Do Companies Invest More after Shareholder Tax Cuts?

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Abstract

This paper investigates changes in firm spending following changes in shareholder taxes. We show that firms with less elastic demand for equity capital will expand operations less than other firms following shareholder tax cuts. Since financial constraint is a factor that diminishes a firm's demand elasticity for capital, we predict that financially constrained firms expand less than other companies following shareholder tax reductions. Using a difference-in-differences approach, we find that financially constrained companies increased their capital expenditures and acquisitions less than other firms did, following the two most recent U.S. reductions in shareholder taxes. The effects appear stronger when capital gains taxes alone were cut (1997) than when both capital gains and dividend taxes were reduced (2003). To our knowledge, these findings provide the first evidence of differential effects on the direct link between corporate spending and the shareholder taxes that its owners face.

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1. Introduction

This paper expands our understanding of the impact of individual shareholder taxes on key operational decisions. Prior studies (Chetty and Saez, 2005, Brown et al., 2007, and Blouin et al., 2011, among others) report that firms increased dividends and share repurchases after shareholder tax rates were lowered in 2003. We extend beyond stockholder distributions to consider investment responses to shareholder tax cuts. Specifically, we examine changes in capital expenditures, research and development, selling, general and administrative expenses, acquisitions, and debt following the 1997 reduction in U.S. personal capital gains tax rate and the 2003 cuts in both personal capital gains and dividend tax rates. Using a difference-in-differences approach, we find cross-firm variation that is consistent with personal shareholder tax policy affecting at least some real corporate decisions. To our knowledge, this is the first paper that empirically links different individual shareholder taxes to various firm-level investment decisions.

Besides the shareholder distribution studies mentioned above, another line of shareholder tax research explores its impact on the cost of equity capital. For example, Dhaliwal et al. (2007) and Guenther et al. (2005) document that the 2003 rate reductions lowered the cost of equity capital. Dai et al. (2013) extend their work and find disproportionate reductions in the cost of capital among financially constrained firms. Since an inverse relation should exist between the cost of capital and investment, we build on these studies to develop hypotheses for the effect of shareholder taxes on corporate spending. In particular, following Dai et al. (2013), we exploit cross-firm variation in financial constraint and test whether firms that experienced a change in their cost of capital also altered their operations.[1]

We posit that reductions in shareholder taxes should increase the quantity of equity capital less for financially constrained firms than for other companies. The logic is that equity investors share the burden of shareholder taxes with the other stakeholders of the firm through both the amount of equity that they supply the firm and the pretax rate of return that they demand for that capital. Shareholder tax rate reductions increase the total supply of equity capital. After a shareholder tax cut, the extent to which the quantity expands and the rate falls for a particular firm depends on both the demand for and the supply of equity capital. For any single firm, the increase in the quantity is decreasing in the firm's demand inelasticity, while the decrease in the pretax returns is increasing in its demand inelasticity. This is because firms with increasing inelastic demand for capital are less responsive to changes in the cost of capital.

In short, reductions in shareholder taxes should increase the quantity of capital less and lower the pre-tax rates of return more for those firms with the greatest demand inelasticity.[2] Moreover, since financial constraint increases demand inelasticity, reductions in shareholder taxes should increase the quantity of equity capital less and lower the cost of equity capital more for financially constrained firms than other firms, *ceteris paribus*. Dai et al. (2013) report evidence consistent with the second prediction concerning the cost

[1] In contrast to the cost-of-capital papers, which analyze the vertical axis of the supply and demand curves (i.e., the reduction in the cost of capital following a shareholder tax cut), we focus on the horizontal axis (i.e., the increase in the quantity of equity capital following the tax cut).

[2] As proof, if the firm's demand for equity capital is completely inelastic, then the burden of the shareholder taxes is shifted fully from the shareholders to the other stakeholders in the firm through no additional equity and infinitely higher pre-tax rates of return. Conversely, if the firm's demand for equity capital is completely elastic, then the shareholders bear the entire burden of the shareholder taxes, providing infinite capital without raising the pre-tax rates of return.

of equity capital declining more for financially constrained firms. We now focus on the first prediction, i.e., reductions in shareholder taxes increasing the quantity of equity capital less for financially constrained firms than for other firms.

We operationalize our inquiry by investigating the question that motivates these types of changes in tax policy: Do shareholder tax cuts lead to expanded investment? Next, we ask: Which type of shareholder tax cut, capital gains or dividend, stimulates more investment? To address these questions, we conduct a difference-in-differences comparison of changes in investments around the two most recent U.S. shareholder tax cuts. We use cross-firm variation in financial constraint to identify cross-sectional differences in firm responses.

We find that, compared with other firms, financially constrained companies increased less (a) their capital expenditures, research and development, selling, general and administrative expenses and acquisitions following the Tax Relief Act of 1997 (TRA) reduction in capital gains tax rates and (b) their capital expenditures and acquisitions following the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA) reductions in capital gains and dividend tax rates. The results are both statistically and economically significant. Although we do not find that financial constraint affects every scenario (e.g., R&D or SG&A expenditures after JGTRRA), we link the slower expansion in business operations to firms' financial constraint (which increases their demand inelasticity for capital) often enough to infer that shareholder level taxes affect investments at the corporate level.

Considering that the shareholder tax effect on the cost of capital may affect debt financing, we also investigate firms' debt usage. We find that financial constrained firms also increased less their short-term, long-term, and new debt following the Tax Relief Act of 1997 (TRA) reduction in capital gains tax rates and their short-term and new debt following the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA) reductions in capital gains and dividend tax rates. This suggests that our finding concerning the shareholder tax effect on firm investment is not limited to equity capital but rather applies to investment from different sources of external financing.

Overall, our findings provide evidence that the sole capital gains tax cut in 1997 has more consistent impact on firms' investments than tax cuts on both capital gains and dividends in 2003. One possible explanation is that shareholder distributions increase more following dividend tax reductions than capital gains tax cuts. If so, a sizeable fraction of the JGTRRA shareholder tax cut savings may have been distributed to investors as dividends, weakening its effect on firms' investment, compared with the capital gains-only tax reduction in TRA. In fact, our JGTRRA findings corroborate the results in Yagan (2015) who reports a small cost-of-capital elasticity of investment and no across board change in corporate investment following the 2003 dividend tax cut.

Besides the scholarly contribution of better understanding how shareholder taxes affect corporate behavior, this paper joins Dai et al., 2013 with policy implications. After shareholder taxes were cut, financially constrained firms enjoy larger declines in their cost of equity capital (the primary finding from Dai et al., 2013) and smaller increases in corporate investment (the primary finding from this paper) than did other firms. Together, the findings in this paper and Dai et al. (2013) are consistent with financially constrained firms experiencing more inelastic demand for equity capital than other companies do.

The efficacy of these tax cuts is unclear. If the government's purpose is to lower cost of capital for the firms that face the most pressing needs for capital, then the policy appears successful. However, if the goal is to stimulate extensive investments by these struggling corporations, then it appears far less effective. Since the tax-induced expansion is being undertaken largely by companies that were not strapped for capital, i.e., the firms with the most elastic demand, then it seems possible that much of the new funds end up invested in projects with a low hurdle rate. The social gains to providing additional equity to companies that already have access to plenty of capital are questionable. In fact, a possible outcome is that much of the tax-induced spending and hiring by companies with the least financial constraints are invested in low return projects. Furthermore, shareholder tax cuts may have differential effects on stimulating firms' investments. Specifically, a capital gains tax cut is likely to be more effective than a dividend tax cut in stimulating company investments. We hypothesize that the reason is that the tax savings associated with a dividend tax cut lead to more corporate distributions and thus weaken the effect of increasing that firm's investments.

Finally, this paper joins a long line of papers that have looked at the 1997 and 2003 shareholder tax rate reductions.[3] However, it is one of the first that also answers Hanlon and Heitzman's (2010) call for pushing tax studies beyond their accounting or financial effects to quantify their impact on real business decisions (see Campbell et al., 2013, for another recent exception). By linking the shareholder tax change to operational decisions, such as capital expenditures, research and development, selling, general and administration

[3] For a smattering of papers investigating these two shareholder tax rate reductions, see Lang and Shackelford (2000), Chetty and Saez (2005), Auerbach and Hassett, 2007, Brown et al. (2007), Dai et al. (2008), Blouin et al. (2009), Dharmapala (2009), Blouin et al. (2011), Desai and Dharmapala (2011), and Lin and Flannery (2013) among many others.

expenses, acquisitions, and debt usage, the findings in this paper are potentially richer for scholars and more useful to policymakers. We look forward to future extensions of this nature.

The remainder of the paper is organized as follows. Section 2 develops hypotheses about the impact of financial constraint on the relation between individual shareholder taxes and firms' investment. Section 3 details the empirical methodology. Section 4 presents the findings. Concluding remarks follow.

2. Hypothesis Development

To aid our understanding of how shareholder taxes affect a firm's expenditures and how the impact might vary depending on the firm's level of financial constraint, we use a simple model based on a firm's demand for and supply of external capital in the presence of shareholder taxes on investment income—both dividends and capital gains. For ease of exposition, we first derive the implications of a shareholder tax rate change on investment and then extrapolate to other expenditures.

