CEOs' Capital Gains Taxes and Share Pledging

Jonathan Underwood
Boston College

Benjamin P. Yost*
Boston College

November 2023

Abstract

We investigate the relation between CEOs' unrealized capital gains tax liabilities ("tax burdens") and share pledging; a practice in which executives use shares held in their firm as collateral for personal loans. Pledging shares allows executives to obtain personal liquidity without selling appreciated shares, thereby allowing them to avoid triggering a tax liability. Employing a hand-collected sample of pledging data for executives from 2006-2019, we find that an interquartile increase in the tax burden is associated with a 30.5% increase in the likelihood that a CEO pledges shares, and an 18.7% increase in the number of shares pledged. Cross-sectionally, we find the relation is stronger for 1) more powerful CEOs, and 2) CEOs whose wealth is more concentrated in the firm. Moreover, we find that high-tax burden CEOs who cease pledging shares receive correspondingly higher cash-based pay, consistent with firms compensating managers who forgo the tax-preferred liquidity benefits of share pledging. Overall, the evidence indicates that the tax deferral benefit is of first-order importance in driving executives' share pledging.

Keywords: CEO ownership, capital gains taxes, pledging shares, compensation

JEL classifications: G30, H24, H26, J33, M52

1. Introduction

An increasingly popular strategy used by wealthy individuals to avoid paying income taxes is summarized by the phrase "buy, borrow, die" (McCaffery, 2012). The strategy consists of buying and holding assets that appreciate without generating taxable cash flows, borrowing to finance lifestyle needs, and holding on to the assets until death, at which point they are passed to heirs with a stepped-up tax basis. We study executives' use of this strategy using their shares in the company they manage. Executives who hold shares for long periods of time often face large unrealized capital gains tax liabilities that would have to be paid if they were to sell the shares, creating a "lock-in" effect, or a tax-based disincentive to sell shares (e.g., Jin and Kothari, 2008; Yost, 2018). As an alternative to selling shares, some executives use their stock as collateral for personal loans; a practice known as share pledging. Share pledging allows executives to finance their personal lifestyle while continuing to own the shares, thereby avoiding the taxes incurred upon a sale. We seek to understand whether and to what extent tax considerations drive executives' decisions to pledge shares.

Recent media attention has highlighted executives' use of share pledging as a key component of the "buy, borrow, die" tax planning strategy. For instance, an article in *The New York Times* reporting on the revelation that wealthy Americans such as Elon Musk pay relatively low tax rates notes that "the wealthy live off unrealized gains – in the form of stocks and other assets that grow more valuable over time. The wealthy borrow against these assets to pay for houses, islands and private planes" (Leonhardt, 2021).[1] Despite considerable coverage in the popular media, no prior study systematically explores the role of taxes in executives' decisions to pledge shares. We aim to fill this gap in the literature.

---

[1] See also the articles "Buy, Borrow, Die: How Rich Americans Live Off Their Paper Wealth" *The Wall Street Journal* (July 13, 2021), and "Why Elon Musk Has a Lower Tax Rate Than You" *The New York Times* (June 10, 2021).

Our central hypothesis is that executives pledge shares in their firm when facing high unrealized capital gains tax liabilities (i.e., "tax burdens") as a way to avoid selling those shares and triggering a required tax payment. Although it may seem intuitive at first glance, there are reasons we may not observe such behavior. First, CEOs may be heavily weighted in their own firm's stock and desire to sell shares to diversify their wealth (in spite of the tax cost of such a sale) rather than pledge shares. Second, due to negative connotations associated with managerial share pledging, boards in recent years have increasingly discouraged or explicitly disallowed share pledging (Bae and Zhang, 2018; Underwood, 2022). Consequently, it is unclear whether, or to what extent, CEOs may pledge shares to avoid taxes. We test our predictions using hand-collected data on share pledging by executives of S&P 1500 firms from 2006-2019.[2] Following Yost (2018), we estimate CEO tax burdens (our primary independent variable) as the percentage of the CEO's total equity owed in federal and state capital gains taxes upon a hypothetical sale of the shares. For our primary dependent variables, we consider the likelihood that a CEO pledges shares and the magnitude (number) of shares pledged.

Our main analysis consists of firm-year panel regressions, including controls for relevant firm and CEO characteristics and industry and year fixed effects. We find that CEOs with higher tax burdens are significantly more likely to pledge shares and pledge a larger number of shares compared to CEOs with lower unrealized tax burdens. Economically, an interquartile movement in a CEO's tax burden is associated with a 30.5% higher likelihood of pledging shares and an 18.7% increase in the number of shares pledged, relative to the sample means. The results are robust to the use of propensity score matching and entropy balancing, which alleviates concerns about comparability across CEOs with high and low tax burdens.

---

[2] In additional analysis presented in Section 5.2, we examine the relation between tax burdens and share pledging for non-CEO executives.

Next, we examine two sources of heterogeneity in the relation between CEO tax burdens and share pledging. First, we consider the effect of CEOs' outside wealth. CEOs with significant outside wealth (CEOs with a larger portion of their total wealth held outside of the firm's equity) have less need to pledge shares in the company they manage to obtain liquidity, compared to CEOs with little outside wealth. Consistent with our conjecture, we find that possessing greater outside wealth weakens the relation between a CEO's tax burden and share pledging. Second, we consider the role of CEO power, which generally confers greater discretion to engage in transactions for personal benefit. Consistent with our expectations, we find a stronger relation between CEO tax burdens and share pledging for more powerful CEOs.

Next, we examine CEOs' share pledging behavior around two important developments during our sample period. First, we consider the effects of an anticipated and actual increase in the top federal capital gains tax rate. Specifically, the historically low Bush-era capital gains tax rates were slated to expire at the end of 2010 before Congress extended them at the last minute for two more years. Second, we consider the role played by Institutional Shareholder Services (ISS), an influential proxy advisory firm, which in 2012 began to recommend that firms prohibit executives from pledging shares. Recent work has found that ISS's stance led many firms to impose anti-share pledging policies in the name of improving governance (Bae and Zhang, 2018; Underwood, 2022).

These twin developments, which coincided in time, created opposing incentives concerning share pledging. On the one hand, higher capital gains tax rates make share pledging more appealing to executives seeking liquidity while avoiding a taxable sale of shares. On the other hand, ISS's opposition is likely to discourage executives from pledging shares. Hence, we make a nuanced prediction: share pledging becomes more valuable for CEOs with large unrealized

capital gains (increasing the likelihood of pledging shares) while becoming more costly for CEOs with small or negative unrealized capital gains (due to increased negative recommendations from ISS). We find evidence consistent with both predictions. Moreover, we find that in the cross-section, the CEOs who increase share pledging in response to the capital gains tax increase are primarily those with relatively low outside wealth and relatively high power. In addition to shedding light on the role of institutional forces in CEOs' share pledging decisions, these findings help to establish a causal relation between taxes and share pledging.

Next, we examine how the firm responds when managers reduce share pledging. If firms place restrictions on share pledging, as often happened after ISS updated its recommendation policy, managers might demand compensation for the restriction of a perquisite along with the realized tax liability of selling shares to pay off the loan. Therefore, we regress a CEO's *Pay* (either *Total Pay* or *Cash Pay*) on whether the CEO reduced the number of pledged shares, interacted with the CEO's tax burden. We find that firms tend to increase pay when the CEO decreases pledged shares while the CEO's tax burden was higher. This suggests that boards help managers alleviate the cost of reducing pledged shares.

We perform several additional analyses to understand the generalizability and robustness of our main findings. First, we aim to validate an underlying assumption: CEOs who pledge shares in response to tax considerations do so to avoid selling shares and triggering a realized tax liability. Consistent with our conjecture, we find that high tax burden CEOs who pledge shares exhibit a reduced likelihood of selling shares: They sell fewer shares. This finding is consistent with CEOs successfully mitigating their personal tax liabilities by pledging shares.

Second, we broaden our analysis to include share pledging by the top five executives in firms (as opposed to just CEOs). Similar to our results for CEOs, we find a robust positive relation

4

between non-CEO executives' tax burdens and the likelihood and amount of share pledging. Moreover, the results are robust to using propensity score matching and entropy balancing to match high- and low-tax burden executives. These results indicate that our main findings on the relation between CEOs' tax burdens and share pledging generalize to the broader population of executives.

Last, we perform a battery of robustness tests. To start, we test and find that our main inferences are similar when we include firm fixed effects and executive fixed effects to control for unobservable time-invariant characteristics of individual firms and executives.[3] Next, we find that our inferences are similar when we set negative values for the CEO tax burden equal to zero, and when we use decile ranks in lieu of a continuous version of the CEO's tax burden. To better isolate the effect of the CEO's tax burden, we test and find that our inferences are unchanged when considering only the state tax portion of the CEO's tax burden (e.g., Hanlon et al., 2021). Finally, our inferences are similar when we measure share pledging as a percentage of the CEO's total shares owned as an alternative dependent variable.

