with probability one. 31,406 public corporation firm-years were matched to the SOI data and satisfy the sample restrictions other than the size restriction. Of these, 23,664 survive the size restriction.

Each confidence interval is Bonferroni-adjusted for the fact that each graph tests multiple (ten) hypotheses; each interval would be 30% tighter if unadjusted.[27]

Figures 3a-c reveal three facts: no within-decile estimate is statistically significantly different from zero, each graph's cross-decile variance in point estimates is small relative to the standard deviation, and there is no upward or downward trend in any graph's point estimates. Hence if one were to extrapolate from these results, one would predict that the 2003 dividend tax cut had no real effects on C-corporations outside of this paper's size range. However, further research is necessary to support out-of-sample conclusions.

V Validation of Salience and the Empirical Design

The previous section documented robust zero effects of the 2003 dividend tax cut on C-corporation investment and employee compensation. Whenever an intervention is found to have had no significant impact, an important concern for interpretation is that perhaps the intervention was simply not salient or relevant. Salience is perhaps unlikely given the prominence and size of the 2003 dividend tax cut; more plausible is that unknown tax provisions neutralized the actual applicability of the tax cut. The dividend tax is assessed on dividend income, so I now test for an immediate impact of the dividend tax cut on dividends and on total payouts to shareholders (dividends plus share buybacks).

I focus on total payouts in the text and report the very similar dividend results in the appendix in order to allow the main results to speak to the unresolved academic debate on the effects of the 2003 dividend tax cut on total payouts. Chetty and Saez (2005) showed that the tax cut increased the dividends of publicly-traded corporations. However, subsequent papers have questioned the relevance of this behavior by arguing that planned buybacks may have simply been relabeled as dividends, leaving total payouts unchanged (Blouin, Raedy, and Shackelford 2007; Brown, Liang, and Weisbenner 2007; Edgerton 2012).

V.A Effect on Payouts

Figure 2d plots the time series of mean payouts to shareholders from C-corporations and S-corporations in the unbalanced panel. Each corporations's payouts value is scaled by its lagged

[27] That is, the t-statistic threshold for statistical significance at the 5% level is 2.81 rather than 1.96.

revenue in the spirit of Lintner (1956), though results are robust to this choice. The figure is then constructed exactly as in Figures 3a-c except for two differences. Because C-corporations pay taxes on annual corporate income at the entity level while S-corporation shareholders are liable for them at the shareholder level, S-corporations often pay higher levels of dividends (approximately ten times larger on average than C-corporations) to help shareholders cover these tax liabilities. Thus I account for level differences in pre-2003 scaled payouts by dividing firm i's scaled payouts in year t by the mean level of payouts for i's corporate type (C or S) in the pre-2003 period, essentially transforming the comparison into percentage terms.[28]

Second, I account for visually apparent differential pre-trends by de-trending each series; I show below that the main qualitative result does not depend on de-trending.[29] To be concrete, the 2002 C-corporation data point means that the average C-corporation in 2002 paid out 0.34 cents per dollar of its lagged revenue net of controls; the 1999 S-corporation data point corresponds to payouts equal to 3.2 cents per dollar of lagged revenue.

The figure shows that C-corporation and S-corporation payouts tracked each other in the five years before 2003, suggesting that in the absence of a tax change the two series would have continued to track each other after 2003. Then immediately after the dividend tax cut, C-corporation payouts spiked by 20% relative to S-corporation payouts and relative to the 2002 difference, and remained elevated above S-corporation payouts through the end of the sample.[30]

The first row of Table 4 columns 1-3 formalize this visual evidence by replicating columns 1-3 of Table 2 for the scaled payouts outcome; Table 4 columns 4-6 report estimates for analogous regressions that allow for differential pre-2003 trends (see footnote 21). To test for a statistically significant increase immediately in 2003, each column also reports coefficients from a separate regression that is analogous to the main specification (1) except that it replaces the post-period indicators with indicators for each post-period year. That is, I estimate:

$$(3) \quad PAYOUTS_{it} = \alpha_1 CCORP_{i,t-2} + \mathbf{X}_{i,t-2}\boldsymbol{\beta} + \mathbf{YEAR}_t\boldsymbol{\gamma} + \mathbf{CCORP}_{i,t-2}\times\mathbf{YEAR}_{i,t}\boldsymbol{\delta}$$

[28] It is *a priori* reasonable to expect C-corporation and S-corporation payouts to track each other in percentage terms because S-corporation income tax liabilities are approximately a flat percentage of income, and a large corporate finanace literature beginning with Lintner (1956) suggests that firms can be thought to pay out a set fraction of after-tax earnings.

[29] The C-corporation series has a slightly steeper downward trend, consistent with the well-documented twenty-year decline in dividend payments (Chetty and Saez 2005), combined with the fact that S-corporation dividends include payouts intended to cover tax payments that need not have been in secular decline.

[30] When not de-trending, the immediate spike in 2003 equals 16%.

where $\mathbf{CCORP}_{it-2} \times \mathbf{YEAR}_{it}$ is a vector of six indicators for each year $T \in \{2003, 2004, 2005, 2006, 2007, 2008\}$, each equal to one if and only if $t = T$ and corporation i was a C-corporation in year t-2.[31] The coefficient vector $\boldsymbol{\delta}$ contains the coefficients of interest: the effect of the tax cut on C-corporation payouts from the pre-period to each post-period year, net of the change in S-corporation payouts. For brevity, Table 4 reports only the estimates I discuss in the main text; see Online Appendix Tables 5 and 6 for full results for the payouts outcome and the dividends-only outcome, respectively.

Across all specifications and samples, I find a large and statistically significant effect on C-corporation payouts. Column 2 reports that in the unbalanced panel with the full set of controls, I estimate that the dividend tax cut caused an immediate 21.5% increase in C-corporation payouts in 2003, with a t-statistic over 5. The 2003 dividend tax cut reduced the top statutory dividend tax rate from 44.7% to 20.8% (see Section II.B), so this point estimate implies an elasticity of payouts with respect to one minus the top statutory dividend tax rate of 0.50 (reported in Online Appendix Table 5). The remaining columns report similar or larger estimates when considering all years, when de-trending, and in the balanced panel. Appendix Table 6 reports similar estimates for the outcome of dividends only. I conclude that the 2003 dividend tax cut was immediately salient and relevant to C-corporations.

V.B Compatibility of the Payouts and Investment Results

As the summary statistics of Table 1 show, corporations carry large cash balances and draw substantial credit from banks and suppliers, so an increase in financial flows to shareholders could represent a reshuffling of corporate claims with no effect on investment or other real behavior. However, standard models of dividend taxation abstract from cash and debt and assume that every dollar of increased payouts substitutes for a dollar of investment. Given the statistically significant payouts effect and null investment result, it is reasonable to ask whether the results distinguish between these possibilities.

The null investment result implies that the results do not reject zero displacement of investment. The standard error on the investment effect (Table 2 column 2) implies a 95% upper bound reduction in investment of $\$90,455$ per C-corporation, while the payouts response (Table

[31] Columns 4-6 of Table 4 report estimates when an additional term—$CCORP_{i,t-2} \times t$—is included in the regression in order to allow for differential pre-trends.

4 column 2) implies a payouts increase of $\$60,409$ per C-corporation; hence, the results also do not reject dollar-for-dollar displacement of investment. The indeterminacy derives from the fact that the payouts effect was large in *percentage* terms but was actually small in *dollar* terms relative to the mean and standard deviation of investment and other balance sheet flows, so it is not possible to determine which asset line item or items were displaced or which liability line item items adjusted to compensate. The main relevance of the payouts result for this paper is that it validates the empirical design and salience.

VI Economic Interpretation and Policy Implications

The previous sections documented that the 2003 dividend tax cut was immediately salient and relevant but had no detectable impact on investment or employee compensation. This section considers reasons for the null investment result and asks under what circumstances would future dividend tax cuts be expected to have large and positive real effects. I begin by noting that a near-zero dividend tax elasticity of investment implies either a small dividend tax elasticity of firms' cost of capital, or a small cost-of-capital elasticity of investment, or both. I then detail whether and why either elasticity would likely have been small and the implications for the real effects of future alternative dividend tax reforms. The section ends with a discussion of the payouts response.

VI.A Economic Interpretation

The prediction that a dividend tax cut can substantially increase investment derives from models that are referred to as representing the "traditional view" (Harberger 1962, 1966; Feldstein 1970; Poterba and Summers 1985). Traditional-view models feature permanent dividend tax cuts and firms that finance marginal investments with newly issued equity.[32] A dividend tax cut reduces firms' cost of capital because it reduces the taxes that must be paid when profits are distributed to shareholders; this induces firms to raise new investment funds and increase investment.

I now derive a quantitative traditional-view prediction for the elasticity of investment with respect to one minus the dividend tax rate ("the dividend tax elasticity of investment"). I do so by multiplying a traditional-view parameterization of the elasticity of the cost of capital with

[32] Similar qualitative predictions obtain when firms finance investment with risky debt, since debt holders often become equity holders after bankruptcy reorganization.

respect to one minus the dividend tax rate ("the dividend tax elasticity of the cost of capital") by empirical estimates of the elasticity of investment with respect to the cost of capital ("the cost-of-capital elasticity of investment").

Desai and Goolsbee (2004) parameterize the workhorse traditional model (Poterba and Summers 1985) as follows. A C-corporation faces a cost of capital equal to:

$$\frac{r}{(1-\tau_{inc})\left[(1-\tau_{div})p-(1-\tau_{acg})(1-p)\right]}$$

where r is the economy's rate of time preference, τ_{inc} is the corporate income tax rate, τ_{div} is the tax rate applied to dividends and other payouts,[33] p is the share of earnings paid out rather than retained, and τ_{acg} is the effective tax rate on accrued capital gains.[34] The effective tax rate on accrued capital gains represents a combination of future payouts (taxed at τ_{div}), future realized capital gains (taxed at the statutory capital gains tax rate), and bequests (taxed at the estate tax rate). Based on their reading of the literature, Desai and Goolsbee assume a payouts share of earnings equal to 0.5 and an effective tax rate on accrued capital gains equal to one-quarter of the top statutory rate.[35] Combining these parameters with the decrease in the top statutory dividend tax rate from 44.7% to 20.8% yields an elasticity of the cost of capital with respect to one minus the payout tax rate of -0.411.