To derive the effect of a change in the shareholder tax rate on capital investment, we use a capital market equilibrium model similar to Hubbard (1998). Let r_c be the cost of capital paid by firms, r_r be an investor's required expected rate of return, r^e be the equilibrium market rate of return on capital, and τ be the shareholder tax rate on investment income. We model a firm's demand for investment as a decreasing function of the cost of capital, i.e., $\partial D/\partial r_c < 0$, and investors' supply of capital as an increasing function of investors' required expected return, i.e., $\partial S/\partial r_r > 0$. We assume that the marginal investors are tax-sensitive.[4] Given that the shareholder taxes on investment income are levied directly on investors, in equilibrium, we have the demand for capital equals the supply of capital, i.e.,

$$D(r^e) = S[(1-\tau)r^e]. \tag{1}$$

Differentiating both sides of equation (1) with respect to the tax rate τ and rearranging terms, we arrive at

$$\frac{\partial r^e}{\partial \tau} = \frac{r^e S'}{(1-\tau)S' - D'}, \tag{2}$$

where S' and D' are the slopes of the supply and demand curves evaluated at the equilibrium market rate of capital, respectively. Since taxes are paid directly by the investors, and not by the firms, we have the equilibrium cost of capital and quantity of capital investment, denoted K^e, given by

$$r_c = r^e \text{ and } K^e = D(r^e).$$

Utilizing the definition of the elasticity of demand for and supply of capital, we have the following comparative static result on the effect of a change in shareholder tax rate on the cost of capital:

$$\frac{\partial r_c}{\partial \tau} = \frac{r^e \varepsilon_S}{(1-\tau)(\varepsilon_S - \varepsilon_D)} > 0 \tag{3}$$

where ε_D and ε_S are the elasticity of demand for and supply of capital with respect to the cost of capital and the required rate of return, respectively. With downward sloping demand for capital and upward sloping supply of capital, equation (3) states that when the taxation

[4] This assumption is consistent with the evidence documented in a large volume of empirical studies on the effect of shareholder taxes on asset pricing (see Graham (2003) for a detailed review).

on capital income is reduced, the cost of equity capital for firms will be lower. If we then take the cross derivative with respect to ε_D, we find that:

$$\frac{\partial r_C^2}{\partial\tau\partial\varepsilon_D} = \frac{r^e\varepsilon_S}{(1-\tau)(\varepsilon_S-\varepsilon_D)^2} > 0 \tag{4}$$

Equation (4) implies that the more inelastic a firm's demand for capital (i.e., ε_D approaches zero from the left), the larger the drop in the cost of capital, a proposition supported by the findings in Dai et al. (2013).

We now extend beyond the cost of capital literature to explore a firm's spending decision following shareholder tax rate reductions. We begin by noting that the effect of a change in the shareholder tax rate on a firm's capital investment can be similarly derived as follows:[5]

$$\frac{\partial K}{\partial\tau} = \frac{\partial K(r)}{\partial r}\frac{\partial r}{\partial\tau} = \frac{K\varepsilon_S\varepsilon_D}{(1-\tau)(\varepsilon_S-\varepsilon_D)} < 0 \tag{5}$$

because ε_D is negative. This means that a firm's capital investment increases when the shareholder tax rate is reduced, *ceteris paribus*. Continuing, the cross derivative with respect to ε_D is:

$$\frac{\partial K^2}{\partial\tau\partial\varepsilon_D} = \frac{K\varepsilon_S^2}{(1-\tau)(\varepsilon_S-\varepsilon_D)^2} > 0 \tag{6}$$

This means that the impact on a firm's investment will be larger for a more elastic firm than for a less elastic firm when there is tax rate reduction.[6] Note that the predictions arising

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[5] For brevity, from this one equation onward, the equilibrium notation of *e* will be dropped from all equations but keep in mind the comparative static analyses are based on equilibrium results.

[6] At first, the prediction on the cost of equity capital from equations (3) and (4) and the prediction on the capital investment from equation (5) and (6) may seem inconsistent. To review, equation (3) states that all firms experience a lower cost of equity capital after shareholder taxes are cut and equation (5) shows that all firms expand after taxes are lowered. However, with equation (4), we find that, after a tax cut, the more inelastic a firm's demand for capital (i.e., ε_D approaches zero from the left), the *larger* the drop in its cost of capital. Therefore, firms with the most inelastic demand enjoy the largest reductions in the cost of capital. With equation (6), we find that the more inelastic a firm's demand for capital (i.e., ε_D approaches zero from

from both equations (5) and (6) are consistent with the implications of a neoclassical general equilibrium investment model, such as Hassett and Hubbard (2002).

For the empirical tests that follow, we need to be able to identify cross-sectional variation in demand elasticity. Following Dai et al. (2013), we assert that the firms that face the more severe financial constraint are the ones that have smaller elasticity of demand for capital. We reason that firms facing severe financial constraint have more pressing needs for capital and are less sensitive to the cost of capital. Thus, these firms will have less elastic demand for capital than firms facing less or no financial constraint.[7] Restated, as firms become more financially constrained, their demand elasticity will decrease. Even though tax cuts will trigger larger reduction in their cost of equity capital, those financially constrained firms will expand their operations less than other firms following a reduction in shareholder taxes. This leads to our hypothesis on the effect of shareholder tax cut on a firm's investment.

Hypothesis: *A shareholder tax rate cut on investment income will increase investment but the impact will be smaller for more financially constrained firms than for less financially constrained firms, ceteris paribus.*

the left), the *less* the firm expands its operations following a cut in shareholder taxes. Thus, even though firms with the most inelastic demand have the largest reductions in their cost of capital after a tax cut, they expand their operations less than other firms because of their steeper downward demand curve.

7 Unfortunately, while an economic literature focuses on the magnitude of demand elasticity for capital (Schaller 2006), economists rarely examine the impact from financial constraint on the demand elasticity for capital. Dai et al. (2013) discuss one exception, Coulibaly and Millar (2011), who estimate the demand elasticity for capital when South Africa faced an economic embargo and also when it did not. During the embargo period from 1985 to 1994, many firms operated under severe financial constraint with the IMF estimating that $8 billion of investment were lost from 1985 to 1991. Coulibaly and Millar (2011) estimate demand elasticity for capital was -0.25 during the embargo period but -0.75 during the non-embargo period. Their results suggest that financial constraint affects the demand elasticity for capital and the more severe the financial constraint is, the less elastic the capital demand is.

3. Regression Equation

To test the effect of a change in shareholder taxes on a firm's investment and how that relation may differ with the firm's financial constraint, we analyze changes in operations around the two most recent shareholder tax cuts in the U.S., the Taxpayer Relief Act of 1997 (TRA) and the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA). Shareholder tax rate reductions were the primary change in both acts. TRA reduced the maximum tax rate on capital gains from 28% to 20% on positions held for more than 18 months. JGTRRA reduced the maximum tax rate on dividends from 39.6% to 15% and the maximum tax rate on capital gains from 20% to 15% for positions held longer than 12 months. Though both acts substantially lowered shareholder taxes, they differ in that TRA reduced the capital gains tax rate alone while JGTRRA reduced tax rates on both capital gains and dividends. This differential shareholder tax rate changes allow us to assess the differential effects on firms' investments from taxes on different sources of shareholder income, that is, capital gains versus dividends. The two tax events also arose during very different economic conditions. TRA was enacted at the height of an extraordinary bull market. JGTRRA was designed to aid in the recovery from a recession.

To test our hypothesis, we adopt a difference-in-differences methodology, which mitigates the effect of concurrent changes, enabling us to focus on the changes in spending across firms facing different financial constraints. Specifically, we use the following model specification to estimate the shareholder tax effects on firms' investments

$$Y_{it} = \alpha + \beta_1 Post_t + \beta_2 FC_{i(t-1)} + \beta_3 Post_t \times FC_{i(t-1)} + \gamma Z_{it} + \varepsilon_{it,} \qquad (7)$$

where the dependent variable *Y* is taken to be various suitably deflated expenditure, *Post* is a categorical variable which takes a value of 0 before the tax cut and 1 after the tax cut,[8] *FC* is the measure for financial constraint, and *Z* represents the firm-level control variables. A negative coefficient on β_3 in the following equation will be interpreted as consistent with firms facing more financial constraints (less elastic demand for capital) expanding less than other firms.

In an attempt to span as much of the firm's operations as possible, the dependent variables include changes in (i) capital expenditure, (ii) research and development, (iii) selling, general and administrative expenses, and (iv) acquisitions. The first one captures internal expansion or upgrading; the second one denotes long-term commitment; the third one includes marketing and advertising campaigns. The fourth one represents external growth.

The dependent variables are measured in first differences because investment is persistent.[9] In the widely used neoclassical investment decision model, firms should invest until the marginal benefit of investing equals the marginal cost of investing, giving rise to the optimality condition of investment known as the Euler equation. Empirically, the Euler equation is estimated by regressing investment scaled by lagged total assets or capital ($I_{i,t}/K_{i,t-1}$) on Tobin's Q and other variables of interest. This persistence of corporate

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[8] For TRA, *Post* is zero on and before 3/31/1997 (fiscal year ending in March or earlier) and one on and after 8/1/1997 (fiscal year ending in August or later). For the JGTRRA, *Post* is zero on and before 4/1/2003 (firms fiscal year ending in March or earlier) and one on and after 7/1/2003 (fiscal year ending in July or later).

[9] To illustrate, we compute the first-order autocorrelation for annual capital expenditures, deflated by the Producer Price Index (PPI), for firms included in the COMPUSTAT database using firm-years from 1951 to 2011 and excluding firms with less than 10 observations. In untabulated results, we find that annual capital expenditure has strong persistence with a median autocorrelation of 0.49 and 75th quarter autocorrelation of 67%. The serial correlation remains high, even when capital expenditures are scaled by lagged total assets with a median of 0.35 and a 75th quarter of 53%.

investment and lagged total assets or capital can create biased and inconsistent estimates and incorrect statistical inferences. One way to address the serial correlation is to include the lagged dependent variable in the regression. However, this approach forces all firms to have the same persistence, which may lead to misspecification among our firms because they have wide cross-sectional differences in their first-order autocorrelation. Instead, we address the serial correlation in our sample by taking the first differences of firm investment. We find that the median (75^{th} quarter) autocorrelation for the first difference in PPI-deflated annual capital expenditure is a more reassuring -0.16 (2%).[10]

Following Dai et al. (2013), we estimate *FC* based on the latest measure developed by Hadlock and Pierce (2010).[11] Specifically, we estimate the probability of being financially constrained for firm *i* at period *t* as follows:

$$FC_{it} = \Pr(Financially\ Constrained) = 1 - \frac{1}{1+\exp(\beta' X_{it} - C_4)} \quad \text{and}$$
$$\beta' X_{it} = -0.737 \times Size_{it} + 0.043 \times Size_{it}^2 - 0.04 \times Firm\ Age_{it}, \tag{8}$$

[10] Studies that take a similar approach to ours include the following: (a) Frank, Singh, and Wang (2010) use the first-difference of the firm's capital expenditure scaled by lagged total assets as their dependent variable in examining the impact of major dividend tax changes in the U.S. since 1980 on corporate investment. (b) Baker, Stein, and Wurgler (2003) use the percentage change in book assets over time besides conventional investment measures in examining equity dependence and the link between investment and stock prices. (c) Anderson and Garcia-Feijoo (2006) use the percentage growth rate in capital expenditures to measure firm level investment activity and sort firms into portfolios for their analysis.