We contribute primarily to two streams of research. First, we extend the nascent literature on share pledging. Most prior work focuses on understanding the consequences of executive share pledging for firms, as opposed to the determinants of the decision to pledge shares in the first place (e.g., Chan et al., 2018; Wang and Chou, 2018; Dou et al., 2019). Moreover, nearly all prior and concurrent research on share pledging examines non-U.S. settings, with a special emphasis on Taiwan due to the availability of share pledging data in Taiwan. In contrast, we employ hand-collected data for a broad sample of executives of U.S. firms (S&P 1500 firms) over a significant time span, 2006 to 2019. The study most closely related to ours is a concurrent working paper by

---

[3] It is worth noting that with the inclusion of executive fixed effects, the coefficients for all other firm-level and CEO-level control variables lose statistical significance (except for the CEO's tax burden), highlighting the relative importance of tax considerations in the CEO's decision to pledge shares.

Fabisik (2019), who also uses U.S. share pledging data but focuses primarily on the firm value implications of CEO share pledging.[4] We provide the first systematic evidence showing that tax considerations are a primary driver in the decision by executives to pledge shares, and that the importance of tax considerations eclipses that of other decision-relevant factors.

Second, we contribute to the growing literature on the effects of executives' personal taxes. Prior work has shown that CEOs' tax burdens create a "lock-in" effect, discouraging the sale of shares (e.g., Jin and Kothari, 2008; Armstrong et al., 2015). A recent spate of follow-up studies has shown that higher CEO capital gains tax burdens have a number of implications for the firm, including reduced corporate risk-taking (Yost, 2018), lower levels of earnings management (Zhang, 2021), and a lower demand for accounting conservatism (Lonare, 2022). We extend this area of research by providing evidence on how executives employ share pledging to defer or escape entirely capital gains tax liabilities on their equity holdings. Our findings shed new light on the techniques used by executives to balance their personal interests and corporate responsibilities, thereby helping to inform boards of directors and proxy advisors (e.g., Institutional Shareholder Services).

2. Related Literature and Hypothesis Development

2.1 Share pledging: Institutional background

Pledged shares serve as collateral in a loan agreement between a lender and the party that owns the shares, similar to a home equity loan. While we focus on share pledging by CEOs and other executives, any individual can pledge shares. Like managers, these pledging arrangements

---

[4] Fabisik (2019) also conducts a descriptive analysis examining the determinants of the CEO's pledging decision, but considers only a relatively crude proxy for CEO tax considerations (an indicator variable equal to one if the firm's stock price has appreciated more than 25% during the CEO's tenure, and zero otherwise). In contrast, we conduct a thorough examination of the role of executives' tax burdens in the share pledging decision using the state-of-the-art methodology to measure and identify the relevant tax effects.

can have similar tax benefits. However, in the U.S., there is no publicly available data on share pledging outside of executives and directors. Therefore, our research partially reflects a wider phenomenon.

The loan terms often require the value of pledged shares to be 1.5x to 2.0x the value of the loan (Anderson and Puleo 2020), though for large loans involving a small firm the pledged share value can be greater than 4.0x. The high value of collateral means these loans generally feature low interest rates, often just 0.5% to 1.5% above a benchmark such as LIBOR, making them a favorable option for managers who desire long-term loans. If the value of the pledged shares drops to below the threshold (e.g., 1.5x, 2.0x, 4.0x), the lender has the right to sell the pledged shares. Individuals facing a margin call may have other options, such as repaying the loan or offering additional collateral. If the lender sells the stock, the manager must file a Form 4 since the managers' shares were sold.

In the U.S., disclosure of share pledging became mandatory on November 6, 2006. The mandate does not apply to significant shareholders, only to named executive officers, directors and director nominees. Specifically, the SEC modified Item 403(b) (which relates to security ownership of management in the firm's proxy statement) to require firms to "indicate by footnote or otherwise, the amount of shares that are pledged as security." The mandate only required the disclosure of the number of pledged shares. Disclosures rarely provide the reason the managers pledge shares and there is very little detail about any related transactions (such as interest rates or if managers sold any pledged shares over the past year).

Share pledging has come under increasing scrutiny in recent years, with some arguing that it reflects poor governance practices. Much of the recent criticism results from a decision in 2012 by Institutional Shareholder Services (ISS), an influential proxy advisory firm, to update its

recommendation policy to discourage firms from allowing executives to pledge shares. In response to ISS's public criticism, many firms implemented anti-pledging policies (Bae and Zhang, 2018), leading to an overall decline in share pledging by executives and directors.

2.2 CEO tax burdens: Prior literature

A small but growing area of research focuses on the incentive effects generated by CEOs' unrealized capital gains tax liabilities on their equity holdings in the firm. CEOs generally hold substantial equity in the firm they manage. Over time, the shares they hold can accumulate large unrealized gains that would trigger significant tax liabilities upon sale (i.e., the CEO's tax burden). Prior work has shown that this tax disincentive to sell, dubbed the "lock-in" effect, causes CEOs to continue holding shares that they would otherwise sell in the absence of taxes (Jin and Kothari, 2008; Armstrong et al., 2015).

A recent wave of studies examines the implications of the CEO tax lock-in effect for corporate decision-making. Yost (2018) argues that the tax disincentive to sell stock causes CEOs to become over-exposed to firm-specific risk, and consequently less willing to make risky corporate decisions. Zhang (2021) finds that firms with high-tax burden CEOs exhibit less earnings management, which Zhang (2021) argues is because locked-in CEOs are less myopic and more long-term oriented. Lonare (2022) predicts and finds evidence that lenders demand relatively lower levels of accounting conservatism from firms with locked-in CEOs, because such CEOs are likely to pursue stable corporate policies.

In this study, we focus on a technique used by CEOs facing large tax burdens that facilitates their ability to obtain liquidity while continuing to own their shares. Because pledging shares provides liquidity without necessitating a taxable sale of stock, it can be viewed as a tool that enables CEOs with high tax burdens to remain locked-in to their shares indefinitely.

2.3 Hypothesis

The tax code allows individuals to pledge shares and receive the proceeds tax-free. Later, when the owner of the shares dies, the heirs take possession of the shares, which receive a step up in basis, and are sold largely tax-free. If the interest rates on loans for pledged shares is low, share pledging is a useful way to mitigate taxes and higher taxes will increase the incentive to do so. While this idea is noted in many places, it is at least partially popularized by the notion "buy, borrow, die" from McCaffery (2012) (buy shares, borrow against those shares, pass on the shares). For CEOs, a step in this is skipped since the shares are typically granted (or given at the firm's founding), making share pledging potentially even more valuable. Therefore, we predict that there is a positive relationship between taxes a manager might pay and whether that manager pledges shares:

H: CEOs' tax burdens are positively associated with share pledging.

There are several reasons our hypothesis may not hold. First, while taxes are at least one reason individuals pledge shares, CEOs and executives in firms are subject to a variety of pressures that might limit or change the incentives to pledge shares. For example, after 2012, many boards restrict share pledging by executives (Bae and Zhang, 2018). Therefore, not all executives who may wish to pledge shares for tax purposes are able to do so. Second, executives also likely have other reasons to pledge shares, such as inside information. If an executive knows the stock price will rise in the future (due to inside information) but needs some liquidity now, share pledging can provide a short-term solution that is negatively related to tax considerations (since it is a pledge while the stock price is low and sell when it is high strategy). Third, CEOs have a high wealth concentration in a single firm, increasing the incentive to sell shares to diversify wealth, not pledge shares to remain in a highly concentrated position.

3. Sample and Data

3.1 Data on share pledging

Since there is no definitive source on share pledging data for U.S. firms,[5] we hand collect the data from firm proxy statements. In 2006, the SEC amended Item 403(b), which requires the disclosure of share ownership by management, to require the disclosure of pledged shares by named executive officers, directors and director nominees. These disclosures are often footnotes to the managerial ownership table that firms disclose in the annual proxy statement. We start by examining all proxy statements on the SEC Edgar Database for firms with fiscal years between 2006 and 2019, where there is matching Compustat and Execucomp data, resulting in an initial set of 25,798 firm-years. We parse each proxy statement into individual sentences and that sentence into individual words. If the sentence contains a pair of keywords,[6] we classify the sentence as related to share pledging, which results in 16,259 firm-years that mention share pledging.

Next, we require the sentence to contain a number made of only commas or digits where there is a comma followed by three digits, which is typical of a financial whole number, resulting in 3,685 firm-years.[7] Since the sentences alone often do not contain enough information to identify the executive pledging shares (for example, the footnote links to a number in a table), we manually read each sentence to identify if the number is indeed about pledging and determine who is pledging the shares.[8] Manually reading these results in 3,501 firm-years with at least one manager

---

[5] Audit Analytics recently released a database of pledging managers, but it starts coverage in 2016.