Hassett and Hubbard (2002) summarize the recent empirical literature as reaching a consensus range for the cost-of-capital elasticity of investment of -0.5 to -1.0.[36] Multiplying these elasticities together, one obtains a predicted range of the dividend tax elasticity of investment of 0.21 to 0.41. These predicted elasticities are 2.5 to 5 times as large as this paper's estimated 95% confidence upper bound (0.08). Hence, either the consensus range for the cost-of-capital elasticity of investment or the parameterized tax elasticity of the cost of capital, or both, failed to materialize.

There is no obvious reason to believe that corporations would have been unusually unre-

[33] Most private C-corporation payouts are taxed at the dividend tax rate; see footnote 12.

[34] Poterba and Summers allow r to depend negatively on p so that an investor's required rate of return is lower for corporations that pay dividends, since regular dividends may have signalling or other intrinsic value. Dividend-paying private corporations tend to pay dividends frequently but in irregular amounts so I ignore this dependency here.

[35] The top statutory capital gains rate equals approximately the top dividend tax rate of 20.8%; it is quantitatively irrelevant whether one uses this value or a five-percentage-points-higher pre-2003 rate.

[36] The investment time horizon that these estimates are based on varies but an approximately three-year horizon is common.

sponsive to cost-of-capital changes in the 2003-2008 time period. Fixed costs to capital stock adjustment can mute investment responses to cost-of-capital changes (Caballero, Engel, and Haltiwanger 1995), but the 2003 dividend tax cut was passed at the end of a cyclical downturn in investment, so corporations are unlikely to have been particularly far from any positive investment thresholds. The short-run supply of capital assets may be inelastic (Goolsbee 1998), but this cannot explain the lack of a relative change (between C- and S-corporations) in investment expenditures (price times quantity, not just quantity).

There are at least three reasons that the true cost-of-capital elasticity of investment may be smaller than the above consensus. First, a large time series literature dating back to Eisner's (1969, 1970) responses to Hall and Jorgenson (1967) finds small cost-of-capital elasticities of investment, and the newer estimates that underlie the modern consensus range employ reasonable but difficult-to-verify structural assumptions (e.g. Caballero, Engel, and Haltiwanger 1995). Second, these newer estimates may reflect intertemporal substitution over short horizons (c.f. Caballero 1994 and Cummins, Hassett, and Hubbard 1994) that would apply, for example, to temporary investment subsidies but likely not to a dividend tax cut (see the next subsection for more discussion of time horizons). Third, there may be publication bias toward statistically significant empirical results (Card and Krueger 1995) and such bias could have led to the publication of erroneously large estimates.

Because this paper is fundamentally concerned with the effects of the dividend tax cut, I now take as given the Hassett-Hubbard consensus range for the cost-of-capital elasticity of investment and turn to reasons why the dividend tax elasticity of the cost of capital could have been small and the implications for the real effects of future alternative dividend tax cuts.

VI.B Policy Implications of a Small Cost-of-Capital Change

Explanations for why the large 2003 dividend tax cut could have caused a small reduction in the cost of capital fall into either of two lines of reasoning: *traditional-view models are the wrong models*, or *traditional-view models are correct but the above parameterization is wrong.* Each line of reasoning clarifies the circumstances under which future dividend tax cuts would be expected to substantially increase investment

(i) Wrong Model. The leading alternative to the traditional view—called the "new view" (also called the "trapped equity view"; King 1977; Auerbach 1979; Bradford 1981)—can explain

the null result on investment. New-view models feature firms with profits from pre-existing operations that are abundant enough to fund all profitable investment.[37] Because those pre-existing profits will inevitably be subject to dividend taxes (whether paid out immediately, or retained for investment and paid out in the future), the new view predicts that a permanent dividend tax cut does not affect the cost of capital and thus does not affect corporate investment.[38]

The policy implication of the new view is that dividend tax cuts typically do not reduce firms' cost of capital and thus are typically not useful tools for increasing investment. The exception would be if a dividend tax cut today signalled that dividend tax rates would fall even further in the future. This is possible, though the policy debate since 2003 has centered on keeping top dividend tax rates constant or raising them. The new view implies that reducing the dividend tax rate to a minimum conceivable rate could actually reduce investment because dividend tax rates could then only rise (Korinek and Stiglitz 2009).

(ii) Wrong Parameterization. An alternative explanation of the null investment result is that the traditional view correctly models firms' investment decisions and thus dividend tax cuts can substantially reduce firms' cost of capital and increase investment, even if the 2003 dividend tax cut in this sample did not. There are at least four distinct versions of this explanation. Considered together, the implication is that it may be difficult for policymakers to implement an alternative dividend tax cut that has substantially larger near-term effects.

First, the returns to new investment can take years to accrue in the form of higher profits that can be paid out to shareholders, and a dividend tax cut reduces the cost of capital for new investment only insofar as those payouts will be taxed at the new low rate. The 2003 dividend tax cut originally carried an expiration date of 2009 before being extended to 2013 and then being made permanent at nearly the full rate reduction (see Section II.B). It is therefore possible that a dividend tax cut with no initial default expiration date would have substantially reduced the cost of capital, even if the 2003 dividend tax cut did not.[39] In this case, it may be the case that modern democracies cannot guarantee the permanence necessary

[37] Access to riskless debt generates similar results because interest payments are not subject to dividend taxes.

[38] An anticipated dividend tax cut would induce a decline in investment before the tax cut, which Figure 2a suggests did not happen.

[39] That is, with respect to the parameterization, perhaps the assumed change in the dividend tax rate was too large.

for a dividend tax cut to substantially reduce firms' cost of capital and thus increase investment. For example, the Tax Reform Act of 1986 reduced the top personal income tax rate to 28% in 1988 with no default expiration date, but the rate was subsequently raised to 39.6% in 1993. Looking globally, a majority of the G7 economies (Japan, Italy, the United States, and the United Kingdom) substantially raised or lowered their top dividend tax rates in the last ten years.[40]

Second and despite stock price evidence that the tax cut was unanticipated (Auerbach and Hassett 2007), perhaps C-corporations had been expecting to enjoy low dividend taxes at some point in the future and thus had been investing at a permanently higher rate even before the tax cut.[41] Under this candidate explanation, a future dividend tax cut would increase investment only if its magnitude exceeded expectations or if it increased expectations of future cuts.

Third and although substantial corporate profits are subject to dividend taxation (about $300 billion in 2008), perhaps most profits from private C-corporations escape dividend taxation and are instead taxed as capital gains in corporate acquisitions, as bequests subject to the estate tax, or not at all through various capital income exclusions.[42] This would imply that a future dividend tax cut could substantially increase near-term investment if the dividend tax base were substantially broadened, such as by lowering the dividend tax rate relative to the capital gains rate. Historically, U.S. policymakers have kept tax rates on taxable dividend income weakly greater than those on taxable capital gains, perhaps because most Americans hold small amounts of their non-cash assets in stocks (Campbell 2006) and thus appear more receptive to low tax rates on capital gains.[43]

Fourth, perhaps the effect of the 2003 dividend tax cut was large but was concentrated among a few blockbuster start-ups (e.g. Facebook) that may have been particularly reliant on external

[40] Japan lowered its top rate from 43.6% to 10%; Italy raised its top rate from 12.5% to 20%; and the UK raised its top rate from 25% to 36% (OECD 2012). These figures include average sub-national top rates.

[41] That is, with respect to the parameterization, perhaps the assumed change in the dividend tax was again too large.

[42] That is, with respect to the parameterization, perhaps the assuemd value of p was too large. Payouts can escape taxes if they are distributed in the form of bequested corporate equity below the estate tax threshold, if the corporate equity is held in tax-favored investment accounts or by untaxed entities like pension funds (though this is unlikely for most private corporations), or if private C-corporations preparing to distribute earnings manage to meet S-status requirements and switch tax status (though switching is rare).

[43] All forms of capital income accrue very disproportionately to high-income Americans, but Republican lawmakers in 2003 explained that in contrast to cutting dividend taxes, "millions of Americans understand the power of cutting the tax on capital gains" making it "easier to understand and easier to sell" (http://www.nytimes.com/2003/05/08/us/as-bush-tax-plan-falters-conservatives-find-a-silver-lining.html).

financing.[44] Though this paper analyzes a substantially larger sample of corporations that are substantially younger than those in commonly-used datasets like COMPUSTAT, inference on such start-ups is fundamentally challenging because there are very few of them and because the counterfactual (e.g. perhaps not founding the company in the first place) is difficult to discern. This candidate explanation would suggest that the long-term effects of dividend tax cuts on the size of the U.S. capital stock may be large but that near-term effects may be small because U.S. production is not dominated by young firms.[45]

VI.C The Payouts Response

This paper is the first to document that the 2003 dividend tax cut increased total corporate payouts. This increase was small in dollar terms and may have been irrelevant for real outcomes (see Section V.B), but the effect is relevant for the study of finance and I now discuss its potential drivers and outline directions for future research.

Traditional-view models do not explain the payouts response.[46] A new-view explanation of the payouts response is that firms viewed the tax cut as temporary and thus engaged in intertemporal tax arbitrage by distributing payouts before tax rates rise (Korinek and Stiglitz 2009). This is plausible and not directly testable. The time series of payouts provide one reason to doubt this mechanism: Figure 2d and Table 4 show that payouts did not decline after 2004 when President Bush won reelection and his party won control of both houses of Congress, which likely reduced expectations of a near-term rise in dividend taxes and hence incentives for immediate tax arbitrage (Korinek and Stiglitz).[47] However, this test is not conclusive because expectations are not observable and various concerns may govern the timing of tax-arbitraging payouts.