[11] As detailed in Dai et al. (2013), Hadlock and Pierce's (2010) financial constraint measure supersedes its predecessors for several reasons, including its use of qualitative information, its sampling period covers both of the two changes in tax law that we study, and its factors rely on relatively exogenous factors. That said, other candidates for measuring financial constraint include the Kaplan and Zingales (1997) index, which amalgamates cash flow, Tobin's Q, leverage, dividends and cash holding scaled by book value of assets and the Whited and Wu (2006) index, which integrates cash flow, a dividend distribution dummy, leverage, size, industry sales growth, and firm sales growth. Two other variables, cash flow and leverage, also been shown to have significant and consistent effects in alternative methods such as Kaplan and Zingales (1997) and Whited and Wu (2006). In robustness checks, we consider two alternative measures of financial constraint. Similar to Kaplan and Zingales (1997) and Whited and Wu (2006), the first includes cash flow (a firm's operating income plus depreciation divided by beginning-of-year book assets) and leverage (book value of long term debt divided by current book assets) in addition to firm size and age in the ordered logit analysis. The second relies solely on firm age to assess the degree to which a firm is financially constrained.

where C_4 is the cut point for group four (likely financial constrained) and the associated cut points for groups 1 to 4 are estimated at -5.310, -0.956, 0.355, and 0.454, respectively.[12]

For firm-level control variables, we follow JGTRRA studies (e.g., Dhaliwal et al. 2007 and Campbell et al. 2013) and include firms' Tobin's Q, internal cash flows, and firm size (in logarithm) at the end of the fourth quarter of the most recent past year. Considering that capital usage may vary with the cost of capital, we include measures of a firm's cost of capital in our regression analysis. Since these variables are endogenously determined, we choose to include the industry average cost of capital and determinants of the cost of capital for each firm in our regression specification. For the former, we use the average cost of equity capital over the sample period for each industry using the classification by Fama and French (1997). For the latter, we include firms' risk exposures to the market, the size, and the value factors measured by β_{MKT}, β_{SMB}, and β_{HML}. Following Dhaliwal et al. (2007), we estimate these risk factor loadings using return data for the 48 months before the beginning of the calendar year. We include the moving average daily turnover for each firm over past 250 days leading up to the end of the most recent past quarter to control for liquidity related returns (see Sikes and Verrecchia, 2012).[13]

Existing studies suggest that firms' capital expenditures are related to sales, we thus also control for changes in annual sales. Since TRA and JGTRRA only apply to income reported on personal tax returns, we control for the investor ownership of a stock. Data on the institutional investors' ownership are obtained from their quarterly filings with the U.S.

[12] These estimates are taken from Column (2) of Table 6 in Hadlock and Pierce (2010). We thank Joshua Pierce for providing us the cut point estimates.

[13] Another reason for controlling turnover is that for the taxation to impact investors' decisions the shareholders must meet various holding periods to benefit from the shareholder tax reductions.

Securities and Exchange Commission (known as Form 13F). We also control for industry fixed effects using the Fama-French 48 industry classifications. Finally, for various robustness tests, we add controls for a firm's dividend change and share repurchase change, capital access using a firm's Standard & Poor's long-term credit rating, a firm's long-term growth with analyst forecasts, and a firm's age.

Considering that the shareholder tax effect on the cost of capital may impact the sources of capital, besides directly linking shareholder taxes and firms' investments, we also investigate the shareholder tax effect on firms' debt usage. For this analysis, we examine different responses in the short-term, long-term, and new debt for firms facing different financial constraints surrounding the shareholder tax changes under TRA and JGTRRA. We discuss our empirical analyses and findings next.

4. Empirical Analyses and Findings

4.1. Summary Statistics

We obtain data from three different sources. For investment, debt, and control variables, we use the merged COMPUSTAT and CRSP database. For investor ownership information, we use data from Thomson Financial. For long-term earnings growth forecasts, we use the I/B/E/S database. Credit ratings come from Standard & Poors.

Table 1 presents the summary statistics for spending and firm control variables around TRA and JGTRRA (Panel A) and the differences in these variables before and after the legislations (Panels B and C). The spending variables including capital expenditures (CAPX), research and development expenditures (R&D), selling, general and administrative expenses (SG&A), and acquisitions (ACQ) are expressed in real terms (one hundred million dollars) obtained by dividing the nominal value by the producer price index (2004=100). Changes are measured for each firm from year *t-1* to *t*. Panel A shows that the mean change in real capital expenditure is 0.097 (an increase of $9.7 million in 2004 dollars) around TRA and -0.019 (a decrease of $1.9 million in 2004 dollars) around JGTRRA. Comparable changes are: R&D—$2.4 million around TRA and $1.1 million around JGTRRA; SG&A—$25.3 million around TRA and $14.9 around JGTRRA; and ACQ—$9.7 million around TRA and $3.3 million around JGTRRA. The financial constraint is measured by the predicted probability that a firm falls in the likely financially constrained category and is estimated using firm size and age (*FC*). On average, 4.1% (3.1%) of firms are likely financially constrained during TRA (JGTRRA).

Many variables experienced significant changes after the tax cut events. All spending items increased after TRA. Capital expenditures grew after JGTRRA. The difference in unconditional capital spending changes for TRA and JGTRRA may reflect different shareholder tax changes for the two tax legislations and the different macroeconomic conditions surrounding TRA and JGTRRA. The probability of firms facing financial constraints declined after the tax cut for both TRA and JGTRRA, consistent with shareholder tax cuts reduces firms' financial constraints, although at least in the case of JGTRRA, it probably also reflects the economy is gradually climbing back from a recession due to the dot-com bubble.

4.2. Univariate Results

We begin with a univariate analysis of the change in firm's expenditures surrounding the tax cut events. Table 2 reports the changes in firms' capital expenditures, R&D expenditures, SG&A expenses, and acquisitions (in $100 million) before and after

TRA and JGTRRA with firms dichotomized using the median predicted probability of firms being likely financially constrained.[14] We expect that the firms with above-median financial constraint expanded less (compared with their operations before the tax cut) than did firms with below-median financial constraint.

Our findings are mostly consistent with this expectation with six of the eight comparisons showing the anticipated negative sign for the difference-in-differences. For example, we find that for firms with high financial constraint (*HFC*, i.e., firms with the predicted probability of being financially constrained above the median), the mean post-TRA change in capital expenditures was $1.44 million, down slightly ($0.02 million) from its mean pre-TRA change in capital expenditures of $1.46 million. In contrast, the mean change in capital expenditures for firms with low financial constraint (*LFC*, i.e., firms with the predicted probability of being financially constrained below the median) jumped from $12.34 million before TRA to $18.94 million after TRA, an increase of $6.59 million. The difference-in-differences of -$6.62 million between the *HFC* firms' mean decline of $0.02 million and the *LFC* firms' average surge of $6.59 million is significant at conventional levels and consistent with less financially constrained firms expanding more after the tax cuts. We find an even larger difference-in-differences for capital expenditures around JGTRRA at $26 million less for more financially constrained *HFC* firms than less financially constrained *LFC* firms. In addition, differences-in-differences are negative (as predicted) and significant in the predicted direction at the 5% level for R&D, SG&A, and acquisitions around TRA and for acquisition around JGTRRA.

[14] For this exercise alone, we restrict our sample to be those firms that show up both before and after the tax event, i.e., a balanced sample.

These univariate results provide some initial evidence that financial constraint may affect the impact of shareholder taxes on spending and job creation. We next turn to regression analysis to allow for other determinants of a firm's spending. We will find that the inferences drawn from the univariate results in this section hold.

4.3. TRA Results

We begin our multivariate analysis with the Tax Relief Act of 1997. Table 3 presents regression results from estimating equation (7), where the dependent variable is changes in (a) capital expenditures, (b) research and development expenditures, (c) selling, general, and administrative expenses, and (d) acquisitions. We find strong evidence that financial constraint affects the relation between capital gains tax rate reductions (the sole shareholder tax change in TRA) and spending.

For the expenditures, the *Post* coefficient is always positive and significant, consistent with an increase in investment following the 1997 cut in capital gains taxes, as expected. More importantly, the coefficient on the key variable of interest, *Post* × *FC*, is always negative and both statistically and economically significant for TRA. The estimated coefficient in the *ΔCAPX* regression implies that, for a one standard deviation increase in the predicted probability of being financially constrained, the increase in capital expenditures would be lower by $2.6 million in 2004 dollars,[15] which represents almost 40% of the average change in the capital expenditures for low financial constraint firms after the tax cut.[16] Similarly, a one standard deviation increase in the predicted probability

[15] These estimates are calculated by multiplying the estimated coefficient for *Post* × *FC* by the standard deviation of *FC*, as reported in Table 1, Panel A.

[16] These estimates are calculated by dividing the estimated reduction in the capital expenditures by the change in capital expenditure after the shareholder tax cut under TRA as reported in Table 2, e.g., 2.6/6.59 for the change in capital expenditure under TRA.

of being financially constrained would have lowered the increase in R&D spending by $0.9 million (28%), SG&A spending by $17.3 million (27%), and acquisitions by $14.4 million (58%).

The TRA findings are robust to numerous extensions and sensitivity tests as shown in Table 4. First, following Dhaliwal et al. (2007), Campbell, et al. (2013), Dai et al. (2013), and many others, who show that shareholder tax changes have less influence on corporate policy when the firm's shareholders are less affected by policy changes,[17] we extend our analysis to see whether the impact of financial constraint on shareholder tax effect on firms' spending varies with the tax sensitivity of the investors. To conduct these tests, we interact *IO*, the percentage of institutional ownership with the *Post*, *FC* and *Post* × *FC*. We expect a positive sign on the triple interaction for investments, indicative of reduced reaction to shareholder tax changes in companies with high institutional ownership. Consistent with this prediction, Table 4, Panel A shows a positive coefficient on *Post* × *FC* × *IO* for each of the regressions where the dependent variable is the change in spending. The other variables of interest, *Post* and *Post* × *FC* remain largely unaltered. By demonstrating that the *Post* × *FC* effect matters less when institutional ownership is high, these findings provide further confirmation that financial constraint affects the relation between shareholder taxes and spending decisions for those companies where the shareholders are subject to personal capital gains taxes.