[6] The keywords required come from two lists, the first list is "share", "shares", "stock", "stocks", "securities", "unit" and "units" while the second list is "pledge", "pledging", "pledged" and "collateral". We require that one keyword from each list is in the sentence (does not have to be consecutive).

[7] This method helps to exclude numbers not related to pledging (such as a "$" before a number) or numbers with decimals. There are rare cases where the firm reports a manager's pledged shares in dollars or a manager is pledging part of a share, which this method will skip.

[8] Some firms provide pledged shares for some individuals and then a total number of pledged shares by all executives and directors. The sum of the individuals may not equal the total if the firm did not disclose each individual, in which case we infer that some other unnamed manager is pledging shares.

or director pledging shares, of which 1,274 are cases where the CEO is pledging shares and 1,246 firm-years where at least one non-CEO executive is pledging shares (which overlaps with the firm-years of the CEO pledging shares). Further data restrictions limit these samples, and our final sample is 973 firm-years where the CEO pledges shares for 257 unique CEOs. See Table 1 for a breakdown of how these restrictions change our sample size.

3.2 Sample

Other than share pledging data, we collect firm financial data from Compustat, stock return data from CRSP and executive ownership data from Execucomp. We also use data on a CEO's outside wealth from Dittman and Maug (2007).

3.3 Variable measurement

3.3.1 CEO tax burden

Our primary independent variable of interest is the CEO's tax burden, which we construct following Yost (2018) as the total federal and state capital gains tax liability from the sale of all vested stock scaled by the total value of the CEO's equity (stock and option) holdings. Specifically, the measure is calculated as:

$$CEO\ Tax\ Burden_t = \frac{\sum_{n=1}^{t}(P_t - P_n) \times N_n \times t_{cg}}{Total\ Equity_t} \tag{1}$$

where P_t is the firm's stock price at the end of year t; P_n is the firm's stock price at the end of year n (i.e., the price at which the CEO is assumed to have received the shares obtained in year n);[9] N_n is the number of unrestricted shares held by the CEO at the end of year t that were obtained in year n; t_{cg} is the maximum long-term capital gains tax rate (federal plus state) faced by the CEO

---

[9] Due to the lack of more detailed data on grant and vesting dates in ExecuComp, we follow Yost (2018) and Hanlon et al. (2021) in making the simplifying assumption that all vested shares during a year became vested at the fiscal year-end, with the fiscal year-end stock price as the new tax basis.

in year t upon selling the shares;[10] and $Total\ Equity_t$ is the stock equivalent value from the CEO's holdings of all stock and options at the end of year t.

Several distinct features drive variation in the CEO's tax burden. The first is the combined federal and state capital gains tax rate facing the CEO upon selling the shares. The second is the difference between the current stock price and the price at which the shares were obtained (i.e., the taxable gain on the shares). The third factor determining the CEO tax burden is the number of shares obtained in any given year n relative to the total number of vested shares owned by the CEO, which ensures that the shares obtained in any given year are weighted appropriately when computing the tax burden. Finally, the CEO tax burden is influenced by the total value of the CEO's equity. All else equal, CEOs with more equity have lower tax burdens, reflecting the relative importance of capital gains taxes in affecting their ability to obtain liquidity.

3.3.2 Share pledging

We use two primary measures for share pledging (our main dependent variable). Our first measure, *Pledged*, is an indicator variable equal to one if the CEO pledges any shares according to the proxy statement, and zero otherwise. Our second measure, *Num Shares Pledged*, represents the natural log of one plus the number of shares the CEO has pledged according to the proxy statement.

3.3.3 Control variables

The control variables in our tests are from Fabisik (2019). These control variables include size (natural log of assets), book to market, leverage, ROA, fiscal year stock return, return volatility during the fiscal year, analyst coverage, total institutional ownership, board independence, percent of ownership by the CEO and CEO tenure. All of our control variables are defined in the Appendix.

3.4 Descriptive statistics

---

[10] State tax rate data is obtained from the National Bureau of Economic Research. Our maintained assumption is that the location of the corporate headquarters reflects the CEO's state of residence (e.g., Yost, 2018; Hanlon et al., 2021).

Panel A of Table 2 displays summary statistics for our main sample. The mean value of *Pledged* is 0.043, denoting that CEOs pledge shares in 4.3% of sample firm-years. The mean value of *CEO Tax Burden* is 0.025, comparable to the mean value of 0.03 in Yost (2018). Panel B of Table 2 presents the correlations between our variables of interest. The table reveals positive and significant associations between *CEO Tax Burden* and both *Pledged* and *Num Shares Pledged*, providing initial evidence of a link between higher tax burdens and increased share pledging.

3.5 Regression specification

We test our central hypothesis by estimating the following linear probability model at the firm-year level:

$$Pledging_{i,t} = \alpha + \beta_1 CEO\ Tax\ Burden_{i,t} + \beta_k Controls_{i,t} + \delta_{ind} + \gamma_t + \epsilon_{i,t} \qquad (2)$$

In the equation above, *i* and *t* index firms and years, respectively. The dependent variable, *Pledging*$_{i,t}$ represents the pledging decision made by the CEO of firm *i* during year *t*, proxied by *Pledged* and *Num Shares Pledged*. *CEO Tax Burden*$_{i,t}$ represents the tax burden of the CEO of firm *i* in year *t*. *Controls* represents the vector of control variables discussed above, whereas δ_{ind} and γ_t represent two-digit SIC industry fixed effects and fiscal year fixed effects, respectively. We predict a positive β_1, indicating that CEOs with high tax burdens are more likely to pledge shares and will pledge a greater number of shares.

4. Main Results

4.1 Baseline results: CEO tax burdens and share pledging

We present the results in Panel A of Table 3. In Column 1, there is a positive and significant relationship between the CEO tax burden and whether the manager has any pledged shares. In Column 2, we add controls similar to Fabisik (2019) along with industry and year fixed effects. Here, we continue to find a positive and significant relationship between the CEO's tax burden

and whether that CEO is pledging shares. In terms of economic magnitude, moving from the 25th to 75th percentile of tax burden (a difference of 0.054, or 5.4% more of the CEO's wealth is subject to taxes if sold) suggests an increase in the probability of the CEO pledging shares by 0.013 (or 1.3%). Since 4.3% of firm-years have a pledging CEO, the change in tax burden from the 25th to 75th percentile implies a 30.5% increase relative to the average.

In Columns 3 and 4, we instead use the natural log of the number of shares pledged, which allows for examination of not just whether managers with a higher tax burden tend to pledge shares, but whether managers with a larger tax burden tend to pledge more shares. In Columns 3 and 4, we find a positive and significant relationship between the number of shares a manager has pledged and the CEO's tax burden. The economic magnitude here is also high, the coefficient of 3.169 on the CEO's tax burden in Column 4 implies an 18.7% increase in the number of shares pledged moving from the 25th to the 75th percentile.[11]

4.2 Matching analysis

In Panel B of Table 3, we conduct several additional tests since there might be other factors that lead to a manager pledging shares (such as firm specific restrictions). Therefore, we redo our tests in Panel A using propensity score matching and entropy balancing. First, in Columns 1 and 2, we use propensity score matching. Specifically, we use propensity score matching to identify firms that do not allow share pledging but are similar to those that do. For both the probability of the CEO pledging shares and the number of shares that the CEO pledges, the results remain positive and significant. Second, we use entropy balancing since we find that firms with a pledging CEO tend to be different than firms that do not have a pledging CEO. Using entropy balancing allows us to reweight statistics so that the control group (firms without a pledging CEO) are closer

---

[11] Our interpretation of the economic magnitude follows Benoit (2011) when the dependent variable has been log-transformed.

to the treatment group (firms with a pledging CEO). In Columns 3 and 4, the results remain positive and significant.

Overall, our results in Panel B suggest that a significant reason that managers pledge shares is due to their own tax burden. Specifically, CEOs with a larger tax burden are far more likely to pledge shares and pledge more shares, consistent with share pledging being a useful method for CEOs to defer paying taxes.