Chetty and Saez (2010) show that the new view can explain the payouts increase as a permanent dividend tax cut causing dispersed shareholders to incur the monitoring costs necessary to prevent wasteful investment by managers. This too is possible, though such agency prob-

[44] That is, the parameterization was correct but only for a subset of corporations.

[45] For example and though many large companies acquire start-ups, ninety-nine of the one hundred most valuable publicly-traded companies in the United States were founded before 2003.

[46] The traditional-view model of Poterba and Summers (1985) allows for a dividend tax cut to immediately increase payouts (and investment) when payouts such as regular dividends carry signalling value. This is unlikely to be relevant for the private corporations studied here.

[47] The 2004 Democratic presidential challenger John Kerry pledged to repeal the tax cut for high-income Americans and at one point was the front-runner according to betting markets (Auerbach and Hassett 2007).

lems would be expected to be least severe among private corporations, whose shareholders are typically concentrated.

Three under-emphasized mechanisms may instead explain the payouts response. First, the dividend tax cut raised the value of C-corporation equity (Auerbach and Hassett 2007), so owners of illiquid private C-corporation stock may have increased payouts in order to rebalance their portfolios or to re-optimize consumption among themselves and their heirs. Second, the dividend tax cut could have induced controlling owners to use payouts for their own liquidity, against the interests of minority shareholders and similar to tunneling (Johnson, La Porta, Lopez-de-Silanes, and Shleifer 2000). Third, high dividend tax rates incent owner-managers to evade taxes by paying out earnings as officer compensation or purchasing consumption goods through the corporation; the tax cut reduced the benefits of this evasion and may have caused C-corporations to evade less and to increase formally-labeled payouts. These effects are observationally equivalent in the data available to me, but testing these various mechanisms is an interesting area for future research.

One potential real implication of the payouts response is that the higher payouts could in principle have be used to fund investment at other corporations, increasing investment on net. This does not find support in any standard model because payouts are assumed to substitute dollar-for-dollar for investment at the paying-out corporation. However, it is at least conceivable that payouts substituted for riskless securities held on corporate balance sheets and that C-corporation shareholders used the increased payouts to purchase risky securities, thereby reducing the cost of capital to corporations generally. Any such risk-bearing-capacity effects would likely have been second-order considering the relatively small size of the payouts response.

VII Potential Reallocation of Investment

The central question of this paper has been whether the 2003 dividend tax cut increased the level of corporate investment and employee compensation—the intended real outcomes of the tax cut. A host of other potential effects could be relevant to economists. In this final section, I investigate whether there is evidence to suggest that the dividend tax cut improved the allocative efficiency of investment, even if it did not increase its overall level. This possibility is motivated by a recent theoretical contribution (Chetty and Saez 2010) that argues that a dividend tax cut

can reduce wasteful investment at some C-corporations (as shareholders improve monitoring and force managers to reduce wasteful spending and to increase payouts) and increase productive investment at other C-corporations (via the traditional-view channel of corporations increasing equity issuance and using the proceeds to fund productive investment).

The possibility of an efficiency-enhancing rebalancing of investment across C-corporations is untestable in its most general form. I instead ask whether the relative movements in payouts and equity issued across subgroups of C-corporations are in line with the particular mechanism of Chetty and Saez. Specifically, I test whether the subgroups of C-corporations that increased payouts the least are also the ones that most increased equity issuance and thus may have increased investment relative to other C-corporations. Note that in unreported results I do not find an effect of the tax cut on C-corporation equity issued, but relative changes in equity issued would nevertheless be possible.

Columns 4-5 of Table 3 implement the triple-difference analysis of Section IV.D for the outcomes of payouts and equity issued. Comparing coefficients across the columns, no negative relationship is apparent between equity issuance and payouts. The statistically significant payouts effects are by age, profitability, cash, and leverage, but the four corresponding equity-issued effects are same-signed, same-signed, opposite-signed, and opposite-signed, respectively, and none is statistically significant. Thus I find no general pattern of payouts and equity issuance that is consistent with investment rebalancing across C-corporation subgroups.

VIII Conclusion

The 2003 dividend tax cut was one of the largest ever changes to a U.S. capital income tax rate and was explicitly intended to increase corporate investment and labor utilization, beginning in the near term. This paper used a large sample of tax returns from large private corporations—some subject to dividend taxation (C-corporations) and others not (S-corporations)—to test whether these real goals were achieved in a firm size range that employs most U.S. private sector workers. I estimate that the tax cut caused no change in C-corporation investment or employee compensation. Evidence of an immediate increase in payouts validates salience and relevance. External validity remains an open question, but neither broadening the sample to include most public corporations nor heterogeneity by firm size suggests different out-of-sample

results.

The findings contrast with evidence of large real effects of numerous other fiscal policies. Economically, the null result implies either that the dividend tax cut had little effect on firms' cost of capital, or that investment responded to cost-of-capital changes substantially less than recent evidence would have predicted, or both. The tax cut could have failed to reduce the cost of capital either because marginal investments are funded out of retained earnings and riskless debt as in "new view" models (King 1977; Auerbach 1979; Bradford 1981) or because of particular features of the tax regime. Each potential mechanism suggests that it may be difficult for policymakers to implement an alternative dividend tax cut that has substantially larger near-term effects.

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Online Appendix A: Variable Definitions in Terms of Tax Return Line Items

Section III.C listed economic definitions of all variables used in this paper. This appendix defines variables in terms of line items on tax forms.

Investment equals the sum of Form 4562 lines 8, 14, 19a-19i column (c), 20a-20c column (c), and 21. Form 4562 is filed alongside either Form 1120 or Form 1120S in order to claim investment depreciation deductions.

Tangible capital assets is reported on Form 1120 or Form 1120S Schedule L (balance sheet) column (d) line 10b.[48]

For C-corporations, employee compensation equals the sum of Form 1120 lines 13, 23, 24, and Schedule A line 3. For S-corporations, employee compensation equals Form 1120S lines 8, 17, 18, and Schedule A line 3.

For C-corporations, dividends equals the sum of Form 1120 Schedule M-2 lines 5a and 5c. For S-corporations, dividends equals Form 1120S Schedule K line 17c. These fields are sources of NIPA dividend aggregates.

Treasury stock is reported on Form 1120 Schedule L column (d) line 27 for C-corps or on Form 1120S Schedule L column (d) line 26 for S-corps.

Total paid in capital equals the sum of the equity capital stock and additional paid-in capital. Equity capital stock is reported on Form 1120 Schedule L column (d) line 22b for C-corps and Form 1120S Schedule L column (d) line 22 for S-corps. Additional paid-in capital is reported on Form 1120 and Form 1120S Schedule L line 23. Note that these equity valuations are book concepts.

Assets is reported on Form 1120 and Form 1120S Schedule L column (d) line 15 and includes financial assets (e.g. cash), inventories, tangible assets (e.g. invested goods), and intangible assets (e.g. patents).

Revenue equals operating revenue and is reported on Form 1120 and Form 1120S line 1c; this excludes non-operating income such as gains from selling used capital goods.

Profit margin is the ratio of operating profit to revenue. For C-corporations, operating profit equals the sum of Form 1120 lines 1c, 12, 18, 19, 20, and 25, minus the sum of lines 2 and 27. For S-corporations, operating profit equals the sum of Form 1120S lines 1c, 7, 13, and 14, minus the sum of lines 2 and 20.

Cash equals the sum of column (d) lines 1, 4, 5, and 6 on Schedule L of Form 1120 or Form 1120S.

Debt equals the sum of column (d) lines 16-21 on Schedule L of Form 1120 or Form 1120S.

NAICS is reported on Form 1120 Schedule K line 2a and Form 1120S Schedule B line 2a. Corporations whose closest return to 2003 was filed before 1999 have 4-digit SIC classifications rather than 6-digit NAICS; I impute a 6-digit NAICS to each 4-digit SIC using the universe of corporations that filed tax returns in both 1998 and 1999 and use the first two digits of this imputed 6-digit NAICS for 2-digit NAICS.

For C-corporations, incorporation date is reported on Form 1120 Box C. For S-corporations, incorporation date is reported on Form 1120S Box E.

[48] This excludes depletable assets (e.g. oil deposits), land, and intangible assets. Tangible capital assets is computed according to standard accounting practices and equals the purchase price of all investment goods currently in use by the corporation, less accumulated book depreciation (as opposed to accumulated tax depreciation, which is affected by accelerated depreciation tax provisions).

Online Appendix B: Reweighting

Section III.E motivated and verbally described the application of the reweighting method of DiNardo, Fortin, and Lemieux (DFL 1996) to flexibly control for any time-varying industry-firm-size shocks. DFL-reweighting is similar to matching but is less parametric. As mentioned in that section, this reweighting does not drive the paper's main results. This appendix specifies the formula for the final weight on every observation used in every table and graph.

DFL reweighting is useful when comparing outcomes across groups g (e.g. corporation types and years) that differ along observable traits (e.g. the S-corporation sample has a larger share of big construction firms the C-corporation sample). One wants to reweight the sample to hold "fixed" the distribution of observable traits. To do so, one first divides all observations into bins b according to the traits (e.g. small construction firms, big construction firms, etc.). Then one inflates or deflates weights in every group-bin so that the within-group distribution of weights across bins equals the original cross-bin distribution of weights in some base group $\underline{g}$ (e.g. C-corporations in 2002). For example, if the 1998 S-corporation group has relatively more big construction firms than the 2002 C-corporation group, then the DFL procedure will down-weight big construction firms and up-weight small construction firms in the 1998 S-corporation group. In this way, DFL holds fixed the distribution of observable traits across groups.