[17] The shares held by institutional investors, such as banks, mutual funds, pension funds, charitable endowments, universities, foreigners, and other corporations were generally unaffected by the changes in TRA and JGTRRA. Exceptions would include shares held by mutual funds for taxable personal accounts and banks held in street name on the behalf of individual investors. Both would flow the tax reduction benefits through to individual tax returns.

Second, as noted above, Chetty and Saez, 2005, Brown et al., 2007, and Blouin et al., 2011, among others report that reductions in dividend (capital gains) taxes lead to increases in dividends (share repurchases). Table 4, Panel B shows that the variables of interest are largely unaltered when we control for changes in dividends and share repurchases. Third, another factor that could affect our variables of interest is a firm's access to capital. We find that inferences are unaltered if we measure access to capital by the existence of a debt rating for the firm.[18] Table 4, Panel C shows that results hold when we include the existence of a debt rating as a control variable.

Fourth, we include forecasted long-term earnings growth as a control variable. Unfortunately, including it drastically reduces the sample size because many firms are missing earnings forecasts. Nonetheless, Table 4, Panel D shows that inferences are unaltered when long-term earnings growth are included as a control variable. Fifth, Table 4, Panel E shows that results are nearly identical if financial constraint is measured using the predicted probability of financial constraint estimated using firm size, age, cash flow and leverage.[19] In untabulated results, we also find that our findings are unaltered when we include firm age as a control variable.

To summarize, the TRA results provide strong evidence linking investments to shareholder taxes. The 1997 reductions in capital gains tax rates appear to have affected capital expenditures, R&D, SG&A, and acquisitions. To our knowledge, we are first to

[18] If we measure the capital access with county-level bank deposits or branches, access to commercial paper market, and access to bank lines of credit, the estimates on our key variables are about the same.

[19] The coefficient estimates for these variables are taken from Column (4) in Table 4 of Hadlock and Pierce (2010). We thank Joshua Pierce for providing the cut points estimates in constructing the probability of financial constraint.

document a link between capital gains tax changes and this array of corporate investment decisions.

4.4. JGTRRA Results

We repeat the same tests and robustness checks for JGTRRA. Table 5 presents the primary results. We find evidence consistent with managers considering shareholder taxes when determining their capital expenditures and acquisitions.

Regarding expenditures, unlike the TRA results, where the variables of interest are significant in every spending regression, the JGTRRA results suggest that shareholder taxes only affect capital expenditures and acquisitions. When the dependent variable is changes in R&D and SG&A expenditures, the signs on the variables of interest are contrary to those predicted but statistically insignificant. For capital expenditures and acquisitions, the key variable of interest, *Post* × *FC*, is always negative and both statistically and economically significant for JGTRRA. The estimated coefficient on *Post* × *FC* in the *ΔCAPX* regression implies that, for a one standard deviation increase in the predicted probability of being financially constrained, the increase in capital expenditures would be lower by $10.2 million in 2004 dollars, which represents 36% of the average change in the capital expenditures for low financial constraint firms after the tax cut. Similarly, a one standard deviation increase in the predicted probability of being financially constrained would have lowered the increase in acquisitions by $11.9 million (32% of average change for low financial constraint firms). Table 6 provides the sensitivity checks as in Table 4. Once again, all inferences hold. In unreported results, we find that including firm age does not alter our findings.

To summarize, the results in this section are consistent with managers' considering individual capital gains and dividend tax policy changes when they undertook capital expenditures and acquisitions following the 2003 shareholder tax rate reductions. We find no similar evidence that JGTRRA shareholder tax cut affected R&D and SG&A decisions. Results again are remarkably robust to a battery of tests.

4.5. Debt Financing and Comparison of TRA and JGTRRA

While our framework is developed for equity capital, shareholder tax savings also may spillover to investments financed by issuing debt. To investigate if the shareholder tax effect also impacts firm debt usage, we perform the same analysis as before but use various measures of debt usage as the dependent variable. They include (a) change in short-term debt; (b) change in long-term debt; and (c) change in new debt.

Table 7 reports the estimation results for TRA. We find that firms increase their debt usage across all categories following the Tax Relief Act of 1997 as indicated by a positive coefficient for *Post*. Financially constrained firms increase less short-term, long-term, and new debt than other firms (a positive coefficient for *Post*FC*). The findings are statistically and economically significant. Lending support to our prediction that institutional investors are less sensitive to the personal tax change under TRA, we find significant positive coefficients for *Post*FC*IO*. Overall, the findings strongly support that the shareholder tax change affected firms' debt use with more financially constrained firms responding less than those firms with less financial constraint.

Table 8 reports the estimation results for JGTRRA. We find that more financially constrained firms increased their short-term and new debt use less than other firms did following the Jobs and Growth Tax Relief Reconciliation Act of 2003 with the increase in new debt use being statistically significant. The change in long-term debt use has the opposite sign in contrast to our prediction. The institutional investor ownership effect is also weaker on firm debt use for JGTRRA.

To summarize, taking together the findings on both investments and debt use, we conclude that the shareholder tax changes affect firms' operational decisions. More financially constrained firms responded much less than those firms with less financial constraint in reaction to shareholder tax changes. In the meantime, we consistently find that the shareholder tax change effect under TRA provides stronger support to our prediction than the effect of shareholder tax changes under JGTRRA. One important difference between these two shareholder tax changes is that TRA solely reduced the capital gains tax rate and JGTRRA lowered tax rates on both capital gains and dividends. As documented in some existing studies mentioned above, while dividend tax reduction may lower firms' cost of capital, it may also incentivize firms to pay out dividends, leaving less funds to invest. Comparing the investment trends of C-corporations and S-corporations pre- and post-tax cut, Yagan (2015) estimates that the dividend tax cut of 2003 "caused zero change in corporate investment." He observes that "the lack of detectable real effects contrasts with an immediate impact on financial payouts to shareholders." Yagan (2015) concludes that his 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."

Our findings provide some consistent evidence to Yagan (2015) in that shareholder tax cut on dividends may not have provided a larger near-term effect across all firms.

However, our findings on TRA and JGTRRA taken together provide strong empirical support of shareholder tax effects on firm investment. We consistently find more uniform effects on investment of the shareholder tax cut on capital gains under TRA than that on JGTRRA, which also reduced dividend tax rates. Our findings also offer suggestive evidence for policymakers in that the shareholder tax cut on dividends may have encouraged more financially constrained firms to increase investment more (as indicated by a positive coefficient for *Post*FC*) — one of the important objectives that policymakers aim to accomplish by reducing shareholder taxes.

5. Closing Remarks

In the spirit of Hanlon and Heitzman (2010), who call for tax research that focuses on "real" corporate decisions, we document that managers alter their investment decisions in response to changes in personal dividend and capital gains tax policy. In general, we find significant responses in corporate spending following the two most recent U.S. shareholder tax cuts. However, firms' reactions to shareholder tax cuts vary inversely with the firm's financial constraint. Employing a difference-in-differences approach, we find that, after the capital gains tax rate was reduced in 1997, financially constrained companies increased their capital expenditures, research and development, selling, general, and administrative expenses, and acquisitions less than other companies did. Similarly, after both dividend and capital gains tax rates fell in 2003, financially constrained firms increased their capital expenditures and acquisitions less than other companies did. We document similar findings on firms' debt use following the two shareholder tax rate cuts. The findings are more consistent for TRA, which solely reduced capital gains tax rate, and weaker for JGTRRA, which lowered tax rates on both capital gains and dividends.

We interpret these patterns in the following manner. Since financially constrained companies have less elastic demand for capital than other companies do, they garner a smaller portion of any increase in the supply curve arising from a cut in shareholder taxes. Imbued with less new capital, the financially constrained firms would not be expected to expand as much as other companies following the shareholder tax cuts. Instead, the bulk of the increase in the supply curve flows to firms with relatively little financial constraint. These companies likely can invest in investments with a low expected return or increase their corporate distributions. When the rate reduction applies to dividends, companies may be particularly incentivized to pay out more, weakening the incentive to invest. Therefore, the patterns we observe are consistent with companies incorporating individual tax changes into their operational decisions. To our knowledge, this is the first paper linking shareholder taxes to a wide array of spending decisions.

These findings have at least two implications for the continuing debates about the appropriate level of shareholder taxes. First, since companies with less elastic demand for capital are, by definition, less strapped for capital, it is likely that much of their tax-induced operational expansions are in low return projects. Thus, even though the tax cuts resulted in spending creation, the social gains to these investments may be limited. Second, assuming that our findings on shareholder tax decreases extrapolate to settings where shareholder taxes are increased, then investment are likely decreasing in response to the shareholder tax increases that became effective last year and more so for those firms with particularly elastic demand for capital.

These two implications suggest avenues for possible future work. First, it would be interesting to track the returns to the investment created as a result of the shareholder tax cuts and the investment lost as a result of shareholder tax increases and attempt to assess the social welfare implication of shareholder tax policy on corporate decisions. Second, the analyses in this study are limited to two shareholder tax cuts because shareholder tax increases have been rare in recent U.S. history. Once data are available, it would be interesting to assess whether the findings in this paper extrapolate to the recent shareholder tax increase.