4.3 Cross-sectional tests: The roles of CEO outside wealth and CEO power

If CEOs use share pledging to defer paying taxes, CEOs with significant wealth outside the firm they manage should be less likely to pledge shares in the firm they manage since the CEO can use the outside wealth for pledging without incurring the disclosure requirements. We gather data on CEO outside wealth from Ingolf Dittman's website following Dittmann and Maug (2007). Since this data only goes through 2014, we impute other years and missing CEO wealth following Armstrong et al. (2015). We then count CEOs with above median outside wealth as having *High Outside Wealth*. In Panel A of Table 4, we repeat the methodology used in Panel A of Table 3 while interacting *CEO Tax Burden* with *High Outside Wealth*. The results in both columns suggest that CEOs with higher outside wealth are much less likely to pledge shares and pledge fewer shares, even when their tax burdens increase. These results suggest that the primary CEOs that pledge shares are those with large amounts of wealth concentrated in the firm that has appreciated considerably, making the potential tax liability the greatest relative to the CEOs total wealth.

More powerful CEOs should be more likely to use share pledging when it benefits them since they can push the board to allow share pledging. To proxy for CEO power, we combine three proxies for powerful CEOs: board independence, CEO pay and CEO tenure. For each variable, we calculate the median across all CEOs and construct an indicator variable equal to one if a CEO is

above the median in each category. We consider a CEO as powerful if the CEO is above the median in at least two of the three variables. In Panel B of Table 4, we repeat the analysis in Panel A of Table 3 and interact *CEO Tax Burden* with an indicator variable for these powerful CEOs (*High CEO Power*). As predicted, more powerful CEOs are more sensitive to their tax burden in the probability they pledge shares and the number of shares they pledge. This result suggests that CEOs with more power (who are less likely to be restricted if they want to pledge shares) are more sensitive to potential tax liabilities.

4.4 The effect of the 2013 capital gains tax increase

4.4.1 Overall effect of the tax increase

In 2012, two notable events happened that relate to share pledging. First, tax breaks expired resulting in a significant increase in the capital gains tax rate (which leads to an increase in the tax burden for managers). Second, Institutional Shareholder Services (ISS), a powerful proxy advisory firm, updated its recommendation policy to recommend against share pledging. These two factors have opposite effects, the increase in the effective tax rate should increase the appeal of share pledging while many boards began to implement anti-pledging policies after 2012 due to the pressure from ISS (Bae and Zhang 2018). Therefore, for CEOs with a low tax burden, where the increase in the tax rate means relatively little, share pledging should decline. On the other hand, for managers with an already large tax burden, share pledging become more important. To test this, we examine share pledging in the lead up and just following the tax rate change (calendar years 2006-2013) and include indicator variables for calendar years 2010-2011 and 2012-2013, along with interactions with *CEO Unrealized Gain*. We expect that as CEOs expect the tax increase and go on to experience the tax increase, CEOs with a large tax burden will be more likely to

pledge (or pledge more) shares. Further, we expect as the ISS recommendation policy comes into effect in calendar year 2013, the base coefficient on 2012-2013 will be negative and significant.

In Panel A of Table 5, we present the results. Here, we use *CEO Unrealized Gains* since the tax burden will implicitly change with the tax rate change. Consistent with before, CEOs with a larger unrealized gain (which generally translates into a larger tax burden) are more likely to pledge shares. However, there is a considerable decrease in the percentage of CEOs pledging shares in 2012 and 2013 (the negative and significant coefficient on *Y2012-2013*). However, this decline is muted for CEOs with a larger unrealized gain, as seen by the interaction of *CEO Unrealized Gain* and *Y2012-2013*. Collectively, these results suggest that the ISS recommendation policy change and the tax rate increase both impacted share pledging, but the incentive to continue pledging shares remains for CEOs with a large potential tax burden and grows as the tax rate increases.

4.4.2 Heterogeneous effects of the tax increase

In Panel B and Panel C of Table 5, we break out the results in Panel A by CEO outside wealth and CEO power. First, in Panel B, we show that the results are particularly prevalent for CEOs with low outside wealth. This suggests that as the tax rate changes, for CEOs where share pledging is particularly important from a tax perspective and a personal wealth perspective, continuing to use share pledging is more common. Second, in Panel C, we show that the results are much stronger for more powerful CEOs. Similar to CEOs with a high level of outside wealth, this result suggests that for CEOs where share pledging is more valuable and have the ability to continue pledging shares continue to pledge shares as the tax rate changes.

4.5 CEO pay and share pledging

After ISS updated its recommendation policy in 2012, many firms implemented anti-pledging policies (Bae and Zhang 2018) and asked managers to reduce their share pledging. For managers with pledged shares, this likely means selling shares, using some other collateral, or using some other assets. Managers might want to be compensated for these restrictions, which would imply increased pay. To test this, we run the following regression:

$$Pay_{i,t} = \alpha + \beta_1 CEO\ Tax\ Burden_{i,t-1} + \beta_2 CEO\ Tax\ Burden_{i,t-1} \times Dec.Pledged\ Shares_{i,t} + \beta_3 Dec.Pledged\ Shares_{i,t} + \beta_k Controls_{i,t} + \delta_{exec} + \gamma_t + \epsilon_{i,t}$$

where *Pay* is either the natural log of one plus total pay (salary, bonus, nonequity incentives, fair value of stock grants and fair value of option grants) or cash pay (salary, bonus and nonequity incentives), *Dec. Pledged Shares* is an indicator variable equal to one when the manager has fewer pledged shares than the previous year or the natural log of one plus the decrease in pledged shares. We also use the lagged *CEO Tax Burden* since a manager with fewer pledged shares might sell shares, directly affecting the tax burden. *Controls* are as described before, and we use executive fixed effects to understand whether the manager is receiving more pay relative to the same executive.

The results are shown in Table 6. In Panel A, we examine the change in *Total Pay*. Here, the coefficients on the interaction (β_2) are positive and significant (coef.= 0.741; t-stat.= 2.29 for the decreased pledging indicator variable and coef.= 0.059; t-stat.= 2.09 for the decreased pledging count variable). This is consistent that a restriction on share pledging (leading to a decrease in the number of pledged shares) is compensated for by increased pay. In Panel B, we examine *Cash Pay*. A decrease in pledged shares can mean some of those shares are sold to pay off the loan. If the manager has a large tax burden, those sold shares will lead to a realized tax liability. The firm, potentially to prevent further stock sales, can increase cash compensation to help offset the tax liability. Further, since managers with pledged shares implicitly had a liquidity need, increased

cash pay can provide additional liquidity. Therefore, we expect similar results to Panel A. In Panel B, we do find that cash pay increases when a manager reduces the number of pledged shares (β_2 is positive and significant in both columns), consistent with our predictions.

5. Additional Analysis

5.1 Stock sales by pledging CEOs with high tax burdens

A natural secondary hypothesis to our main hypothesis (that managers use share pledging to avoid paying capital gains tax) is that managers who pledge shares sell fewer shares. For example, if a manager uses share pledging, the manager now has a source of liquidity without selling shares and selling any pledged shares will necessitate paying off part of the loan. Therefore, it is likely that managers who pledge shares to avoid paying taxes are less likely to sell shares.

To test our conjecture, we estimate the following model:

$$Stock\ Sale_{i,t} = \alpha + \beta_1 CEO\ Tax\ Burden_{i,t} + \beta_2 CEO\ Tax\ Burden_{i,t} \times Pledged_{i,t} \\ + \beta_3 Pledged_{i,t} + \beta_k Controls_{i,t} + \delta_{ind} + \gamma_t + \epsilon_{i,t} \tag{3}$$

In the equation above, *i* and *t* index firms and years, respectively. The dependent variable, *Stock Sale*$_{i,t}$ represents stock sales made by the CEO of firm *i* during year *t*, proxied by *Sale* (an indicator variable equal to one if the CEO sold any shares during the year and zero otherwise) and *Num Shares Sold* (the natural log of one plus the number of shares sold by the CEO during the year). All other variables are as described previously. We predict a negative β_2, indicating that high tax burden CEOs with shares pledged are less likely to sell stock and sell fewer shares of stock.

The results from estimating Eq. (3) are shown in Table 7. Column 1 shows a negative and significant coefficient on *CEO Tax Burden × Pledged* (coef.= -0.672; t-stat.= -2.40) denoting that high-tax burden CEOs exhibit a reduced likelihood of selling stock when pledging shares. Column 2 also shows a negative and significant coefficient on *CEO Tax Burden × Pledged* (coef.= -2.98;

t-stat.= -2.12), denoting that high-tax burden CEOs sell fewer shares when pledging. Overall, the findings in Table 7 provide support for our assumption that CEOs who pledge shares in response to tax considerations are able to successfully avoid selling shares and triggering realized tax liabilities.

5.2 Non-CEO executives

While our primary analyses focus on CEO tax burdens and share pledging, other executives can also pledge shares for tax purposes. However, these executives tend to have fewer shares (and receive a larger share of their compensation as cash compensation), so it might also be the case that share pledging is less valuable for these executives. Therefore, to test whether non-CEO executives also use share pledging to mitigate tax burdens, we repeat our main analyses for non-CEO executives.