This paper's main analyses (Figure 2, Table 2, and all appendix tables) compare outcomes across corporation types and time, so I DFL-reweight across 22 (= 2 corporation types × 11 years 1998-2008) groups g. I define the base group $\underline{g}$ to be the 2002 C-corporation group. I implement DFL-reweighting to control for any industry and firm-size differences; I therefore use each observation's two-digit industry and firm size (revenue averaged over the preceding two lags) to bin it into one of 190 (= 19 two-digit industries × 10 within-industry size deciles) bins b, where the bins are defined using the within-industry size deciles of 2002 C-corporations. Recall that in order to make the results dollar-weighted, each observation is initially weighted by its firm size (revenue averaged over the preceding two lags); let $size_i$ denote note this initial weight on firm-year observation i. Let b denote the bin that observation i falls in, and let g denote the group that observation i falls in. The final weight w on observation i equals:

$$w_{ibg} = size_i \left(\frac{\sum_{i' \in b \cap i' \in \underline{g}} size_{i'}}{\sum_{i' \in b \cap i' \in g} size_{i'}} \right) \left(\frac{\sum_{i' \in g} size_{i'}}{\sum_{i' \in \underline{g}} size_{i'}} \right) \tag{4}$$

where i' denotes firm-year observations generally.

To explain the formula, note that the two parenthetical factors each equal 1 for every observation i that is in the base group $\underline{g}$, so every observation in the base group has final weight equal to its size $size_i$. Every observation not in the base group has final weight that is smaller or greater than its size, depending on whether its bin is overrepresented or underrepresented in its group relative to the base group. The first parenthetical factor is the key factor: it ensures that within every group g, the ratio of the sum of final weights in an industry-size bin b (e.g. top-decile construction firms) to the sum of final weights in any other industry size bin b' (e.g. bottom-decile construction firms) is identical to the corresponding ratio in the base group $\underline{g}$. The second factor ensures that the sum of each group's final weight equals the sum of each group's original weight ($\sum_{i' \in g} w_{i'bg} = \sum_{i' \in g} size_{i'}, \forall g$); without this factor, the procedure would be imposing that all groups must carry equal final weight.

This paper's main heterogeneity analysis (Table 3) reports coefficients from triple-difference

regressions between corporation types (C vs. S), time period (pre-2003 vs. post-2003), and firm trait rank (top quintile vs. bottom quintile). Hence for the regressions underlying this table, I construct weights using equation (4) in which groups g denote one of 44 type-year-trait groups (one for each corporation type, year 1998-2008, and top or bottom quintile), base group $\underline{g}$ denotes 2002 top-quintile C-corporations, and industry-size bins b are defined according to the within-industry size-decile distribution of top-trait-quintile C-corporations in 2002. The exceptions are the triple-difference regressions by firm size, which can be reweighted only across 19 industry bins since the top and bottom firm size quintiles of course do not overlap.

Finally, this paper's detailed firm size heterogeneity analysis (Figure 3) reports coefficients from difference-in-differences regressions within each firm size decile. Hence for the regressions underlying these graphs, I construct weights using equation (4) in which groups g denote one of 220 type-year-decile groups (= 2 corporation types $\times$ 11 years 1998-2008 $\times$ 10 firm size deciles where the deciles are defined over the pooled C-corporation sample), base group $\underline{g}$ denotes 2002 fifth-decile C-corporations, and bins b denote one of 19 two-digit industries. Corporations are unweighted in Table 1 and Appendix Figure 1.

TABLE 1
Summary Statistics for the Main Analysis Sample

	C-corporations				S-corporations			
	Mean (1)	Median (2)	10th pctile (3)	90th pctile (4)	Mean (5)	Median (6)	10th pctile (7)	90th pctile (8)
Characteristics:								
Lagged revenue	69,049,024	26,376,350	3,308,379	163,471,168	76,253,112	42,199,724	5,378,300	169,657,520
Lagged assets	45,161,292	16,924,808	1,877,119	104,594,464	35,453,684	19,229,830	2,995,620	74,793,208
Lagged tangible capital assets	10,766,801	2,036,695	118,258	24,904,272	7,804,121	2,276,789	173,153	17,401,354
Lagged profit margin	-0.03	0.04	-0.09	0.17	0.08	0.06	-0.01	0.25
Lagged revenue growth	0.15	0.03	-0.21	0.45	0.10	0.03	-0.18	0.34
Lagged cash / lagged assets	0.18	0.10	0.01	0.47	0.17	0.10	0.01	0.46
Lagged leverage	0.68	0.66	0.21	1.00	0.63	0.66	0.16	0.97
Age	26	22	6	52	27	23	7	51
Outcomes:								
Investment	2,238,240	249,206	1,185	4,583,290	1,907,913	307,604	4,524	3,796,888
Investment / lagged tangible capital assets	1.610	0.153	0.001	0.767	1.114	0.166	0.005	0.792
Net investment	440,653	-19,566	-1,277,166	1,751,472	352,125	-21,432	-984,313	1,567,998
Net investment / lagged tangible capital assets	0.871	-0.034	-0.286	0.459	1.720	-0.029	-0.254	0.454
Employee compensation	12,387,611	3,838,782	324,038	28,072,528	11,247,429	5,006,804	452,086	24,141,574
Employee compensation / lagged revenue	0.291	0.160	0.028	0.492	0.188	0.131	0.027	0.376
Payouts	656,775	0	0	441,996	3,477,043	684,527	0	7,754,608
Payouts / lagged revenue	0.015	0.000	0.000	0.011	0.093	0.017	0.000	0.169
Dividends	530,035	0	0	249,108	3,401,402	658,109	0	7,586,753
Dividends / lagged revenue	0.012	0.000	0.000	0.006	0.092	0.016	0.000	0.166
Equity issued	2,740,535	0	0	570,177	275,265	0	0	295
Equity issued / lagged revenue	0.239	0.000	0.000	0.013	0.023	0.000	0.000	0.000
Number of firm-year observations		194,679				137,546		
Number of firms		43,958				32,090		

Notes: This table lists summary statistics for C-corporations (whose dividends are taxable) and S-corporations (whose dividends are not taxable) in this paper's main analysis sample: an unbalanced panel of annual corporate income tax returns, comprising all observations from the IRS Statistics of Income stratified random sample in years 1998-2008 in which the filing corporation had between $1 million and $1 billion in lagged assets and $500,000 and $1.5 billion in lagged revenue, was private through the previous year, and is not in the finance or utilities industries. "Lagged" denotes "averaged over the two preceding lags". Revenue equals operating revenue. Assets equals the book value of assets. Tangible capital assets, also called capital, equals the book value of tangible capital assets (e.g. excluding cash and patents). Profit margin equals one minus the ratio of operating costs to revenue. Cash equals liquid current assets. Leverage equals the book value of non-equity liabilities divided by assets; this is greater than one when accumulated losses exceed paid-in equity. Age equals the year of the return minus the year of incorporation. Investment equals the cost of all newly purchased tangible capital assets. Net investment equals the annual dollar change in tangible capital assets. Employee compensation equals the sum of all non-officer wages, salaries, benefits, and pension contributions. Dividends equals *pro rata* cash and property distributions to shareholders. Payouts, also called total payouts to shareholders, equals dividends plus share buybacks (non-negative annual changes in treasury stock). Equity issued equals non-negative annual changes in paid-in equity. C- vs. S-status is defined as of the second lag; corporations can switch status if they meet the legal requirements but fewer than 4% ever switched in this sample. See Figure 1 for the industrial mix. All monetary figures are in 2010 dollars.

TABLE 2
Effect of the 2003 Dividend Tax Cut on Investment, Net Investment, and Employee Compensation

A. Investment

Dependent variable:	Investment					
Dep. var. winsorized at:	95th percentile			99th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged capital)		($ per 96-97 cap.)
	(1)	(2)	(3)	(4)	(5)	(6)
C-Corp × Post-2003	0.0010	-0.0001	-0.0585	-0.0100	-0.0113	-0.2419
	(0.0045)	(0.0043)	(0.0419)	(0.0068)	(0.0066)	(0.1772)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.07	0.53	0.01	0.05	0.55
Pre-2003 C-corp mean	0.2429	0.2429	0.2928	0.2828	0.2828	0.3719
Pre-2003 C-corp s.d.	0.2514	0.2514	0.3073	0.4181	0.4181	0.6703
Implied ε wrt $(1-\tau_{div})$	0.01	0.00	-0.46	-0.08	-0.09	-1.51
	[-0.07, 0.09]	[-0.08, 0.08]	[-1.11, 0.19]	[-0.19, 0.03]	[-0.2, 0.01]	[-3.67, 0.66]

B. Net Investment and Employee Compensation

Dependent variable:	Net Investment			Employee compensation		
Dep. var. winsorized at:	95th percentile			95th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged revenue)		($ per 96-97 rev.)
	(7)	(8)	(9)	(10)	(11)	(12)
C-Corp × Post-2003	0.0054	0.0048	-0.0271	-0.0012	-0.0012	0.0055
	(0.0041)	(0.0039)	(0.0162)	(0.0025)	(0.0020)	(0.0061)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.04	0.20	0.00	0.37	0.88
Pre-2003 C-corp mean	0.0421	0.0421	0.0853	0.1648	0.1648	0.1726
Pre-2003 C-corp s.d.	0.2541	0.2541	0.2709	0.1415	0.1415	0.1439
Implied ε wrt $(1-\tau_{div})$	0.30	0.26	-0.73	-0.02	-0.02	0.07
	[-0.15, 0.74]	[-0.16, 0.69]	[-1.6, 0.13]	[-0.09, 0.05]	[-0.07, 0.04]	[-0.09, 0.23]

Notes: This paper reports difference-in-differences estimates of the effect of the 2003 dividend tax cut on real outcomes. All columns display the coefficient on the interaction between a C-corporation indicator and an indicator for the year being 2003 or later, from a regression of the outcome on this interaction, a C-corporation indicator, year fixed effects and possibly additional controls. "Lagged controls" indicates that the regression includes two-digit NAICS industry fixed effects and quartics in age, lagged revenue, lagged profit margin, and revenue growth. "Firm FE's" indicates that the regression includes firm fixed effects. The unbalanced panel is this paper's main sample; see Table 1 for details. The balanced panel is constructed similarly, except the sample restrictions apply only to years 1996-1997 and observations are required in all years 1996-2008. "Lagged" denotes "averaged over the preceding two lags". Before the regression, each observation's outcome value is scaled by either the firm's tangible capital assets or its revenue (see Online Appendix Table 2 for alternative scalings) averaged over the two preceding lags in the unbalanced panel and over 1996-1997 in the balanced panel, and then winsorized (top-coded) at the level indicated. The regressions are dollar-weighted (each observation is weighted by its lagged or 1996-1997 revenue) and they flexibly control for any time-varying industry or firm-size shocks by non-parametrically reweighting the S-corporation sample within every year to match the distribution of C-corporations across 190 industry-firm-size bins as detailed in Section III.E. Elasticity equals the reported coefficient divided by the pre-2003 C-corporation outcome mean, divided by the percent change in one-minus-the-top-statutory-dividend-tax-rate (the top rate fell from 44.7% to 20.8%). Standard errors are clustered by firm. See Online Appendix Tables 1-4 for robustness checks.