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Appendix: Variable definition and measurement

ΔCAPX is the change in capital expenditure (in 100 million dollars) from year *t–1* to year *t*;
ΔR&D is the change in R&D expenditure (in 100 million dollars) from year *t–1* to year *t* we fill in zeros if missing;
ΔSG&A is the change in the Selling, General and Administrative expense (in 100 million dollars) from year *t–1* to year *t*;
ΔACQ is the change in the acquisition expenditure (in 100 million dollars) from year *t–1* to year *t*;
FC is the predicted probability of a firm being financially constrained in the most recent quarter in year t using Hadlock and Pierce (2010)'s SA index (size and age factors);
FC_A is the predicted probability of a firm being financially constrained in the most recent quarter in year t using Hadlock and Pierce (2010)'s size and age together with two more factors: cash flow and leverage and it is used as an alternative measure for financial constraint;
YLD is four times the dividends declared in the most recent past quarter divided by the end of quarter price as in Naranjo, Nimalendran and Ryngaert (1998);
IO is the percentage of firm shares held by institutional investors;
Rated is a dummy variable equal to 1 if a firm has a Standard & Poor's long-term creditor rating in a given year;
Tobin's Q is the beginning of the year market value of assets scaled by book value of assets [(data item #6 – data item #60 + data item #25 × data item #199) / lagged value of data item #6];
CF is cash flow from operations calculated as earnings before extraordinary items plus depreciation less working capital accruals based on Bushman et al. (2008) [(data item #18 + data item #14 – (change in data item #4 – change in data item #1 – (change in data item #5 – change in data item #34 – change in data item #71))) / lagged value of data item #6];
r_{AVE} is the average of cost of capital in year *t–1*;
ΔSale is the change in sales from year *t – 1* to year *t*;
CashHolding is cash and cash equivalents; *IND* is one minus the percentage ownership by institutional investors;
Turnover is the moving average of the past 250 daily volume scaled by the shares outstanding;
LogLTG is the logarithm of the forecasted long-term earnings growth rate;
LogSize is the logarithm of a firm's market capitalization;
β_{mkt}, β_{smb}, and β_{hml} are the beta coefficient relative to the market, the SMB, and the HML factor, respectively from the estimation using past 48 monthly returns.
ΔCAPX, *ΔRD*, *ΔSA, ΔACQ, ΔSALE*, and *CashHolding* are deflated by PPI with year 2004 as 100.

Table 1 Summary Statistics

This table reports summary statistics for firm characteristics for the period surrounding TRA and JGTRRA for the full sample (Panel A), the pre- and post- subsamples for TRA (Panel B) and pre- and post- subsamples for JGTRRA (panel C). All variables are winsorized at the 1% and 99% tails. The sample spans 1996 to 1998 for TRA and 2002 to 2004 for JGTRRA. We exclude 1997 for TRA and 2003 for JGTRRA to avoid transient effect.

Panel A: Summary statistics for the full sample

	TRA				JGTRRA			
Variable	N	Mean	Median	Std Dev	N	Mean	Median	Std Dev
ΔCAPX	12254	0.097	0.002	0.599	9963	-0.019	0.000	0.877
ΔR&D	12254	0.024	0.000	0.170	9963	0.011	0.000	0.219
ΔSG&A	11184	0.253	0.024	2.162	9338	0.149	0.011	2.756
ΔACQ	11498	0.097	0.000	3.578	9562	0.033	0.000	4.890
FC	15049	0.041	0.030	0.034	12685	0.031	0.024	0.024
FC_A	12158	0.041	0.031	0.035	10595	0.033	0.025	0.029
IO	14121	0.695	0.753	0.252	12143	0.644	0.686	0.285
Tobin's Q	13788	3.415	1.727	5.301	11353	2.365	1.430	2.784
CF	10937	-0.035	0.059	0.387	8808	-0.001	0.061	0.272
r_{AVE}	14151	0.105	0.106	0.014	12048	0.095	0.091	0.013
ΔSale	13953	110.181	9.564	434.844	11416	116.354	3.406	707.870
CashHolding	14018	156.591	13.475	637.844	11447	364.151	34.559	1308.280
Turnover	14885	0.005	0.003	0.006	12452	0.006	0.003	0.009
Ln(size)	14869	4.902	4.793	1.865	12421	5.429	5.372	1.978
YLD	15049	0.025	0.000	0.083	12685	0.048	0.000	0.215
β_{MKT}	14516	0.940	0.855	1.179	12409	0.994	0.872	0.898
β_{SMB}	14516	0.844	0.616	1.388	12409	0.579	0.394	0.904
β_{HML}	14516	0.128	0.290	1.859	12409	0.190	0.340	1.132
Rated	15049	0.192	0.000	0.394	12685	0.243	0.000	0.429
ΔDiv	12302	1.978	0.000	52.877	9769	4.212	0.000	98.556
ΔShare	11110	7.418	0.000	137.403	8688	0.113	0.000	223.886
Ln(growth)	6483	2.868	2.815	0.720	5751	2.749	2.708	0.709

Panel B: pre- and post-tax cut comparison for TRA event

	Pre-TRA		Post-TRA		Post-Pre	
Variable	N	Mean	N	Mean	difference	p-value
ΔCAPX	6037	0.073	6217	0.120	0.048	<0.0001
ΔR&D	6037	0.018	6217	0.030	0.012	<0.0001
ΔSG&A	5551	0.104	5633	0.400	0.296	<0.0001
ΔACQ	5665	0.019	5833	0.173	0.154	0.021
FC	7473	0.042	7576	0.040	-0.002	<0.0001
FC_A	5998	0.041	6160	0.040	-0.001	0.065
IO	6999	0.708	7122	0.681	-0.027	<0.0001
Tobin's Q	6805	3.431	6983	3.400	-0.030	0.739
CF	5340	-0.026	5597	-0.044	-0.018	0.013
r_{AVE}	7009	0.104	7142	0.106	0.001	<0.0001
ΔSale	6904	81.353	7049	138.416	57.063	<0.0001
CashHolding	6938	150.859	7080	162.209	11.350	0.292
Turnover	7384	0.005	7501	0.005	0.000	0.026
Ln(size)	7376	4.746	7493	5.055	0.308	<0.0001
YLD	7473	0.024	7576	0.027	0.003	0.023
β_{MKT}	7180	0.941	7336	0.938	-0.003	0.869
β_{SMB}	7180	0.882	7336	0.806	-0.076	0.000
β_{HML}	7180	0.216	7336	0.042	-0.174	<0.0001
Rated	7473	0.176	7576	0.207	0.031	<0.0001
ΔDiv	6066	2.437	6236	1.531	-0.906	0.338
ΔShare	5757	5.385	5353	9.603	4.218	0.104
Ln(growth)	2989	2.813	3494	2.916	0.104	<0.0001

Panel C: pre- and post-tax cut comparison for JGTRRA event

	Pre-JGTRRA		Post-JGTRRA			
Variable	N	Mean	N	Mean	difference	p-value
ΔCAPX	5158	-0.096	4805	0.065	0.161	<0.0001
ΔR&D	5158	0.012	4805	0.010	-0.003	0.556
ΔSG&A	4841	0.163	4497	0.135	-0.028	0.623
ΔACQ	4983	-0.027	4579	0.098	0.125	0.210
FC	6548	0.033	6137	0.030	-0.003	<0.0001
FC_A	5536	0.035	5059	0.031	-0.004	<0.0001
IO	6257	0.660	5886	0.626	-0.034	<0.0001
Tobin's Q	5943	2.157	5410	2.593	0.436	<0.0001
CF	4627	-0.012	4181	0.011	0.023	0.000
r_{AVE}	6225	0.101	5823	0.089	-0.012	<0.0001
ΔSale	5970	105.673	5446	128.063	22.389	0.092
CashHolding	5988	318.583	5459	414.136	95.553	0.000
Turnover	6438	0.006	6014	0.007	0.001	<0.0001
Ln(size)	6417	5.211	6004	5.661	0.450	<0.0001
YLD	6548	0.052	6137	0.044	-0.008	0.058
β_{MKT}	6427	0.987	5982	1.000	0.013	0.435
β_{SMB}	6427	0.622	5982	0.533	-0.089	<0.0001
β_{HML}	6427	0.198	5982	0.181	-0.016	0.416
Rated	6548	0.235	6137	0.253	0.018	0.019
ΔDiv	5102	2.303	4667	6.299	3.996	0.045
ΔShare	4502	-3.134	4186	3.605	6.739	0.165
Ln(growth)	2873	2.828	2878	2.670	-0.159	<0.0001

Table 2 Univariate difference-in-difference analyses on investments around TRA and JGTRRA

This table presents firms' change in investments from year *t–1* to year *t* one year before and after the tax cut for TRA (JGTRRA) in terms of capital expenditure (*ΔCAPX*), research and development expenditure (*ΔR&D*), selling and administrative (*ΔSG&A*), and acquisition expenditure (*ΔACQ*) for high financial constrained (*HFC*) and low financial constrained (*LFC*) firms separately and their difference in difference. *HFC* (*LFC*) represents firm-years when the predicted financial constraint is above (below) the median financial constraint for the quarter before the tax cut (1995Q4 for TRA and in 2001Q4 for JGTRRA). *FC* is the predicted probability of a firm being financially constrained in the most recent past quarter in year *t* using Hadlock and Pierce (2010)'s SA index. The reported p-values are based for two-sided tests and the sample used for this test is a balanced sample.

	TRA				JGTRRA			
	Pre	Post	Post-Pre	p-value	Pre	Post	Post-Pre	p-value
ΔCAPX								
HFC	0.0146	0.0144	-0.0002	0.9569	-0.010	0.0150	0.0252	<0.0001
LFC	0.1234	0.1894	0.0659	0.0239	-0.179	0.1064	0.2852	<0.0001
Diff-in-Diff			-0.0662	0.0239			-0.2601	<0.0001
ΔR&D								
HFC	0.0061	0.0053	-0.0008	0.6749	-0.005	0.0032	0.0085	<0.0001
LFC	0.0291	0.0616	0.0325	<0.0001	0.023	0.0211	-0.0021	0.8551
Diff-in-Diff			-0.0333	<0.0001			0.0106	0.3353
ΔSG&A								
HFC	0.0365	0.0673	0.0308	<0.0001	-0.005	0.0326	0.0376	<0.0001
LFC	0.0862	0.7275	0.6413	<0.0001	0.245	0.1291	-0.1160	0.3813
Diff-in-Diff			-0.6105	<0.0001			0.1537	0.2692
ΔACQ								
HFC	0.0194	0.0388	0.0194	0.0000	0.013	0.0270	0.0138	0.3920
LFC	0.0475	0.2980	0.2505	0.1160	-0.201	0.1782	0.3787	0.0521
Diff-in-Diff			-0.2311	0.0051			-0.3649	0.0474

Table 3 Shareholder tax effect on investment: main results for TRA

This table presents regression results of shareholder tax effects on firms' investment for firms facing varying financial constraints. We use data from 1996 to 1998, and *Post* takes a value of zero before 1997 and value of one after 1997. We exclude 1997 to avoid transient effect. See Appendix for variable definition and measurement. All variables on the right hand side are measured at year t-1 while dependent variable is measured at year t. Industry is based on Fama-French 48 industry. Standard errors are robust and P-value is one-sided if there is a prediction.