First, we repeat Panel A of Table 3 in Panel A of Table 8, regressing whether a manager is pledging shares (the number of shares the manager is pledging) on that manager's tax burden. Across all four specifications, the results are positive and significant, suggesting that even for non-CEO executives, share pledging remains an important compensation method when tax burdens are high. Second, similar to our analyses for CEOs, we repeat this specification using propensity score matching and entropy balancing to help control for the differences that might exist between firms where executives use share pledging and firms where they do not. In Panel B of Table 8, we continue to find that executives with a higher tax burden are more likely to use share pledging.

5.3 Variance Decomposition

To help understand the relative importance of tax burden compared to the other variables in our regression, we conduct a variance decomposition analysis following Lemmon et al. (2008). Conceptually, variance decomposition indicates how important a specific variable is in a

regression. In our setting, we calculate the Type III partial sum of squares for each coefficient. Specifically, starting with Equation 1, we remove each coefficient from the regression and note the change in the sum of squared errors (which is called the partial sum of squared errors).[12] When the partial sum of squared errors is larger, the coefficient is relatively more important to the regression. To aid comparability, we divide each partial sum of squared errors by the sum of the partial sums, which makes the value for a specific coefficient a percentage of its contribution.

We present the results for these analyses in Table 9 and Figure 1. In columns 1 and 3 (2 and 4), we present the results using industry and year (executive and year) fixed effects. Columns 1 and 3 suggest that a CEO's tax burden is the second largest contributor behind a CEO's tenure to whether or not a CEO will pledge shares. In Column 2, when controlling for the time-invariant characteristics of a CEO using executive fixed effects, we find that tenure becomes relatively unimportant while a CEO's tax burden becomes by far the most important characteristic. In Figure 1 Panel A (Panel B) we present a graphical representation of Column 1 (Column 2). These results collectively suggest that tax considerations are a primary contributor to the decision to pledge shares.

5.4 Robustness tests

5.4.1 Firm and executive fixed effects

One concern with our main specification could be that CEOs who pledge shares are different than those that do not. If this is the case, then our main specification is picking up some difference between these CEOs and their willingness to pledge shares that might correlate with their tax burden. To help alleviate this concern, we re-estimate Eq. (1) while controlling for time-

---

[12] Unlike Lemmon et al. (2008), we do not calculate the impact of fixed effects in these equations since we are interested in the incremental impact of the other variables that are more within the control of the CEO as opposed to the values that are largely outside the CEO's control (such as a year) or time invariant properties of the industry or executive.

invariant firm and executive characteristics and present the results in Panel A of Table 10. Column 1 (2) shows that the relation between *CEO Tax Burden* and *Pledged* is still positive and significant when including firm (executive) fixed effects. Columns 3-4 reveal similar findings for *Num Shares Pledged* when controlling for firm and executive fixed effects. These findings lend confidence to the robustness of the relation between CEOs' tax burdens and share pledging.

5.4.2 Tax burdens winsorized below zero

Another potential concern with our main specification is that CEOs with a negative tax burden drive our results. These CEOs should be less likely to pledge shares, but our primary prediction is that CEOs with a high tax burden are more likely to pledge shares. In Panel B of Table 10, we rerun our main specification with the CEO tax burden winsorized at zero so that all of the variation comes from CEOs with a positive tax burden. We find substantially similar results.

5.4.3 Tax burden ranks

Similarly, CEOs with extremely large or small tax burdens might be overweighted in our main analyses due to using a least squares regression. We attempt to control for these potential non-linearities in the CEO tax burden by using the decile rank of the tax burden for CEOs in Panel C of Table 10, where we continue to find similar results.

5.4.4 CEO state tax burdens

While the total tax burden (i.e., federal plus state) is likely what drives most of the CEO's decision to pledge shares, it is also likely that CEOs in higher tax states are more likely to see share pledging as valuable than CEOs in lower tax states. Therefore, we replace our main tax burden variable with a measure of the CEO tax burden at the state level and rerun our main specification. In Panel D of Table 10, we obtain similar results.

5.4.5 Percentage of shares pledged

Finally, while we find CEOs are more likely to pledge shares when their tax burdens are higher, when tax burdens are high, they might also be willing to pledge a greater portion of their holdings. In Panel E of Table 10, we regress the percent of a CEO's shares that are pledged on the CEO's tax burden. Our results remain positive and significant.

6. Conclusion

We examine the relationship between share pledging and taxes. While the idea that share pledging is related to taxes is known, it is difficult to measure for the general population since data is not available. Instead, we examine share pledging by executives, who must disclose share pledging information. We find that share pledging is a significant factor in the choice of CEOs and other executives to pledge shares. We substantiate this claim with a variety of analyses: matching analyses to control for differences between pledging and non-pledging executives, cross sectional tests that show that more powerful CEOs are more likely to pledge shares and CEOs with higher outside wealth are less likely to pledge shares, and examining how CEOs change share pledging in anticipation of a tax change in 2012. While our data is only for executives and CEOs, our results suggest that taxes are a major contributor to other similarly wealthy individuals' share pledging. These individuals would not face the constraints of executives and pledge more diverse portfolios, likely making share pledging a widespread method to mitigate taxes.

References

Anderson, R., Puleo, M. Insider Share-Pledging and Equity Risk. J Financ Serv Res 58, 1–25 (2020). https://doi.org/10.1007/s10693-020-00332-x.

Armstrong, Chris S. and Core, John E. and Guay, Wayne R., Why Do CEOs Hold So Much Equity? (July 23, 2015). Available at SSRN: http://dx.doi.org/10.2139/ssrn.2544792.

Bae, Jihun and Zhang, Ruishen, Anti-Pledging Policy, CEO Compensation, and Investment (May 10, 2022). Available at SSRN: http://dx.doi.org/10.2139/ssrn.3445348.

Benoit, Kenneth. 2011. "Linear Regression Models with Logarithmic Transformations." links.sharezomics.com. 2011. https://links.sharezomics.com/assets/uploads/files/1600247928973-from_slack_logmodels2.pdf.

Chan, Konan, Hung-Kun Chen, Shing-Yang Hu, and Yu-Jane Liu. 2018. "Share Pledges and Margin Call Pressure." Journal of Corporate Finance 52 (October): 96–117. https://doi.org/10.1016/j.jcorpfin.2018.08.003.

Dittmann, Ingolf, and Ernst Maug. 2007. "Lower Salaries and No Options? On the Optimal Structure of Executive Pay." The Journal of Finance 62 (1): 303–43.

Dou, Ying, Ronald W. Masulis, and Jason Zein. 2019. "Shareholder Wealth Consequences of Insider Pledging of Company Stock as Collateral for Personal Loans." The Review of Financial Studies 32 (12): 4810–54.

Fabisik, Kornelia. 2019. "Why Do U.S. CEOs Pledge Their Own Company's Stock?" Swiss Finance Institute Research Paper. https://doi.org/10.2139/ssrn.3486231.

Hanlon, Michelle, Rodrigo S. Verdi, and Benjamin P. Yost. 2021. "CEO Tax Effects on Acquisition Structure and Value." The Accounting Review 96 (2): 333–63.

Jin, Li, and S. P. Kothari. 2008. "Effect of Personal Taxes on Managers' Decisions to Sell Their Stock." Journal of Accounting and Economics 46 (1): 23–46.

Lemmon, Michael L., Michael R. Roberts, and Jaime F. Zender. 2008. "Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure." *The Journal of Finance* 63 (4): 1575–1608.

Leonhardt, David. 2021. "A Voluntary Tax." The New York Times, June 9, 2021. https://www.nytimes.com/2021/06/09/briefing/tax-jeff-bezos-wealthy.html.

McCaffery, Edward. 2009. The Oxford Introductions to U.S. Law: Income Tax Law. Oxford University Press.

SEC. 2006. "SEC Final Rule, 33-8732A." August 29, 2006. https://www.sec.gov/rules/final/2006/33-8732a.pdf.

Underwood, Jonathan. 2022. "Share Pledging: The Costs and Benefits." Boston College.

Wang, Yu-Chun, and Robin K. Chou. 2018. "The Impact of Share Pledging Regulations on Stock Trading and Firm Valuation." Journal of Banking & Finance 89 (April): 1–13.

Yost, Benjamin P. 2018. "Locked-In: The Effect of CEOs' Capital Gains Taxes on Corporate Risk-Taking." The Accounting Review 93 (5): 325–58.

Appendix A
Variable definitions

This table provides a detailed description of the procedures used to compute each variable used in the analyses. The data are obtained through Compustat, CRSP, ExecuComp, I/B/E/S, BoardEx, Thomson Reuters Insider Filing Data Feed, Thomson Reuters Institutional (13f) Holdings, and firm proxy statements collected from the SEC's EDGAR database. All continuous variables are winsorized at the 1st and 99th percentiles of their distributions.