TABLE 3
Effect Heterogeneity

Dependent variable:	Investment ($ per lagged capital) (1)	Net investment ($ per lagged capital) (2)	Employee comp. ($ per lagged revenue) (3)	Payouts (%) (4)	Equity issued ($ per lagged revenue) (5)
C-Corp × Post-2003					
× High lagged revenue	0.0110	-0.0007	-0.0041	-2.8	-0.0009
	(0.0127)	(0.0103)	(0.0054)	(8.8)	(0.0004)
× High age	0.0088	-0.0016	-0.0057	40.9	0.0004
	(0.0168)	(0.0144)	(0.0060)	(10.4)	(0.0006)
× High lagged rev. growth	-0.0055	-0.0146	-0.0003	-7.5	-0.0006
	(0.0159)	(0.0165)	(0.0081)	(11.0)	(0.0008)
× High profit margin	-0.0296	0.0085	-0.0088	97.5	0.0020
	(0.0171)	(0.0140)	(0.0108)	(15.8)	(0.0012)
× High cash/assets	-0.0207	-0.0217	-0.0115	35.9	-0.0006
	(0.0155)	(0.0148)	(0.0115)	(12.2)	(0.0011)
× High leverage	-0.0017	0.0169	-0.0103	-59.6	-0.0003
	(0.0198)	(0.0190)	(0.0100)	(17.7)	(0.0012)

Notes: This table reports triple-difference estimates of the effect of the 2003 dividend tax cut. Each cell represents a separate regression and reports the coefficient on the triple interaction of a C-corporation indicator, an indicator for the year being 2003 or later, and an indicator for the firm being in the top quintile rather than the bottom quintile (the middle three quintiles are omitted) of the trait specified in the row heading (see Table 1 for definitions). The specifications underlying each cell of columns 1-3 are identical to the difference-in-differences spefications underlying Table 2 columns 2, 8, and 11, respectively, except that each regression fully interacts the top-quintile indicator with the C-corporation and post-2003 indicators. Similar to Table 2, regressions are dollar-weighted (each observation is weighted by its lagged revenue) and flexibly control for any time-varying industry and firm-size shocks by non-parametrically reweighting the S-corporation sample within every year and quintile to match the distribution of C-corporations across 190 industry-firm-size bins; the exception is regressions by the lagged-revenue trait which can be reweighted only across 19 industry bins since the top and bottom quintiles do not overlap in size. Column 4 makes the same modifications to the difference-in-difference regression underlying Table 4 column 2. Column 5 replicates this table's column 3 for the outcome of equity issued. Standard errors are clustered by firm.

TABLE 4
Effect of the 2003 Dividend Tax Cut on Total Payouts to Shareholders

Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	(%)	(%)	(%)	(%)	(%)	(%)
	(1)	(2)	(3)	(4)	(5)	(6)
C-Corp × Post-2003	23.7	28.0	94.2	40.0	45.9	71.0
	(3.6)	(3.3)	(9.0)	(7.3)	(6.5)	(15.3)
C-Corp × Year-2003	18.2	21.5	65.4	26.5	30.6	52.8
	(4.3)	(4.1)	(9.1)	(4.8)	(4.6)	(11.0)
C-Corp × Year-2004	31.1	34.7	78.3	42.6	47.3	61.5
	(5.1)	(4.9)	(11.7)	(6.5)	(6.1)	(10.9)
C-Corp × Year-2005	27.3	30.5	93.2	42.0	46.6	72.2
	(5.8)	(5.5)	(13.1)	(8.2)	(7.6)	(16.8)
Lagged controls		X			X	
Firm FE's			X			X
Pre-trend controls				X	X	X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
Pre-2003 C-corp mean ($ per lagged revenue)	0.0031	0.0031	0.0059	0.0031	0.0031	0.0059

Notes: This table reports difference-in-differences estimates of the effect of the 2003 dividend tax cut on total payouts to shareholders (dividends plus buybacks). The first row of columns 1-3 use the same specifications, controls, scaling, weights underlying Table 2 columns 10-12 except that before the winsorizing and in order to account for large level differences in pre-2003 payouts (see Table 1 and the y-axes of Table 2d), each firm i's payouts in year *t* is divided by the mean level of payouts for *i*'s corporate type (C or S) in the pre-2003 period, essentially transforming the comparison into percentage terms. The second-through-fourth rows of each column report results from a separate regression in which the C-corp × post-2003 interaction term is replaced with a vector of interactions between the C-corporation indicator and post-2003 year indicators; see Online Appendix Table 5 for additional reported coefficients. Columns 4-6 modify the specifcations of columns 1 3 in order to allow for differential trends; see Section V.A for the specification and Online Appendix Table 1 for analogous specifications for real outcomes. Standard errors are clustered by firm. See Online Appendix 6 for results on the outcome of dividends only.

ONLINE APPENDIX TABLE 1
Effect of the 2003 Dividend Tax Cut on Investment, Net Investment, and Employee Compensation
Allowing for Differential Pre-2003 Trends

A. Investment

Dependent variable:	Investment					
Dep. var. winsorized at:	95th percentile			99th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged capital)		($ per 96-97 cap.)
	(1)	(2)	(3)	(4)	(5)	(6)
C-Corp × Post-2003	-0.0132	-0.0165	-0.0992	-0.0220	-0.0260	-0.1698
	(0.0124)	(0.0120)	(0.0367)	(0.0196)	(0.0192)	(0.1150)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.07	0.53	0.01	0.05	0.55
Pre-2003 C-corp mean	0.2429	0.2429	0.2928	0.2828	0.2828	0.3719
Pre-2003 C-corp s.d.	0.2514	0.2514	0.3073	0.4181	0.4181	0.6703
Implied ε wrt $(1-\tau_{div})$	-0.13	-0.16	-0.78	-0.18	-0.21	-1.06
	[-0.36, 0.11]	[-0.38, 0.07]	[-1.35, -0.22]	[-0.5, 0.13]	[-0.52, 0.09]	[-2.46, 0.35]

B. Net Investment and Employee Compensation

Dependent variable:	Net Investment			Employee compensation		
Dep. var. winsorized at:	95th percentile			95th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged revenue)		($ per 96-97 rev.)
	(7)	(8)	(9)	(10)	(11)	(12)
C-Corp × Post-2003	0.0242	0.0212	-0.0668	0.0054	0.0040	0.0017
	(0.0125)	(0.0119)	(0.0421)	(0.0057)	(0.0047)	(0.0063)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.04	0.20	0.00	0.37	0.88
Pre-2003 C-corp mean	0.0421	0.0421	0.0853	0.1648	0.1648	0.1726
Pre-2003 C-corp s.d.	0.2541	0.2541	0.2709	0.1415	0.1415	0.1439
Implied ε wrt $(1-\tau_{div})$	1.33	1.17	-1.81	0.08	0.06	0.02
	[-0.01, 2.67]	[-0.12, 2.45]	[-4.05, 0.43]	[-0.08, 0.23]	[-0.07, 0.18]	[-0.14, 0.19]

Notes: This table replicates Table 2 except that it allows for differential pre-2003 trends by including an interaction between the post-2003 indicator and a year variable, as well as interacting the C-corporation indicator and the C-Corp × Post-2003 interaction with the year variable. The reported coefficient equals the estimated effect of the tax cut averaged over the post-2003 period, equal to the coefficient on the C-Corp × Post-2003 interaction plus 2005.5 times the coefficient on the C-Corp × Post-2003 × year interaction, since 2005.5 is the mid-point of the post-2003 period. See the notes to Table 2 for additional details.

ONLINE APPENDIX TABLE 2
Effect of the 2003 Dividend Tax Cut on Investment, Net Investment, and Employee Compensation
Alternative Scalings

A. Investment

Dependent variable:	Investment					
Dep. var. winsorized at:	95th percentile			99th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged revenue)		($ per 96-97 rev.)	($ per lagged revenue)		($ per 96-97 rev.)
	(1)	(2)	(3)	(4)	(5)	(6)
C-Corp × Post-2003	-0.0022	-0.0021	0.0003	-0.0036	-0.0034	0.0000
	(0.0005)	(0.0004)	(0.0013)	(0.0007)	(0.0007)	(0.0018)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.16	0.64	0.01	0.13	0.62
Pre-2003 C-corp mean	0.0243	0.0243	0.0313	0.0292	0.0292	0.0362
Pre-2003 C-corp s.d.	0.0322	0.0322	0.0401	0.0524	0.0524	0.0591
Implied ε wrt $(1-\tau_{div})$	-0.21	-0.20	0.02	-0.29	-0.27	0.00
	[-0.3, -0.12]	[-0.28, -0.12]	[-0.16, 0.21]	[-0.4, -0.17]	[-0.37, -0.16]	[-0.23, 0.23]

B. Net Investment and Employee Compensation

Dependent variable:	Net Investment			Employee compensation		
Dep. var. winsorized at:	95th percentile			95th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged revenue)		($ per 96-97 rev.)	($ per lagged capital)		($ per 96-97 cap.)
	(7)	(8)	(9)	(10)	(11)	(12)
C-Corp × Post-2003	-0.0001	-0.0001	-0.0006	-0.0088	-0.0510	0.0943
	(0.0003)	(0.0003)	(0.0012)	(0.1078)	(0.0951)	(0.1766)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.05	0.23	0.02	0.18	0.90
Pre-2003 C-corp mean	0.0025	0.0025	0.0070	3.1822	3.1822	2.9259
Pre-2003 C-corp s.d.	0.0262	0.0262	0.0273	3.9831	3.9831	3.6652
Implied ε wrt $(1-\tau_{div})$	-0.10	-0.08	-0.20	-0.01	-0.04	0.07
	[-0.71, 0.52]	[-0.67, 0.51]	[-0.97, 0.58]	[-0.16, 0.15]	[-0.17, 0.1]	[-0.2, 0.35]

Notes: This table replicates Table 2 except that outcomes that were scaled by lagged tangible capital are now scaled by lagged revenue, and vice versa. See the notes to that table for details.