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-0.172	0.151	-0.091	0.017	-0.765	0.078	0.294	0.661
Post	+	**0.055**	**0.002**	**0.017**	**0.000**	**0.357**	**<.0001**	**0.319**	**0.000**
FC		1.154	<.0001	0.231	0.009	2.075	0.043	2.842	0.061
Post*FC	-	**-0.768**	**0.014**	**-0.272**	**0.002**	**-5.088**	**<.0001**	**-4.242**	**0.006**
IO		-0.029	0.351	0.018	0.057	0.202	0.069	-0.499	0.003
Tobin's Q		0.001	0.358	0.002	<.0001	0.008	0.081	-0.002	0.790
CF		0.039	0.048	0.042	<.0001	0.108	0.124	0.038	0.715
r_{AVE}		0.222	0.677	0.234	0.145	3.143	0.080	-0.224	0.936
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	<.0001
CashHolding		0.000	<.0001	0.000	<.0001	0.000	0.250	0.000	0.006
Turnover		-0.469	0.661	1.440	<.0001	1.995	0.588	4.742	0.407
Ln(size)		0.027	<.0001	0.010	<.0001	0.003	0.890	-0.036	0.171
YLD		-0.058	0.391	-0.018	0.402	-0.203	0.401	0.045	0.898
β_{MKT}		0.000	0.955	0.000	0.990	0.010	0.554	-0.001	0.959
β_{SMB}		-0.003	0.434	-0.004	0.005	0.005	0.732	0.011	0.612
β_{HML}		0.006	0.070	-0.001	0.575	-0.007	0.575	0.004	0.836
Industry FE		yes		yes		yes		yes	
N		9438		9438		8254		8824	
Log Likelihood		15260.0		-7678.6		32014.7		42204.2	

Table 4 Shareholder tax effect on investment: robustness tests for TRA

This table presents regression results of shareholder tax effects on firms' investment for firms facing varying financial constraints. We use data from 1996 to 1998, and *Post* takes a value of zero before 1997 and value of one after 1997. We exclude 1997 to avoid transient effect. See Appendix for variable definition and measurement. All variables on the right hand side are measured at year *t-1* while dependent variable is measured at year *t*. Industry is based on Fama-French 48 industry. There are five panels: Panel A considers institutional investors ownership; Panel B controls for change in dividend distribution and change in share repurchases; Panel C controls for a firm's ability to access to bond market; Panel D controls for firm's long term growth and Panel E considers an alternative measure for financial constraint. Standard errors are robust and P-value is one-sided if there is a prediction.

Panel A: considering institution investor ownership

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-0.191	0.135	-0.100	0.013	-1.350	0.003	0.045	0.950
Post	+	**0.247**	**<.0001**	**0.085**	**<.0001**	**1.165**	**<.0001**	**1.316**	**<.0001**
FC		2.282	0.089	0.241	0.543	18.257	<.0001	8.970	0.197
IO		0.013	0.825	0.044	0.012	0.921	<.0001	-0.076	0.806
Post*FC	**-**	**-7.682**	**<.0001**	**-1.803**	**0.000**	**-28.713**	**<.0001**	**-32.312**	**0.000**
*Post*IO*		-0.248	0.001	-0.104	<.0001	-1.156	<.0001	-1.420	0.000
*FC*IO*		-1.475	0.305	-0.179	0.673	-19.112	<.0001	-8.558	0.250
Post*FC*IO	+	**8.143**	**<.0001**	**2.035**	**0.000**	**29.239**	**<.0001**	**34.815**	**0.000**
Tobin's Q		0.002	0.154	0.002	<.0001	0.006	0.176	0.000	0.947
CF		0.047	0.018	0.045	<.0001	0.099	0.158	0.061	0.557
r_{AVE}		0.313	0.557	0.264	0.100	3.507	0.051	0.277	0.920
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	<.0001
CashHolding		0.000	<.0001	0.000	<.0001	0.000	0.146	0.000	0.008
Turnover		-0.224	0.835	1.496	<.0001	1.385	0.708	5.417	0.345
Ln(size)		0.024	<.0001	0.009	<.0001	0.008	0.666	-0.050	0.072
YLD		-0.062	0.366	-0.018	0.395	-0.183	0.447	0.040	0.908
β_{MKT}		0.000	0.963	0.000	0.833	0.010	0.555	0.002	0.947
β_{SMB}		-0.002	0.564	-0.003	0.008	0.003	0.823	0.012	0.572
β_{HML}		0.006	0.086	-0.001	0.414	-0.006	0.624	0.001	0.933
Industry FE		yes		yes		yes		yes	
N		9438		9438		8254		8824	
Log Likelihood		15235.8		-7703.2		31976.1		42174.9	

Panel B: controlling for change in dividends and in share repurchases

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-0.121	0.332	-0.102	0.011	-0.753	0.119	0.487	0.514
Post	+	**0.047**	**0.010**	**0.019**	**0.000**	**0.375**	**<.0001**	**0.338**	**0.000**
FC		1.174	0.000	0.231	0.012	1.835	0.107	2.881	0.087
Post*FC	-	**-0.676**	**0.039**	**-0.326**	**0.001**	**-5.421**	**<.0001**	**-4.430**	**0.010**
IO		-0.039	0.224	0.025	0.014	0.201	0.111	-0.569	0.002
Tobin's Q		0.000	0.907	0.002	0.000	0.009	0.117	-0.002	0.807
CF		0.034	0.117	0.043	<.0001	0.119	0.148	0.054	0.655
r_{AVE}		-0.104	0.856	0.296	0.083	3.429	0.091	-1.426	0.650
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	<.0001
CashHolding		0.000	<.0001	0.000	<.0001	0.000	0.901	0.000	0.007
Turnover		-0.283	0.812	1.118	0.002	2.207	0.609	8.283	0.218
Ln(size)		0.030	<.0001	0.011	<.0001	-0.006	0.788	-0.041	0.164
YLD		-0.096	0.174	-0.021	0.344	-0.247	0.355	0.091	0.815
β_{MKT}		-0.001	0.896	0.000	0.995	0.013	0.524	-0.004	0.893
β_{SMB}		-0.003	0.478	-0.003	0.014	0.004	0.792	0.009	0.709
β_{HML}		0.006	0.137	-0.001	0.341	-0.009	0.491	0.006	0.765
ΔDiv		0.001	<.0001	0.000	0.001	-0.002	0.014	-0.001	0.170
ΔShare		0.000	0.060	0.000	<.0001	0.000	0.046	0.000	0.673
Industry FE		yes		yes		yes		yes	
N		8273		8273		7238		7756	
Log Likelihood		13494.8		-6826.7		28846.7		37939.3	

Panel C: controlling for capital access

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-0.168	0.162	-0.090	0.018	-0.765	0.079	0.327	0.625
Post	**+**	**0.054**	**0.002**	**0.017**	**0.000**	**0.357**	**<.0001**	**0.317**	**0.000**
FC		1.139	0.000	0.230	0.010	2.074	0.043	2.814	0.064
Post*FC	**-**	**-0.749**	**0.017**	**-0.269**	**0.003**	**-5.084**	**<.0001**	**-4.171**	**0.007**
IO		-0.020	0.511	0.019	0.045	0.204	0.068	-0.465	0.005
Tobin's Q		0.002	0.123	0.002	<.0001	0.008	0.080	0.002	0.837
CF		0.046	0.020	0.043	<.0001	0.109	0.122	0.067	0.517
r_{AVE}		0.290	0.587	0.241	0.134	3.153	0.079	0.002	1.000
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	<.0001
CashHolding		0.000	<.0001	0.000	<.0001	0.000	0.255	0.000	0.012
Turnover		-0.309	0.773	1.459	<.0001	2.025	0.582	5.363	0.348
Ln(size)		0.020	<.0001	0.009	<.0001	0.001	0.939	-0.066	0.018
YLD		-0.068	0.319	-0.019	0.375	-0.204	0.398	0.012	0.973
β_{MKT}		0.000	0.973	0.000	0.982	0.010	0.553	-0.001	0.965
β_{SMB}		-0.003	0.477	-0.004	0.005	0.005	0.730	0.012	0.587
β_{HML}		0.006	0.094	-0.001	0.543	-0.007	0.571	0.002	0.896
Rated		0.073	<.0001	0.009	0.099	0.011	0.857	0.313	0.001
Industry FE		yes		yes		yes		yes	
N		9438		9438		8254		8824	
Log Likelihood		15247.7		-7672.7		32018.4		42195.4	

Panel D: controlling for long-term growth

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-0.298	0.150	-0.185	0.006	-1.053	0.046	-0.532	0.617
Post	**+**	**0.050**	**0.070**	**0.024**	**0.007**	**0.399**	**<.0001**	**0.444**	**0.002**
FC		2.972	0.000	0.020	0.938	3.357	0.105	9.046	0.021
Post*FC	**-**	**-1.343**	**0.070**	**-0.584**	**0.014**	**-7.840**	**0.000**	**-9.061**	**0.016**
IO		-0.058	0.233	0.025	0.107	0.381	0.003	-0.483	0.043
Tobin's Q		0.000	0.998	0.002	0.002	0.008	0.145	-0.007	0.569
CF		0.045	0.312	0.078	<.0001	0.146	0.191	0.148	0.482
r_{AVE}		0.398	0.663	0.547	0.054	2.461	0.268	1.830	0.677
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	0.021
CashHolding		0.000	<.0001	0.000	<.0001	0.000	<.0001	0.000	0.333
Turnover		0.301	0.862	1.990	0.000	-1.977	0.647	-5.374	0.527
Ln(size)		0.048	<.0001	0.012	<.0001	0.039	0.099	0.065	0.135
YLD		-0.022	0.874	-0.029	0.505	-0.381	0.253	0.361	0.573
β_{MKT}		0.004	0.699	0.002	0.427	0.008	0.728	0.023	0.624
β_{SMB}		-0.004	0.616	-0.003	0.193	0.001	0.977	0.019	0.634
β_{HML}		0.010	0.103	-0.001	0.594	-0.009	0.552	-0.012	0.688
Ln(growth)		-0.011	0.483	0.008	0.095	0.010	0.811	-0.077	0.311
Industry FE		yes		yes		yes		yes	
N		4783		4783		4289		4410	
Log Likelihood		9233.3		-1922.8		15396.7		21732.7	