Dependent variables:

Variable	Definition
Pledged	An indicator variable equal to one if the executive pledges shares during the fiscal year, and zero otherwise.
Num Shares Pledged	The natural log of one plus the number of shares pledged by the executive during the fiscal year.
Pct Shares Pledged	The percentage of the executive's total shares owned that are pledged during the fiscal year.
Sale	An indicator variable equal to one if the executive sells shares during the fiscal year, and zero otherwise. Data on executive sales comes from Thomson Reuters Insider Filing Data Feed.
Num Shares Sold	The natural log of one plus the number of shares sold by the executive during the fiscal year. Data on executive sales comes from Thomson Reuters Insider Filing Data Feed.
Total Pay	The natural log of one plus the sum of salary, bonus, nonequity incentives, fair value of stock grants and fair value of option grants
Cash Pay	The natural log of one plus the sum of salary, bonus and nonequity incentives

Primary independent variables:

Variable	Definition
CEO Tax Burden	The *CEO Tax Burden* measure is computed as: $$CEO\ Tax\ Burden_t = \frac{\sum_{n=1}^{t}(P_t - P_n) \times N_n \times t_{cg}}{Total\ Equity_t}$$ Where P_t is the firm's stock price at the end of year t; P_n is the price at which the CEO obtained the stock; N_n is the number of unrestricted shares held by the CEO in year t that were obtained in year n; t_{cg} is the total capital gains tax rate (maximum federal plus state) faced by the CEO in year t upon selling shares; and $Total\ Equity_t$ is the stock equivalent value from the CEO's holdings of all vested and unvested stock and options held at the end of year t. Past grants of CEO option holdings are estimated following the approximation method in Core and Guay (2002).
CEO Unrealized Gain	The *CEO Unrealized Gain* measure is computed as: $$CEO\ Unrealized\ Gain_t = \frac{\sum_{n=1}^{t}(P_t - P_n) \times N_n}{Total\ Equity_t}$$ Where P_t is the firm's stock price at the end of year t; P_n is the price at which the CEO obtained the stock; N_n is the number of unrestricted shares held by the CEO in year t that were obtained in year n; and $Total\ Equity_t$ is the stock equivalent value from the CEO's holdings of all vested and unvested stock and options held at the end of year t. Past grants of CEO option holdings are estimated following the approximation method in Core and Guay (2002).
Exec Tax Burden	Computed using the same approach as for *CEO Tax Burden*, but for the other (non-CEO) top executives listed in ExecuComp.
High Outside Wealth	An indicator variable equal to one (zero) for CEOs with an above-median (below-median) share of their total wealth held outside of the firm's shares in each industry-year.

	CEO total wealth is estimated based based on accumulated past CEO compensation (Dittmann and Maug, 2007). Non-firm wealth figures are available on Ingolf Dittmann's website http://people.few.eur.nl/dittmann/data.htm. These estimates are used to impute non-firm wealth for CEOs and years not covered in the data (e.g., Armstrong et al. 2015).
High CEO Power	An indicator variable equal to one (zero) for firms with an above-median (below-median) value for an index of CEO power consisting of three components: CEO ownership (*CEO Own*), CEO tenure (*CEO Tenure*), and the percentage of the board's directors classified as not independent (1 - *Board Independence*). For each component, the CEO power index receives a one (zero) for firms with an above-median (below-median) value within each industry-year. The sum of the three components are used to determine *High CEO Power*.
Y2010-2011	An indicator variable equal to one for calendar years 2010 and 2011, and zero otherwise.
Y2012-2013	An indicator variable equal to one for calendar years 2012 and 2013, and zero otherwise.
Dec Pledged Shares Ind.	An indicator variable equal to one if the manager is pledging fewer shares in year t compared to t-1.
Dec Pledged Shares Count	The natural log of one plus the number of fewer shares the manager is pledging in year t compared to t-1. Equal to zero if the manager is pledging the same number or more shares in year t.

Control variables:

Variable	Definition
Size	The natural log of the firm's book value of assets at the fiscal year-end.
BTM	The ratio of the firm's book value of assets to its market value of assets at the current fiscal year-end.
Leverage	The firm's current and long-term debt scaled by total assets at the current fiscal year-end.
ROA	The firm's income before extraordinary items for the current fiscal year scaled by total assets.
Ret 1 Yr	The firm's cumulative daily stock returns for the 12 months ending at the current fiscal-year end.
Ret Volatility	The annualized standard deviation of the firm's daily stock returns for the current fiscal year.
Analyst Coverage	The natural log of one plus the number of analyst forecasts included in the most recent consensus forecast.
Inst Own	The percentage of the firm's outstanding common stock owned by institutional investors at the end of the current fiscal year.
Board Independence	The percentage of the board listed as independent directors.
CEO Own	The percentage of the firm's outstanding common stock owned by the CEO at the end of the current fiscal year. Using data from ExecuComp, ownership is computed as the number of vested and unvested shares held by the CEO scaled by common shares outstanding.
CEO Tenure	The natural log of one plus the CEO's tenure in years at the end of the current fiscal year.

Figure 1
Variance Decomposition

This figure shows the visual results of the variance decomposition in Table 8 (Columns 1 and 2 in Panel A and Panel B, respectively). The sample consists of firm-years from 2006-2019. These use the regression in Table 3 as a baseline and we individually remove each coefficient from the regression and note the change in the residual sum of squared errors. This change presents a value of how important that variable is in the overall regression. We sum up these changes in the sum of squared errors and divide each value by the total, which provides a percent that removing a specific coefficient changes the overall sum of squares.

Panel A: Using Industry and Year Fixed Effects
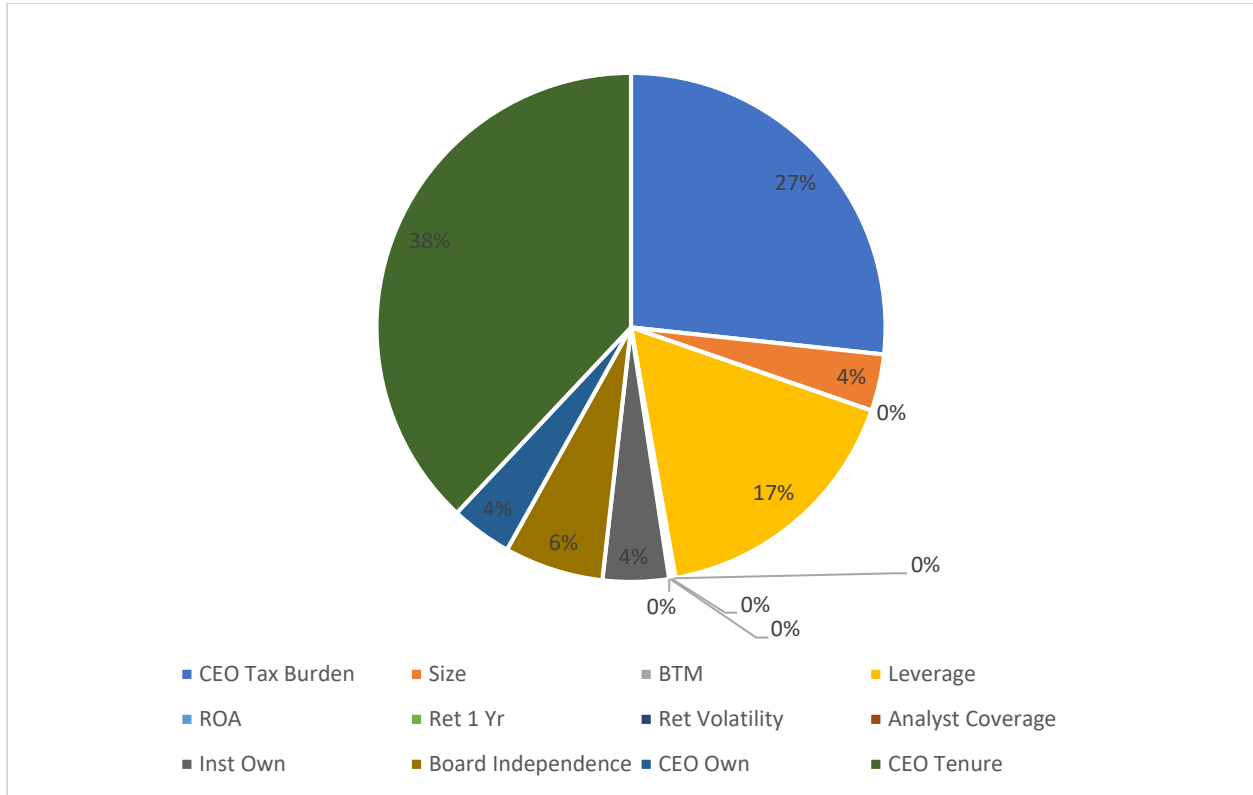
Figure 1 (Continued)
Panel B: Using Executive and Year Fixed Effects
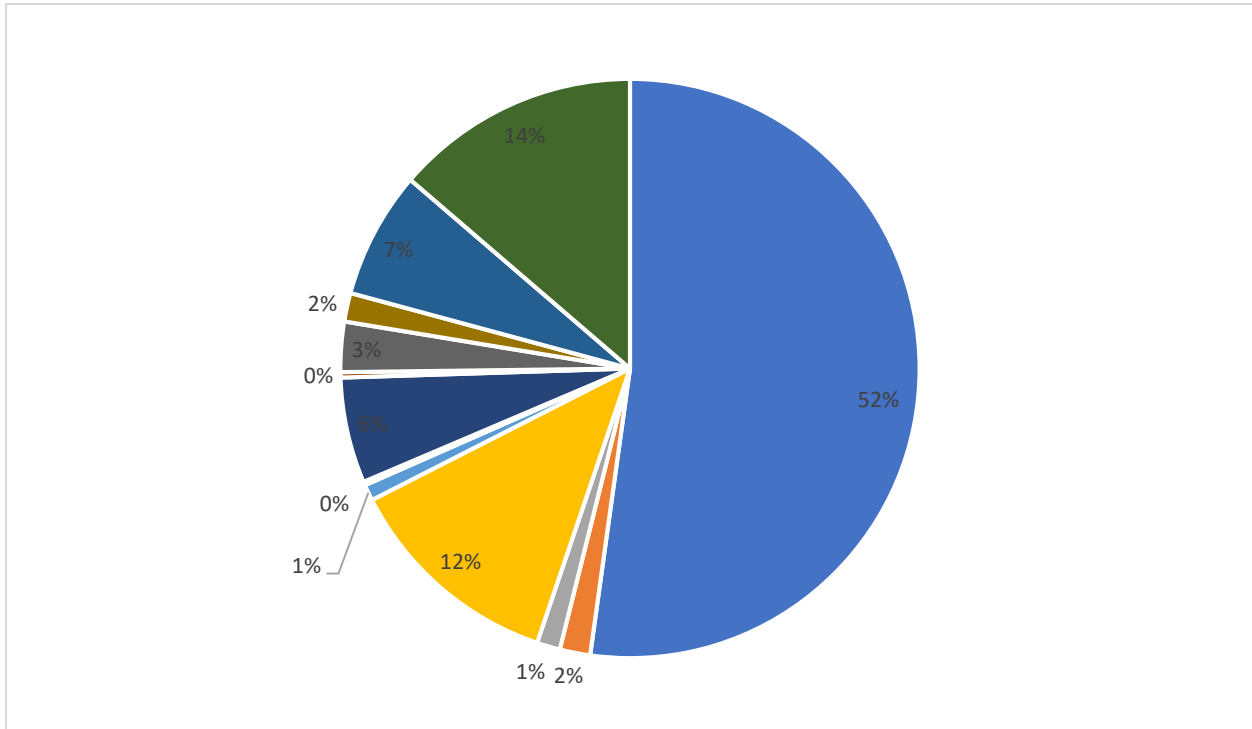
Table 1
Sample selection