ONLINE APPENDIX TABLE 3
Effect of the 2003 Dividend Tax Cut on Investment, Net Investment, and Employee Compensation
Years 1998-2004 Only

A. Investment

Dependent variable:	Investment					
Dep. var. winsorized at:	95th percentile			99th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged capital)		($ per 96-97 cap.)
	(1)	(2)	(3)	(4)	(5)	(6)
C-Corp × Post-2003	-0.0143	-0.0134	-0.0697	-0.0307	-0.0295	-0.1502
	(0.0053)	(0.0051)	(0.0375)	(0.0085)	(0.0083)	(0.1321)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	232,483	232,483	53,242	232,483	232,483	53,242
Clusters (firms)	63,025	63,025	7,606	63,025	63,025	7,606
R^2	0.01	0.07	0.51	0.01	0.05	0.49
Pre-2003 C-corp mean	0.2429	0.2429	0.2928	0.2828	0.2828	0.3719
Pre-2003 C-corp s.d.	0.2514	0.2514	0.3073	0.4181	0.4181	0.6703
Implied ε wrt $(1-\tau_{div})$	-0.14	-0.13	-0.55	-0.25	-0.24	-0.93
	[-0.23, -0.04]	[-0.22, -0.03]	[-1.13, 0.03]	[-0.39, -0.12]	[-0.37, -0.11]	[-2.55, 0.68]

B. Net Investment and Employee Compensation

Dependent variable:	Net Investment			Employee compensation		
Dep. var. winsorized at:	95th percentile			95th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged revenue)		($ per 96-97 rev.)
	(7)	(8)	(9)	(10)	(11)	(12)
C-Corp × Post-2003	-0.0045	-0.0036	-0.0385	-0.0039	-0.0034	0.0022
	(0.0052)	(0.0050)	(0.0187)	(0.0024)	(0.0020)	(0.0052)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	232,483	232,483	53,242	232,483	232,483	53,242
Clusters (firms)	63,025	63,025	7,606	63,025	63,025	7,606
R^2	0.02	0.05	0.23	0.00	0.37	0.91
Pre-2003 C-corp mean	0.0421	0.0421	0.0853	0.1648	0.1648	0.1726
Pre-2003 C-corp s.d.	0.2541	0.2541	0.2709	0.1415	0.1415	0.1439
Implied ε wrt $(1-\tau_{div})$	-0.25	-0.20	-1.04	-0.05	-0.05	0.03
	[-0.81, 0.31]	[-0.74, 0.34]	[-2.04, -0.05]	[-0.12, 0.01]	[-0.1, 0.01]	[-0.11, 0.17]

Notes: This table replicates Table 2 except that it restricts the sample to years 1998-2004 only. See the notes to that table for details.

ONLINE APPENDIX TABLE 4
Effect of the 2003 Dividend Tax Cut on Investment, Net Investment, and Employee Compensation Including Public Corporations

A. Investment

Dependent variable:	Investment					
Dep. var. winsorized at:	95th percentile			99th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged capital)		($ per 96-97 cap.)
	(1)	(2)	(3)	(4)	(5)	(6)
C-Corp × Post-2003	-0.0020	-0.0016	-0.1391	-0.0076	-0.0066	-0.4364
	(0.0052)	(0.0050)	(0.1117)	(0.0076)	(0.0073)	(0.4088)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	355,889	355,889	91,124	355,889	355,889	91,124
Clusters (firms)	77,275	77,275	8,284	77,275	77,275	8,284
R^2	0.01	0.08	0.56	0.01	0.06	0.63
Pre-2003 C-corp mean	0.2479	0.2479	0.3038	0.2835	0.2835	0.3704
Pre-2003 C-corp s.d.	0.2532	0.2532	0.3242	0.3962	0.3962	0.6179
Implied ε wrt $(1-\tau_{div})$	-0.02	-0.01	-1.06	-0.06	-0.05	-2.73
	[-0.11, 0.08]	[-0.11, 0.08]	[-2.73, 0.61]	[-0.18, 0.06]	[-0.17, 0.06]	[-7.73, 2.28]

B. Net Investment and Employee Compensation

Dependent variable:	Net Investment			Employee compensation		
Dep. var. winsorized at:	95th percentile			95th percentile		
Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	($ per lagged capital)		($ per 96-97 cap.)	($ per lagged revenue)		($ per 96-97 rev.)
	(7)	(8)	(9)	(10)	(11)	(12)
C-Corp × Post-2003	0.0013	0.0018	-0.0230	-0.0014	-0.0015	0.0240
	(0.0048)	(0.0046)	(0.0126)	(0.0033)	(0.0026)	(0.0090)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	355,889	355,889	91,124	355,889	355,889	91,124
Clusters (firms)	77,275	77,275	8,284	77,275	77,275	8,284
R^2	0.02	0.06	0.22	0.01	0.38	0.87
Pre-2003 C-corp mean	0.0484	0.0484	0.0959	0.1883	0.1883	0.2055
Pre-2003 C-corp s.d.	0.2671	0.2671	0.2925	0.1551	0.1551	0.1691
Implied ε wrt $(1-\tau_{div})$	0.06	0.09	-0.55	-0.02	-0.02	0.27
	[-0.38, 0.51]	[-0.34, 0.51]	[-1.15, 0.04]	[-0.1, 0.06]	[-0.08, 0.04]	[0.07, 0.47]

Notes: This table replicates Table 2 except that it includes all publicly-traded corporations that satisfy the sample restrictions (other than being privately held) listed in the notes to Table 1. See the notes to those tables for details. Note that publicly-traded corporations were omitted from the main sample because all public corporations are C-corporations and thus may have no reasonable S-corporation counterparts.

ONLINE APPENDIX TABLE 5
Effect of the 2003 Dividend Tax Cut on Total Payouts to Shareholders (Full Results)

Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	(%)	(%)	(%)	(%)	(%)	(%)
	(1)	(2)	(3)	(4)	(5)	(6)
A. Overall Difference-in-Differences Estimates						
C-Corp × Post-2003	23.7	28.0	94.2	40.0	45.9	71.0
	(3.6)	(3.3)	(9.0)	(7.3)	(6.5)	(15.3)
Lagged controls		X			X	
Firm FE's			X			X
Pre-trend controls				X	X	X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.13	0.53	0.01	0.13	0.54
Pre-2003 C-corp mean ($ per lagged revenue)	0.0031	0.0031	0.0059	0.0031	0.0031	0.0059
Implied ε wrt $(1-\tau_{div})$	0.55	0.65	2.18	0.93	1.06	1.64
	[0.39, 0.71]	[0.5, 0.8]	[1.77, 2.59]	[0.59, 1.26]	[0.77, 1.36]	[0.95, 2.34]
B. Year-by-Year Difference-in-Differences Estimates						
C-Corp × Year-2003	18.2	21.5	65.4	26.5	30.6	52.8
	(4.3)	(4.1)	(9.1)	(4.8)	(4.6)	(11.0)
C-Corp × Year-2004	31.1	34.7	78.3	42.6	47.3	61.5
	(5.1)	(4.9)	(11.7)	(6.5)	(6.1)	(10.9)
C-Corp × Year-2005	27.3	30.5	93.2	42.0	46.6	72.2
	(5.8)	(5.5)	(13.1)	(8.2)	(7.6)	(16.8)
C-Corp × Year-2006	17.2	22.6	100.6	35.1	42.3	75.3
	(5.8)	(5.5)	(13.7)	(9.3)	(8.4)	(20.3)
C-Corp × Year-2007	16.3	22.5	98.1	37.4	45.6	68.7
	(5.8)	(5.5)	(13.3)	(10.4)	(9.2)	(22.8)
C-Corp × Year-2008	30.7	35.3	129.3	55.0	61.9	95.7
	(6.3)	(5.9)	(16.9)	(11.8)	(10.4)	(25.9)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.13	0.54	0.01	0.13	0.54
Implied 2003 ε wrt $(1-\tau_{div})$	0.42	0.50	1.51	0.61	0.71	1.22
	[0.23, 0.61]	[0.31, 0.68]	[1.1, 1.92]	[0.39, 0.83]	[0.5, 0.92]	[0.72, 1.72]

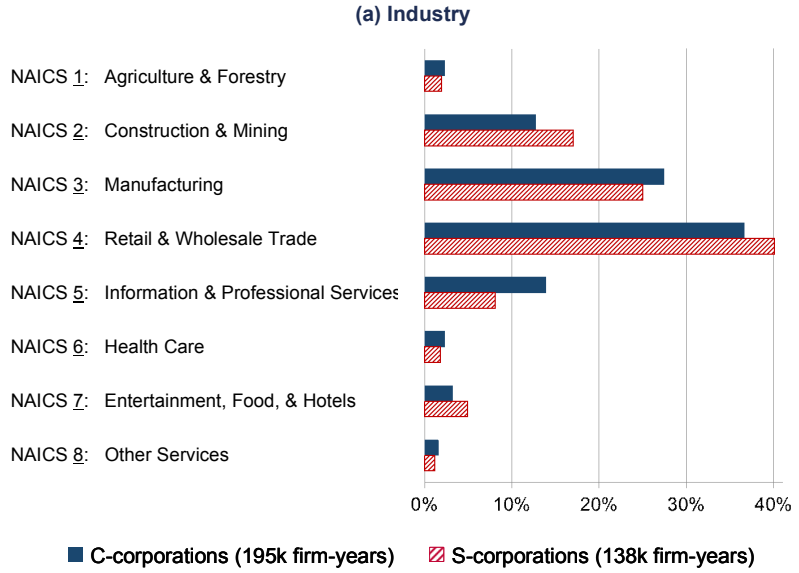
Notes - This table reports full results from the regressions underlying Table 4. See the notes to that table for details.