Panel E: alternative financial constraint measure

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-0.134	0.285	-0.114	0.004	-0.903	0.049	0.200	0.777
Post	**+**	**0.071**	**0.000**	**0.023**	**<.0001**	**0.402**	**<.0001**	**0.348**	**0.000**
FC		0.881	0.009	0.448	<.0001	3.552	0.003	3.435	0.047
Post*FC	**-**	**-1.111**	**0.001**	**-0.402**	**<.0001**	**-6.074**	**<.0001**	**-4.778**	**0.003**
IO		-0.024	0.460	0.018	0.076	0.207	0.081	-0.501	0.004
Tobin's Q		0.002	0.213	0.003	<.0001	0.014	0.031	-0.004	0.664
CF		0.049	0.068	0.063	<.0001	0.191	0.050	0.070	0.626
r_{AVE}		0.144	0.796	0.302	0.074	3.388	0.074	0.294	0.920
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	<.0001
CashHolding		0.000	<.0001	0.000	<.0001	0.000	0.381	0.000	0.010
Turnover		-0.602	0.602	1.532	<.0001	1.325	0.741	4.128	0.507
Ln(size)		0.022	<.0001	0.011	<.0001	0.007	0.727	-0.032	0.259
YLD		-0.072	0.305	-0.017	0.430	-0.183	0.468	0.046	0.899
β_{MKT}		0.004	0.470	-0.001	0.644	0.010	0.617	-0.005	0.883
β_{SMB}		-0.006	0.255	-0.004	0.012	0.012	0.487	0.014	0.608
β_{HML}		0.006	0.152	0.000	0.714	-0.014	0.346	-0.001	0.960
Industry FE		yes		yes		yes		yes	
N		8849		8849		7735		8283	
Log Likelihood		14601.8		-6790.8		30440.5		40070.6	

Table 5 Shareholder tax effect on investment: main results for JGTRRA

This table presents regression results of shareholder tax effects on firms' investment for firms facing varying financial constraints. We use data from 2002 to 2004, and *Post* takes a value of zero before 2003 and value of one after 2003. We exclude 2003 for JGTRRA to avoid transient effect. See Appendix for variable definition and measurement. All variables on the right hand side are measured at year t-1 while dependent variable is measured at year t. Industry fixed effects are included. Standard errors are robust and P-value is one-sided if there is a prediction.

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		0.405	0.031	0.000	0.995	1.035	0.066	-1.421	0.103
Post	+	**0.293**	**<.0001**	**-0.019**	**0.987**	**-0.256**	**0.983**	**0.535**	**<.0001**
FC		1.246	0.054	-0.003	0.986	-4.283	0.038	2.363	0.397
Post*FC	-	**-4.251**	**<.0001**	**0.293**	**0.943**	**3.349**	**0.919**	**-4.971**	**0.048**
IO		-0.125	0.006	-0.003	0.800	-0.042	0.768	0.425	0.043
Tobin'sQ		0.015	0.000	0.006	<.0001	0.037	0.004	0.001	0.940
CF		0.137	0.001	0.108	<.0001	0.324	0.020	0.120	0.513
r_{AVE}		-1.697	0.062	-0.068	0.774	-4.166	0.145	14.010	0.000
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	0.000
CashHolding		0.000	<.0001	0.000	0.010	0.000	<.0001	0.000	<.0001
Turnover		-0.876	0.510	-0.180	0.612	-4.109	0.326	2.211	0.705
Ln(size)		-0.063	<.0001	-0.001	0.621	-0.083	0.000	-0.003	0.923
YLD		-0.076	0.057	-0.001	0.939	-0.023	0.852	-0.118	0.512
β_{MKT}		-0.003	0.792	-0.008	0.007	0.019	0.572	-0.063	0.197
β_{SMB}		0.025	0.010	-0.004	0.168	-0.001	0.972	0.033	0.467
β_{HML}		0.003	0.699	0.001	0.570	-0.020	0.480	-0.031	0.431
Industry FE		yes		yes		yes		yes	
N		7938		7938		6990		7605	
Log Likelihood		19488.3		-1885.1		31811.9		40118.2	

Table 6 Shareholder tax effect on investment: robustness tests for JGTRRA

This table presents regression results of shareholder tax effects on firms' investment for firms facing varying financial constraints. We use data from 2002 to 2004, and *Post* takes a value of zero before 2003 and value of one after 2003. We exclude 2003 for JGTRRA to avoid transient effect. See Appendix for variable definition and measurement. All variables on the right hand side are measured at year t-1 while dependent variable is measured at year t. Industry is based on Fama-French 48 industry. There are five panels: Panel A considers institutional investors ownership; Panel B controls for change in dividend distribution and change in share repurchases; Panel C controls for a firm's ability to access to bond market; Panel D controls for firm's long term growth and Panel E considers an alternative measure for financial constraint. Standard errors are robust and P-value is one-sided if there is a prediction.

Panel A: considering institutional investors ownership

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		0.155	0.435	0.044	0.413	1.307	0.029	-2.358	0.010
Post	+	**0.684**	**<.0001**	**-0.072**	**0.999**	**-0.871**	**0.999**	**1.125**	**0.001**
FC		7.929	0.001	-1.298	0.033	-11.593	0.120	31.300	0.002
IO		0.247	0.007	-0.062	0.009	-0.488	0.088	1.479	0.000
Post*FC	-	**-14.585**	**<.0001**	**1.838**	**0.991**	**21.324**	**0.984**	**-23.368**	**0.032**
*Post*IO*		-0.662	<.0001	0.088	0.003	1.020	0.007	-0.902	0.065
*FC*IO*		-8.752	0.001	1.608	0.016	10.084	0.217	-33.741	0.002
Post*FC*IO	+	**14.555**	**0.000**	**-2.117**	**0.999**	**-24.764**	**0.984**	**23.961**	**0.051**
Tobin'sQ		0.015	0.000	0.006	<.0001	0.036	0.006	-0.004	0.813
CF		0.143	0.001	0.108	<.0001	0.303	0.031	0.112	0.543
r_{AVE}		-1.761	0.053	-0.064	0.787	-4.090	0.152	14.150	0.000
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	0.000
CashHolding		0.000	<.0001	0.000	0.009	0.000	<.0001	0.000	<.0001
Turnover		-0.905	0.496	-0.170	0.632	-4.073	0.330	1.809	0.757
Ln(size)		-0.060	<.0001	-0.002	0.412	-0.083	0.001	0.019	0.589
YLD		-0.072	0.070	-0.002	0.887	-0.026	0.832	-0.107	0.550
β_{MKT}		-0.002	0.851	-0.008	0.007	0.015	0.660	-0.071	0.148
β_{SMB}		0.024	0.014	-0.003	0.218	-0.002	0.944	0.019	0.675
β_{HML}		0.004	0.666	0.001	0.621	-0.018	0.511	-0.023	0.560
Industry FE		yes		yes		yes		yes	
N		7938		7938		6990		7605	
Log Likelihood		19455.4		-1891.3		31793.4		40095.1	

Panel B: controlling for the changes in dividends and share repurchases

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		0.484	0.014	-0.010	0.861	0.860	0.148	-1.784	0.058
Post	**+**	**0.295**	**<.0001**	**-0.020**	**0.986**	**-0.314**	**0.997**	**0.426**	**0.003**
FC		1.210	0.100	-0.196	0.312	-3.942	0.091	1.932	0.557
Post*FC	**-**	**-4.346**	**<.0001**	**0.349**	**0.952**	**4.401**	**0.950**	**-2.620**	**0.229**
IO		-0.182	0.000	0.007	0.604	0.001	0.994	0.438	0.071
Tobin'sQ		0.017	0.000	0.005	<.0001	0.036	0.019	-0.008	0.699
CF		0.139	0.006	0.096	<.0001	0.301	0.068	0.101	0.660
r_{AVE}		-1.750	0.085	0.071	0.790	-3.620	0.253	17.561	0.000
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	0.023
CashHolding		0.000	<.0001	0.000	0.001	0.000	0.002	0.000	0.001
Turnover		0.120	0.940	0.103	0.807	-6.204	0.211	3.594	0.618
Ln(size)		-0.073	<.0001	-0.001	0.501	-0.062	0.016	0.022	0.559
YLD		-0.091	0.036	-0.003	0.827	-0.031	0.818	-0.149	0.462
β_{MKT}		-0.002	0.859	-0.008	0.027	-0.007	0.852	-0.089	0.127
β_{SMB}		0.027	0.021	-0.005	0.136	0.002	0.950	0.020	0.714
β_{HML}		0.007	0.474	0.001	0.735	-0.024	0.456	-0.034	0.477
ΔDiv		0.001	<.0001	0.000	0.303	0.000	0.278	0.005	<.0001
ΔShare		0.000	0.001	0.000	<.0001	-0.001	<.0001	0.001	<.0001
Industry FE		yes		yes		yes		yes	
N		6593		6593		5869		6312	
Log Likelihood		16402.2		-1311.9		26947.6		33956.1	