Panel A: Share pledging sample

Description	Change in no. of obs	No. of obs remaining
Relevant Proxy Statements for Firms from 2006-2019		25,798
Exclude Proxies that do not mention share pledging	(9,539)	16,259
Exclude Proxies that do not have financial number with share pledging	(12,574)	3,685
Manuall Identify Share Pledging	(184)	3,501
Firm-Years with Share Pledging		**3,501**
Firm-Years with CEO Pledging Shares		**1,274**
Firm-Years with Other Executives Pledging Shares		**1,246**
Executive-Years with Other Executives Pledging Shares		**1,643**

Panel B: Firm-year sample

Description	Change in no. of obs	No. of obs remaining
Compustat Firms for Fiscal Years 2006-2019		157,196
Exclude Compustat Firm-Years with 0 or Negatve Assets	(35,362)	121,834
Exclude Observations not in CRSP	(52,423)	69,411
Exclude Observations not in Execucomp	(41,869)	27,542
Exclude Observations without a Proxy Statement Filed within 6 months of Fiscal Year End	(1,744)	25,798
Exclude Observations with key missing variables	(3,262)	22,536
Final firm-year observations		**22,536**
Final firm count		**2,562**

Table 2
Sample descriptive information

This table presents descriptive information for the sample and variables of interest. The sample consists of firm-years with the necessary data for the CEO share pledging tests during fiscal years 2006-2019. Panel A contains summary statistics for the sample of firm-years. Panel B presents Pearson and Spearman correlations for the variables used in the share pledging tests. Details of variable construction are contained in Appendix A.

Panel A: Summary statistics

Variables	N	Mean	SD	P25	P50	P75
Primary dependent variables:						
Pledged	22,536	0.043	0.203	0.000	0.000	0.000
Num Shares Pledged	22,536	0.525	2.487	0.000	0.000	0.000
Other variables:						
CEO Tax Burden	22,536	0.025	0.078	0.000	0.010	0.054
Size	22,536	7.912	1.731	6.681	7.825	9.013
BTM	22,536	0.692	0.288	0.468	0.691	0.920
Leverage	22,536	0.244	0.203	0.068	0.218	0.370
ROA	22,536	0.043	0.094	0.011	0.042	0.086
Ret 1 Yr	22,536	0.135	0.369	-0.054	0.144	0.330
Ret Volatility	22,536	0.389	0.207	0.245	0.334	0.472
Analyst Coverage	22,536	1.990	1.009	1.609	2.197	2.773
Inst Own	22,536	0.817	0.184	0.726	0.849	0.933
Board Independence	22,536	0.205	0.106	0.128	0.194	0.268
CEO Own	22,536	0.020	0.060	0.000	0.004	0.011
CEO Tenure	22,536	1.933	0.763	1.365	1.946	2.485

Panel B: Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Pledged	…	1.00	0.12	0.03	0.02	0.06	-0.02	0.01	0.00	-0.02	-0.04	-0.02	0.16	0.14
2 Num Shares Pledged	0.99	…	0.12	0.03	0.02	0.06	-0.02	0.01	0.00	-0.02	-0.04	-0.02	0.16	0.14
3 CEO Tax Burden	0.10	0.11	…	0.02	-0.28	-0.08	0.28	0.25	-0.29	0.04	-0.03	0.04	0.36	0.33
4 Size	0.02	0.02	0.03	…	0.25	0.32	-0.06	-0.06	-0.45	0.46	-0.05	-0.40	-0.42	-0.06
5 BTM	0.01	0.01	-0.30	0.22	…	0.14	-0.58	-0.30	0.16	-0.18	-0.10	0.11	0.02	-0.05
6 Leverage	0.06	0.07	-0.11	0.24	0.09	…	-0.16	-0.07	-0.12	0.02	0.07	-0.08	-0.11	-0.06
7 ROA	0.00	0.00	0.30	0.06	-0.42	-0.14	…	0.16	-0.23	0.20	0.07	-0.08	-0.03	0.05
8 Ret 1 Yr	0.01	0.01	0.24	-0.06	-0.31	-0.07	0.20	…	-0.06	-0.02	0.03	0.02	0.03	0.02
9 Ret Volatility	0.00	0.00	-0.34	-0.35	0.23	0.00	-0.34	-0.04	…	-0.22	0.04	0.12	0.22	-0.02
10 Analyst Coverage	-0.02	-0.02	0.09	0.39	-0.18	-0.02	0.17	-0.01	-0.23	…	0.13	-0.35	-0.27	-0.01
11 Inst Own	-0.04	-0.04	0.03	0.01	-0.08	0.07	0.09	0.01	-0.06	0.17	…	-0.04	-0.05	-0.02
12 Board Independence	-0.02	-0.02	0.00	-0.39	0.11	-0.08	-0.05	0.02	0.10	-0.26	-0.08	…	0.23	0.02
13 CEO Own	0.08	0.09	0.19	-0.16	-0.03	-0.08	0.02	0.01	0.07	-0.11	-0.17	0.03	…	0.49
14 CEO Tenure	0.14	0.14	0.28	-0.06	-0.05	-0.05	0.06	0.02	-0.03	0.00	-0.03	0.04	0.27	…

Table 3
CEO tax burdens and share pledging

This table presents the results examining the relation between CEO tax burdens and share pledging. The sample consists of firm-years from 2006-2019. In Panel A, columns 1-2 (3-4) show the results using *Pledged* (*Num Shares Pledged*) as the dependent variable. Panel B shows the results after using propensity score matching and entropy balancing to match firm-years with high CEO tax burdens (*High CEO Tax Burden* = 1) to those with low CEO tax burdens (*High CEO Tax Burden* = 0). *High CEO Tax Burden* is an indicator variable equal to one (zero) if the firm's CEO has a tax burden above (below) the median for the fiscal year. The propensity score matching procedure is performed using a caliper of 0.01. In Panel B, columns 1-2 (3-4) show the results using the propensity score matched (entropy balanced) sample. All variables are defined in Appendix A. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, *** indicate statistics significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tailed *t*-test.