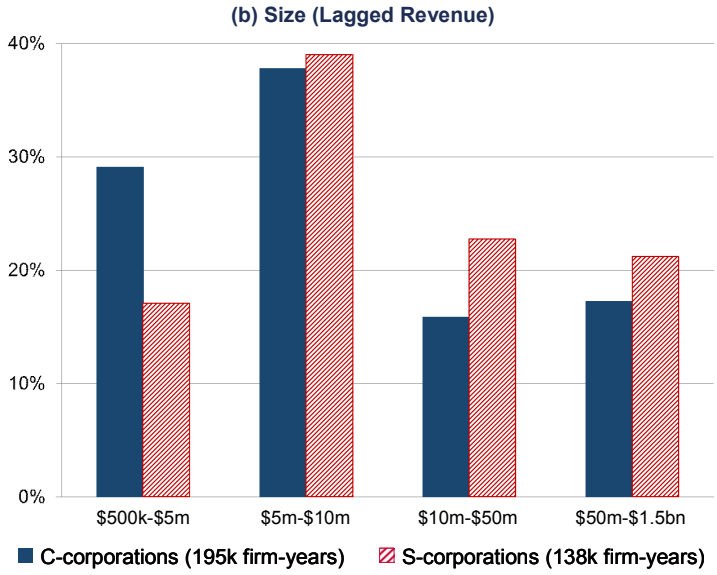
ONLINE APPENDIX TABLE 6
Effect of the 2003 Dividend Tax Cut on Dividend Payouts to Shareholders

Panel:	Unbalanced		Balanced	Unbalanced		Balanced
	(%)	(%)	(%)	(%)	(%)	(%)
	(1)	(2)	(3)	(4)	(5)	(6)
A. Overall Difference-in-Differences Estimates						
C-Corp × Post-2003	29.5	34.0	90.1	47.0	53.2	67.6
	(3.9)	(3.6)	(8.8)	(7.7)	(7.0)	(15.3)
Lagged controls		X			X	
Firm FE's			X			X
Pre-trend controls				X	X	X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.12	0.57	0.01	0.12	0.57
Pre-2003 C-corp mean ($ per lagged revenue)	0.0022	0.0022	0.0047	0.0022	0.0022	0.0047
Implied ε wrt $(1-\tau_{div})$	0.68	0.79	2.08	1.09	1.23	1.56
	[0.51, 0.86]	[0.62, 0.95]	[1.69, 2.48]	[0.74, 1.44]	[0.91, 1.55]	[0.87, 2.26]
B. Year-by-Year Difference-in-Differences Estimates						
C-Corp × Year-2003	20.4	23.8	68.2	29.2	33.5	55.9
	(4.5)	(4.3)	(9.3)	(5.0)	(4.8)	(10.9)
C-Corp × Year-2004	35.7	39.4	78.1	47.9	52.8	61.7
	(5.4)	(5.2)	(11.5)	(6.8)	(6.5)	(11.1)
C-Corp × Year-2005	32.6	35.8	79.5	48.1	52.9	59.1
	(6.1)	(5.9)	(11.9)	(8.6)	(8.0)	(16.3)
C-Corp × Year-2006	28.2	33.9	96.8	47.2	54.7	72.3
	(6.3)	(6.1)	(12.8)	(9.9)	(9.1)	(19.6)
C-Corp × Year-2007	23.6	30.2	94.4	46.0	54.7	65.8
	(6.2)	(5.9)	(12.8)	(10.9)	(9.8)	(22.8)
C-Corp × Year-2008	36.7	41.6	123.3	62.4	69.8	90.6
	(6.8)	(6.4)	(16.8)	(12.4)	(11.1)	(26.2)
Lagged controls		X			X	
Firm FE's			X			X
N (firm-years)	332,225	332,225	83,666	332,225	332,225	83,666
Clusters (firms)	73,141	73,141	7,606	73,141	73,141	7,606
R^2	0.01	0.12	0.57	0.01	0.13	0.57
Implied 2003 ε wrt $(1-\tau_{div})$	0.47	0.55	1.58	0.68	0.77	1.29
	[0.27, 0.67]	[0.36, 0.74]	[1.16, 2]	[0.45, 0.9]	[0.56, 0.99]	[0.8, 1.79]

Notes - This table replicates Online Appendix Table 5 except that it replaces the dependent variable outcome of total payouts with the outcome of dividends only.

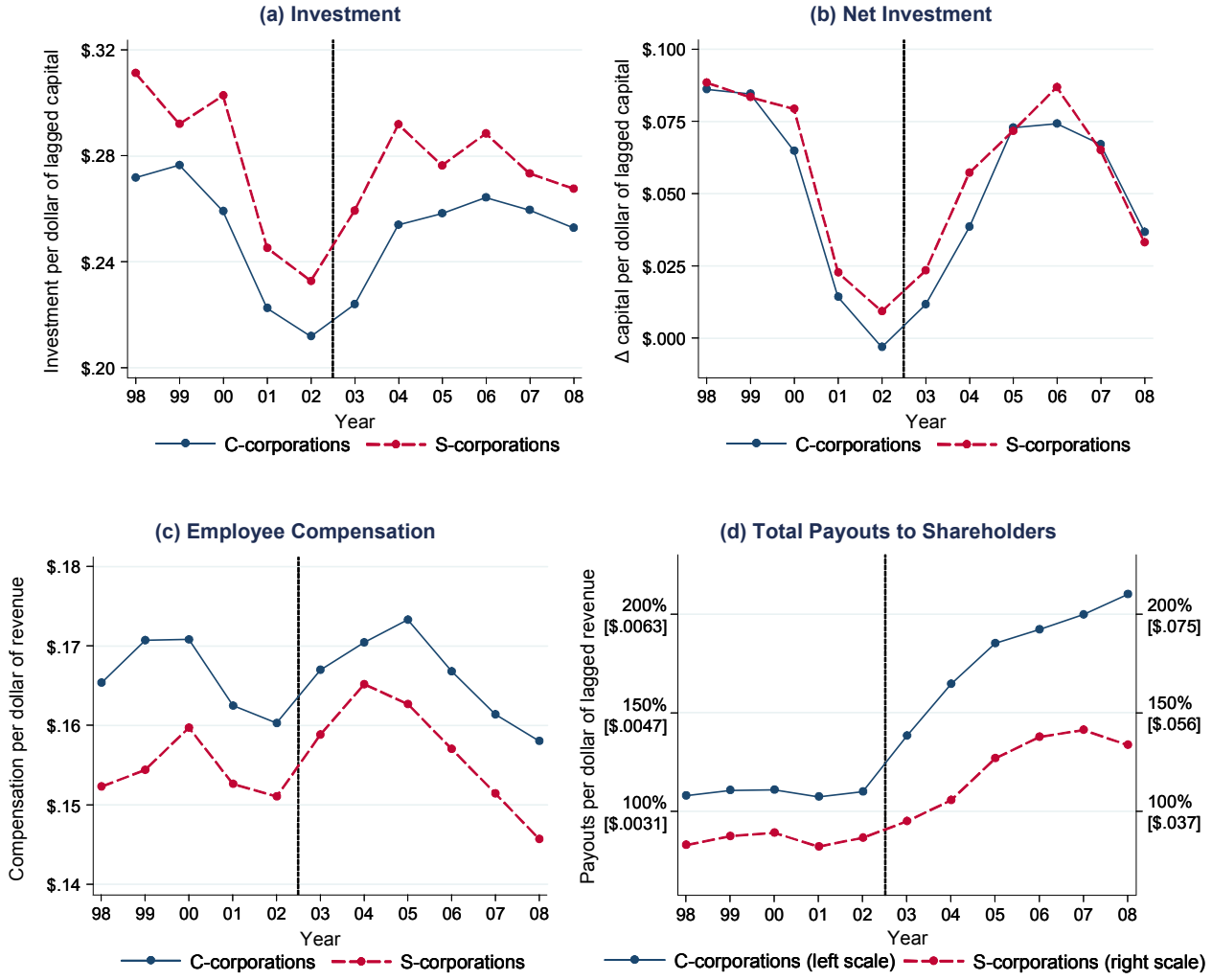
FIGURE 1
Industry and Size Distribution of the Main Analysis Sample