Panel C: controlling for the capital access

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		0.408	0.030	0.000	0.999	1.038	0.065	-1.416	0.104
Post	+	**0.292**	**<.0001**	**-0.018**	**0.987**	**-0.259**	**0.994**	**0.529**	**<.0001**
FC		1.239	0.056	-0.001	0.994	-4.303	0.037	2.256	0.419
Post*FC	-	**-4.244**	**<.0001**	**0.293**	**0.942**	**3.366**	**0.820**	**-4.936**	**0.049**
IO		-0.133	0.004	-0.002	0.854	-0.059	0.682	0.381	0.069
Tobin'sQ		0.013	0.001	0.006	<.0001	0.033	0.010	-0.006	0.721
CF		0.128	0.002	0.109	<.0001	0.305	0.029	0.077	0.676
r_{AVE}		-1.684	0.064	-0.070	0.770	-4.135	0.148	14.072	0.000
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	0.000
CashHolding		0.000	<.0001	0.000	0.014	0.000	<.0001	0.000	<.0001
Turnover		-0.972	0.465	-0.170	0.631	-4.389	0.294	1.718	0.769
Ln(size)		-0.057	<.0001	-0.002	0.443	-0.069	0.005	0.029	0.415
YLD		-0.071	0.073	-0.001	0.906	-0.015	0.901	-0.093	0.605
β_{MKT}		-0.003	0.763	-0.008	0.007	0.018	0.590	-0.065	0.185
β_{SMB}		0.024	0.015	-0.004	0.189	-0.004	0.893	0.024	0.589
β_{HML}		0.006	0.528	0.001	0.635	-0.015	0.593	-0.021	0.602
Rated		-0.066	0.012	0.007	0.338	-0.150	0.067	-0.369	0.003
Industry FE		yes		yes		yes		yes	
N		7938		7938		6990		7605	
Log Likelihood		19487.4		-1878.0		31811.7		40111.5	

Panel D: controlling for long-term growth

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		0.765	0.013	-0.052	0.554	1.607	0.070	-1.601	0.326
Post	+	**0.388**	**<.0001**	**-0.024**	**0.942**	**-0.742**	**0.999**	**1.002**	**0.000**
FC		1.193	0.501	-0.550	0.255	-13.750	0.007	9.180	0.272
Post*FC	-	**-8.347**	**0.000**	**0.426**	**0.792**	**16.694**	**0.998**	**-16.430**	**0.035**
IO		-0.133	0.074	0.021	0.323	0.183	0.405	0.431	0.252
Tobin'sQ		0.022	0.003	0.004	0.029	0.032	0.123	0.016	0.634
CF		0.309	0.001	0.183	<.0001	0.442	0.107	0.359	0.414
r_{AVE}		-2.578	0.096	0.145	0.728	-7.355	0.100	25.311	0.001
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	<.0001
CashHolding		0.000	0.001	0.000	0.056	0.000	0.027	0.000	<.0001
Turnover		-2.341	0.281	0.234	0.701	-9.095	0.141	0.344	0.974
Ln(size)		-0.094	<.0001	0.000	0.977	-0.066	0.085	-0.061	0.348
YLD		-0.200	0.012	-0.009	0.674	-0.023	0.920	-0.088	0.821
β_{MKT}		-0.004	0.840	-0.012	0.034	0.019	0.734	-0.060	0.527
β_{SMB}		0.032	0.080	-0.004	0.410	0.013	0.812	0.070	0.436
β_{HML}		-0.008	0.632	-0.004	0.365	-0.064	0.172	-0.097	0.223
Ln(growth)		0.001	0.983	0.009	0.193	-0.021	0.781	-0.149	0.205
Industry FE		yes		yes		yes		yes	
N		4238		4238		3789		3995	
Log Likelihood		11796.5		684.5		17816.4		22918.1	

Panel E: alternative financial constraint measure

	Prediction	*ΔCAPX*		*ΔR&D*		*ΔSG&A*		*ΔACQ*	
		estimate	p-value	estimate	p-value	estimate	p-value	estimate	p-value
Intercept		0.402	0.031	-0.003	0.948	0.845	0.129	-1.539	0.081
Post	**+**	**0.308**	**<.0001**	**-0.023**	**0.997**	**-0.313**	**0.999**	**0.525**	**<.0001**
FC		1.727	0.004	0.060	0.710	-2.695	0.161	3.674	0.163
Post*FC	**-**	**-4.385**	**<.0001**	**0.371**	**0.986**	**4.444**	**0.980**	**-4.255**	**0.055**
IO		-0.153	0.001	-0.006	0.647	-0.001	0.995	0.401	0.060
Tobin'sQ		0.014	0.000	0.005	<.0001	0.030	0.021	-0.002	0.891
CF		0.136	0.005	0.121	<.0001	0.338	0.032	0.193	0.363
r_{AVE}		-1.787	0.050	-0.054	0.824	-4.165	0.142	14.295	0.000
ΔSale		0.000	<.0001	0.000	<.0001	0.002	<.0001	0.000	0.001
CashHolding		0.000	<.0001	0.000	0.001	0.000	<.0001	0.000	<.0001
Turnover		-1.323	0.322	-0.230	0.525	-3.673	0.379	2.110	0.724
Ln(size)		-0.062	<.0001	-0.001	0.790	-0.054	0.020	0.008	0.818
YLD		-0.071	0.072	-0.001	0.931	-0.017	0.886	-0.115	0.525
β_{MKT}		-0.002	0.832	-0.007	0.020	-0.002	0.945	-0.062	0.230
β_{SMB}		0.032	0.002	-0.004	0.142	-0.004	0.902	0.033	0.489
β_{HML}		0.005	0.603	0.001	0.839	-0.012	0.670	-0.036	0.393
Industry FE		yes		yes		yes		yes	
N		7783		7783		6853		7458	
Log Likelihood		19006.6		-1801.2		30941.6		39451.6	

Table 7 Shareholder tax effect on firm debt usage under TRA

This table presents regression results of shareholder tax effects on firms' debt usage for firms facing varying financial constraints. We use data from 1996 to 1998, and *Post* takes a value of zero before 1997 and value of one after 1997. We exclude 1997 to avoid transient effect. *ΔSTD, ΔLTD,* and *ΔND* represent the change in short-term, long-term, and new debt, respectively. See Appendix for other variable definition and measurement. All variables on the right hand side are measured at year *t-1* while dependent variable is measured at year *t*. Industry is based on Fama-French 48 industry. Standard errors are robust and P-value is one-sided if there is a prediction.

	Prediction	*ΔSTD*		*ΔLTD*		*ΔND*	
		estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-86.935	0.003	-67.852	0.205	-57.568	0.290
Post	+	**63.544**	**<.0001**	**189.460**	**<.0001**	**85.053**	**<.0001**
FC		28.546	0.023	39.672	0.082	15.758	0.493
IO		20.867	0.121	45.915	0.061	5.743	0.816
Post*FC	-	**-63.477**	**<.0001**	**-190.590**	**<.0001**	**-84.489**	**0.005**
*Post*IO*		-51.198	0.003	-162.620	<.0001	-83.891	0.008
*FC*IO*		-5.630	0.750	-17.352	0.589	5.335	0.869
Post*FC*IO	+	**51.258**	**0.032**	**167.560**	**<.0001**	**83.743**	**0.056**
Tobin's Q		-0.374	0.258	-1.209	0.044	-0.559	0.357
CF		-6.840	0.142	-3.133	0.711	3.272	0.702
r_{AVE}		37.122	0.773	-379.610	0.104	13.285	0.955
ΔSale		28.860	<.0001	187.180	<.0001	116.970	<.0001
CashHolding		42.479	<.0001	-78.172	<.0001	-50.922	<.0001
Turnover		-34.705	0.894	-62.962	0.895	273.720	0.569
Ln(size)		5.198	<.0001	14.930	<.0001	6.809	0.001
YLD		13.724	0.407	6.389	0.831	6.684	0.826
Firm age		0.643	<.0001	-0.665	0.002	0.316	0.140
β_{MKT}		0.705	0.564	-3.727	0.093	-0.215	0.924
β_{SMB}		-0.496	0.621	0.793	0.663	0.006	0.997
β_{HML}		-0.359	0.658	2.322	0.115	1.221	0.413
Industry FE		yes		yes		yes	
N		9166		9139		9167	
Log Likelihood		114052.9		124538.2		125146.3	

Table 8 Shareholder tax effect on firm debt usage under JGTRRA

This table presents regression results of shareholder tax effects on firms' debt usage for firms facing varying financial constraints. We use data from 2002 to 2004, and *Post* takes a value of zero before 2003 and value of one after 2003. We exclude 2003 to avoid transient effect. *ΔSTD, ΔLTD,* and *ΔND* represent the change in short-term, long-term, and new debt, respectively. See Appendix for other variable definition and measurement. All variables on the right hand side are measured at year *t-1* while dependent variable is measured at year *t*. Industry is based on Fama-French 48 industry. Standard errors are robust and P-value is one-sided if there is a prediction.

	Prediction	*ΔSTD*		*ΔLTD*		*ΔND*	
		estimate	p-value	estimate	p-value	estimate	p-value
Intercept		-39.396	0.339	51.366	0.443	101.310	0.275
Post	**+**	**22.844**	**0.044**	**-220.150**	**<.0001**	**132.480**	**<.0001**
FC		14.406	0.316	-77.557	0.002	138.870	<.0001
IO		17.898	0.291	-21.318	0.470	143.150	0.000
Post*FC	**-**	**-22.568**	**0.248**	**205.370**	**<.0001**	**-129.060**	**0.005**
*Post*IO*		-18.710	0.391	127.290	0.002	-99.833	0.054
*FC*IO*		-15.787	0.464	11.933	0.752	-189.700	0.000
Post*FC*IO	**+**	**20.133**	**0.507**	**-106.360**	**0.064**	**99.742**	**0.165**
Tobin's Q		0.662	0.420	2.170	0.115	4.063	0.030
CF		11.900	0.179	28.825	0.051	66.482	0.001
r_{AVE}		232.820	0.224	385.130	0.240	-235.840	0.591
ΔSale		28.520	<.0001	94.751	<.0001	11.541	0.097
CashHolding		-19.450	<.0001	-43.580	<.0001	-64.090	<.0001
Turnover		72.648	0.799	356.280	0.457	669.070	0.303
Ln(size)		-0.187	0.903	2.685	0.274	-19.133	<.0001
YLD		11.188	0.196	-2.379	0.866	-9.467	0.627
Firm age		-0.032	0.844	-0.568	0.025	-0.549	0.130
β_{MKT}		0.853	0.723	-12.537	0.002	0.674	0.902
β_{SMB}		-0.789	0.718	-0.249	0.944	5.546	0.258
β_{HML}		0.027	0.989	-0.111	0.972	-5.399	0.218
Industry FE		yes		yes		yes	
N		7721		7695		7723	
Log Likelihood		100412.3		108630.8		113228.7	