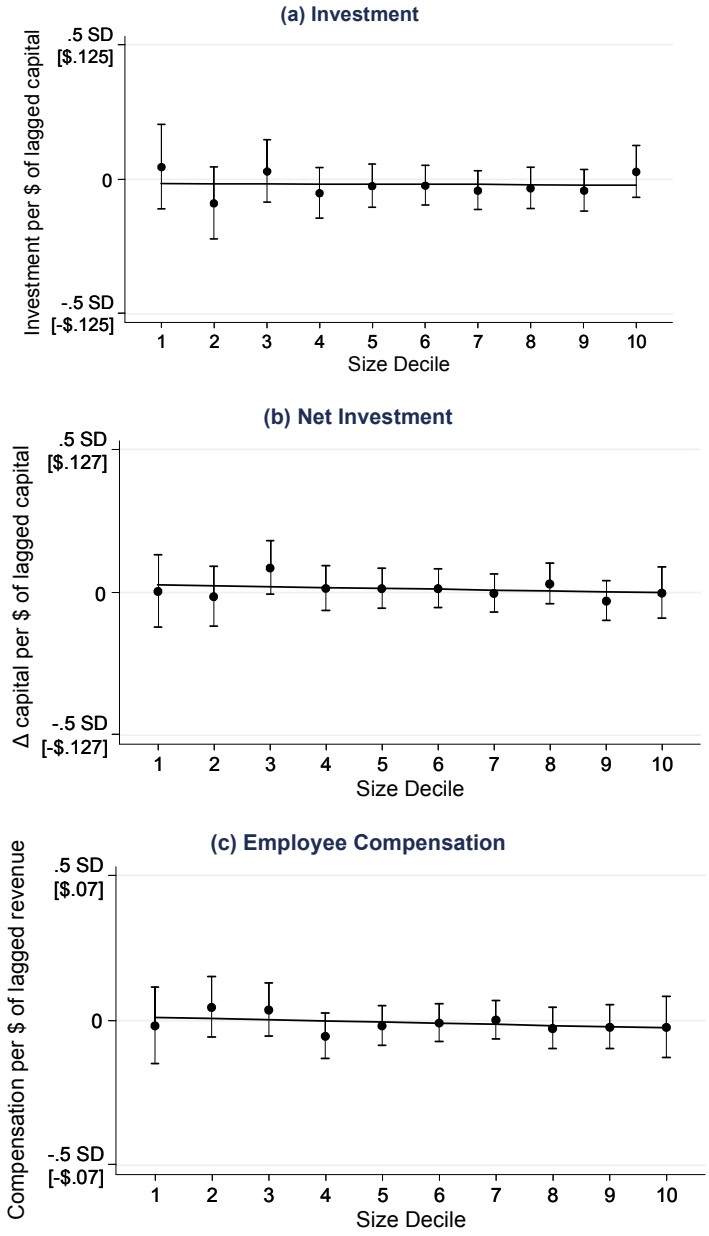
Notes: This figure plots the industry and size mix of the C-corporations (whose dividends are taxable) and S-corporations (whose dividends are not taxable) in this paper's main analysis sample. Each graph's bars sum to 100% within each corporation type. "Lagged revenue" denotes operating revenue averaged over the preceding two lags. This sample is an unbalanced panel of annual corporate income tax returns, comprising all observations from the IRS Statistics of Income stratified random sample in years 1998-2008 in which the filing corporation had between $1 million and $1 billion in lagged assets and $500,000 and $1.5 billion in lagged revenue, was private through the previous year, and is not in the finance or utilities industries. All analyses flexibly control for any time-varying industry or firm-size shocks by non-parametrically reweighting the S-corporation sample within every year to match the distribution of C-corporations across 190 industry-firm-size bins as detailed in Section III.E. C- vs. S-status is defined as of the second lag; corporations can switch status if they meet the legal requirements but fewer than 4% ever switched in this sample. See Table 1 for summary statistics.

FIGURE 2
Effects of the 2003 Dividend Tax Cut



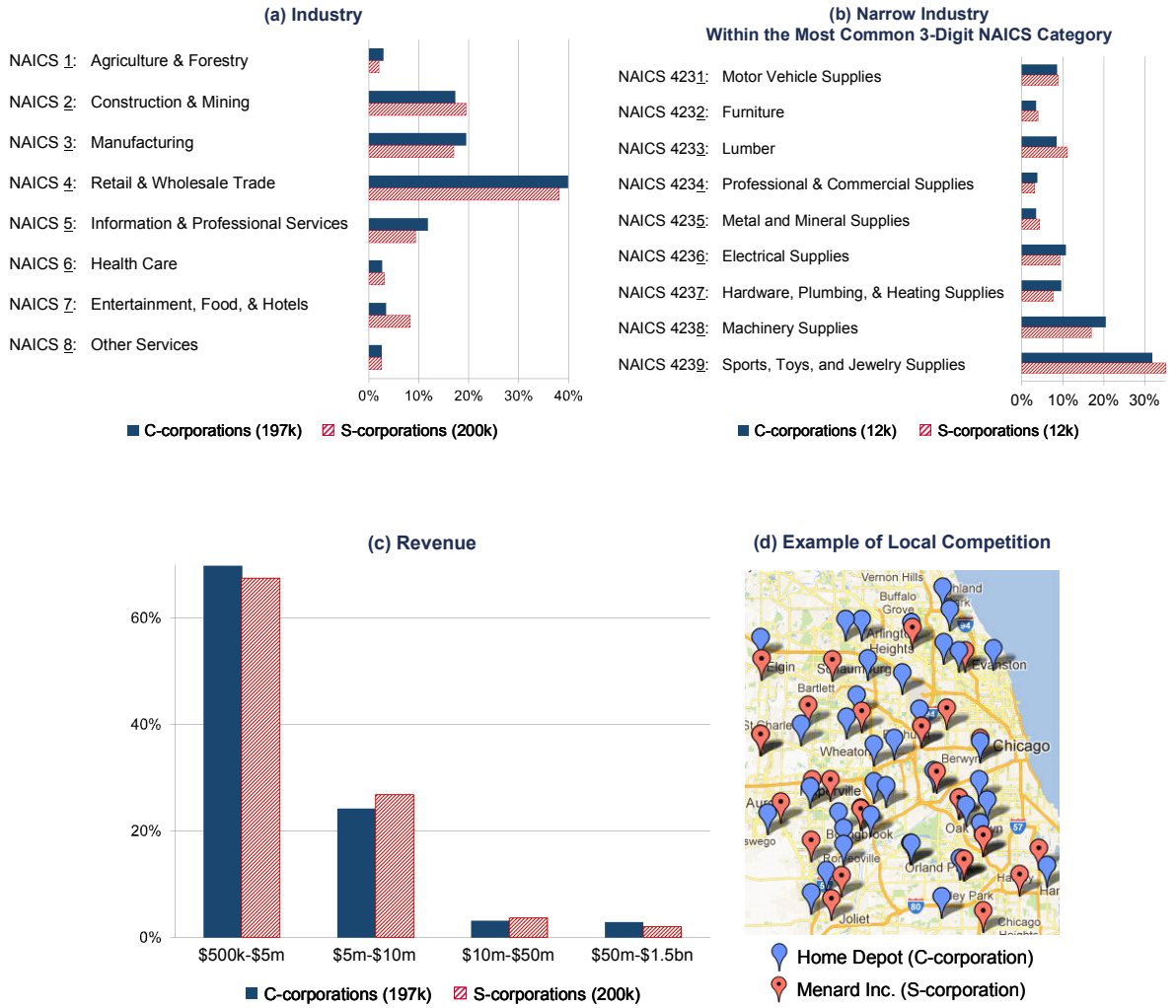
Notes: These figures plot the time series of annual outcomes for C-corporations and S-corporations in the main analysis sample net of a rich set of controls. Investment equals the cost of all newly purchased tangible capital assets. Net investment equals the annual dollar change in tangible capital assets. Employee compensation equals the sum of all non-officer wages, salaries, benefits, and pension contributions. Total payouts to shareholders equals dividends plus share buybacks (non-negative annual changes in treasury stock). Each graph is constructed by scaling each observation by either the firm's tangible capital assets or revenue averaged over the two preceding lags; winsorizing (top-coding) observations at the 95^{th} percentile; regressing this scaled outcome variable within every year on a C-corporation indicator, two-digit NAICS industry fixed effects, and quartics in age, lagged revenue, lagged profit margin, and revenue growth; and requiring that the vertical distance between the two lines equals the regression coefficient on the C-corporation indicator and that the weighted average of the lines equals the sample average in that year. The regressions are dollar-weighted (each observation is weighted by its lagged revenue) and flexibly control for any time-varying industry or firm-size shocks by non-parametrically reweighting the S-corporation sample within every year to match the distribution of C-corporations across 190 industry-firm-size bins as detailed in Section III.E. The payouts graph is included to establish an immediate behavioral response and differs from the other graphs in two ways that account for income-tax-induced differences in baseline payout levels and for slightly differential pre-trends as detailed in Section V.A.

FIGURE 3
Effects by Size Decile



Notes: This graph plots estimated within-size-deciles effects of the 2003 dividend tax cut in the main analysis sample. Variables are defined, scaled, and winsorized as detailed in Figure 2. Each y-axis height equals one standard deviation of the outcome. Each graph is computed by binning corporations into deciles according to the unweighted deciles of the pooled C-corporation lagged revenue distribution, and then within each decile estimating a regression of the outcome on a C-corporation indicator, the interaction of a C-corporation indicator and post-2003 indicator, year fixed effects, two-digit NAICS industry fixed effects, and quartics in age, lagged revenue, lagged profit margin, and revenue growth. Each graph plots the coefficients on the interaction term with Bonferroni-corrected 95% confidence intervals to adjust for multiple (ten) hypothesis testing; uncorrected confidence intervals are one-third tighter. Standard errors are clustered by firm. The solid line is the best unweighted linear fit through the coefficients. Observations are weighted analogously to Figure 2.

ONLINE APPENDIX FIGURE 1
Industry and Size Distribution of the U.S. Population of Corporations



Notes: Panels (a)-(c) plot the U.S. population distribution of C-corporations and S-corporations across broad (1-digit NAICS) industry categories, within the most numerous narrow (3-digit NAICS) industry category, and revenue bins. Each graphs's bars sum to 100% within each corporation type. The sample underlying panels (a)-(c) comprises the universe of corporate income tax returns from tax year 2002 that satisfy the size and industry restrictions applied to the paper's main sample: assets between $1 million and $1 billion, revenue between $500,000 and $1.5 billion, and any industry other than finance and utilities. These full-population data were drawn from unedited population data at the IRS; these data lack many of the variables necessary for this paper's analysis and so are used only for this figure's panels (a)-(c). Panel (d) illustrates within-industry local competition between a particular C-corporation and S-corporation in suburban Chicago; tax data were not used in any way to construct this panel. Home Depot, Inc., the largest U.S. home improvement retailer, is a publicly-traded corporation and is thus a C-corporation. Menard Inc., the third-largest U.S. home improvement retailer, is a pubicly-known S-corporation based on a 2003 press story (http://www.insidemilwaukee.com/Article/242011-BigMoney). Store locations were derived from Google Maps.

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