Panel A: Main results

Dependent variable:		Pledged		Num Shares Pledged	
	Pr. Sign	(1)	(2)	(3)	(4)
CEO Tax Burden	+	0.273***	0.243***	3.561***	3.169***
		(6.00)	(5.16)	(6.14)	(5.40)
Size			-0.006**		-0.065*
			(-2.03)		(-1.90)
BTM			0.003		0.017
			(0.23)		(0.12)
Leverage			0.079***		0.996***
			(4.54)		(4.50)
ROA			-0.019		-0.287
			(-0.75)		(-0.88)
Ret 1 Yr			-0.003		-0.043
			(-0.75)		(-0.85)
Ret Volatility			-0.008		-0.052
			(-0.55)		(-0.29)
Analyst Coverage			-0.000		0.006
			(-0.01)		(0.15)
Inst Own			-0.037**		-0.447**
			(-2.17)		(-2.19)
Board Independence			-0.093**		-1.191***
			(-2.44)		(-2.59)
CEO Own			0.112*		1.759**
			(1.91)		(2.22)
CEO Tenure			0.026***		0.326***
			(6.47)		(6.50)
Year FE		No	Yes	No	Yes
Industry FE (SIC 2-digit)		No	Yes	No	Yes
S.E. clustered by firm		Yes	Yes	Yes	Yes
No. of observations		22,536	22,536	22,536	22,536
R-Squared		0.011	0.072	0.012	0.076

Table 3 (continued)

Panel B: Matching analysis

Matching method:		Propensity Score Matching		Entropy Balancing	
Dependent variable:		*Pledged*	*Num Shares Pledged*	*Pledged*	*Num Shares Pledged*
	Pr. Sign	(1)	(2)	(3)	(4)
High CEO Tax Burden	+	0.027***	0.336***	0.021***	0.266***
		(5.20)	(5.56)	(2.66)	(2.76)
Controls		Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes	Yes	Yes
S.E. clustered by firm		Yes	Yes	Yes	Yes
No. of observations		14,192	14,192	22,536	22,536
R-Squared		0.074	0.076	0.084	0.091

Table 4

Cross-sectional variation in the relation between tax burdens and share pledging

This table presents the results of cross-sectional tests examining variation in the relation between CEO tax burdens and share pledging. The sample consists of firm-years from 2006-2019. Panel A (Panel B) considers the influence of CEO outside wealth (CEO power). In Panel A, *High Outside Wealth* is an indicator variable equal to one (zero) for CEOs with an above-median (below-median) share of their total wealth held outside of the firm in each industry-year, where CEO wealth is estimated following Dittmann and Maug (2007). In Panel B, *High CEO Power* is an indicator variable equal to one (zero) for firms with an above-median (below-median) value for a CEO power index consisting of three components: CEO ownership, CEO tenure, and the percentage of the board's directors classified as not independent. All variables are defined in Appendix A. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, *** indicate statistics significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tailed *t*-test.

Panel A: CEO outside wealth

Dependent variable:		*Pledged*	*Num Shares Pledged*
	Pr. Sign	(1)	(2)
CEO Tax Burden	+	0.387***	5.015***
		(4.78)	(4.92)
CEO Tax Burden × High Outside Wealth	-	-0.229***	-2.937***
		(-2.83)	(-2.87)
High Outside Wealth		0.006	0.097
		(1.10)	(1.37)
Controls		Yes	Yes
Year FE		Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes
S.E. clustered by firm		Yes	Yes
No. of observations		22,536	22,536
R-Squared		0.074	0.077

Panel B: CEO power

Dependent variable:		*Pledged*	*Num Shares Pledged*
	Pr. Sign	(1)	(2)
CEO Tax Burden	+	0.150***	1.853***
		(2.76)	(2.91)
CEO Tax Burden × High CEO Power	+	0.154**	2.180**
		(2.00)	(2.30)
High CEO Power		0.005	0.063
		(0.77)	(0.84)
Controls		Yes	Yes
Year FE		Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes
S.E. clustered by firm		Yes	Yes
No. of observations		22,536	22,536
R-Squared		0.073	0.077

Table 5
Effects of anticipated and actual tax increases on CEO share pledging

This table presents the results examining the effect of anticipated and actual capital gains tax increases contained in the American Taxpayer Relief Act of 2012 on share pledging for CEOs with unrealized gains. The sample consists of firm-years from 2006-2013. Panel A examines the overall effect of the tax increase on share pledging by CEOs with unrealized gains. Panel B (Panel C) examines cross-sectional variation in the effect of the tax increase based on CEO outside wealth (CEO power). *Y2010-2011* (*Y2012-2013*) is an indicator variable equal to one for fiscal years 2010-2011 (2012-2013), and zero otherwise. All variables are defined in Appendix A. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, *** indicate statistics significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tailed *t*-test.

Panel A: Overall effect of the tax increase

Dependent variable:		*Pledged*	*Num Shares Pledged*
	Pr. Sign	(1)	(2)
CEO Unrealized Gain × Y2010-2011	+	0.036**	0.432**
		(2.26)	(2.19)
CEO Unrealized Gain × Y2012-2013	+	0.055***	0.656**
		(2.76)	(2.57)
Y2010-2011	0	-0.004	-0.030
		(-1.01)	(-0.66)
Y2012-2013	-	-0.019***	-0.204***
		(-3.73)	(-3.45)
CEO Unrealized Gain	+	0.047***	0.647***
		(3.03)	(3.37)
Controls		Yes	Yes
Year FE		No	No
Industry FE (SIC 2-digit)		Yes	Yes
S.E. clustered by firm		Yes	Yes
No. of observations		13,264	13,264
R-Squared		0.082	0.087

Panel B: CEO outside wealth and the effect of the tax increase

Dependent variable:			*Pledged*		*Num Shares Pledged*	
Group:			Low Outside Wealth	High Outside Wealth	Low Outside Wealth	High Outside Wealth
	Label	Pr. Sign	(1)	(2)	(3)	(4)
CEO Unrealized Gain × Y2010-2011	β_1	+,0	0.081***	-0.010	1.002***	-0.137
			(3.01)	(-0.52)	(3.01)	(-0.59)
CEO Unrealized Gain × Y2012-2013	β_2	+,0	0.102***	0.016	1.241***	0.177
			(3.10)	(0.65)	(2.95)	(0.58)
p-value for difference in β_1 coefficients			< 0.01		< 0.01	
p-value for difference in β_2 coefficients			0.03		0.03	
CEO Unrealized Gain main effect			Yes	Yes	Yes	Yes
Controls			Yes	Yes	Yes	Yes
Year FE			Yes	Yes	Yes	Yes
Industry FE (SIC 2-digit)			Yes	Yes	Yes	Yes
S.E. clustered by firm			Yes	Yes	Yes	Yes
No. of observations			6,502	6,760	6,502	6,760
R-Squared			0.093	0.112	0.100	0.118

Table 5 (continued)

Panel C: CEO power and the effect of the tax increase

Dependent variable:			Pledged		Num Shares Pledged	
Group:			Low CEO Power	High CEO Power	Low CEO Power	High CEO Power
	Label	Pr. Sign	(1)	(2)	(3)	(4)
CEO Unrealized Gain × Y2010-2011	β_1	0,+	0.004	0.048**	0.045	0.577*
			(0.23)	(1.97)	(0.21)	(1.89)
CEO Unrealized Gain × Y2012-2013	β_2	0,+	0.015	0.090***	0.134	1.087***
			(0.59)	(3.04)	(0.44)	(2.83)
p-value for difference in β_1 coefficients			0.15		0.15	
p-value for difference in β_2 coefficients			0.05		0.05	
CEO Unrealized Gain main effect			Yes	Yes	Yes	Yes
Controls			Yes	Yes	Yes	Yes
Year FE			Yes	Yes	Yes	Yes
Industry FE (SIC 2-digit)			Yes	Yes	Yes	Yes
S.E. clustered by firm			Yes	Yes	Yes	Yes
No. of observations			6,951	6,312	6,951	6,312
R-Squared			0.063	0.107	0.066	0.116

Table 6

Cash Pay and Decreases in Share Pledging

This table presents the results examining the relation between CEOs' pay and when the CEO decreases the number of pledged shares, interacted with the CEO's tax burden. The sample consists of firm-years from 2006-2019. *Total Pay* is the natural log of one plus the total salary, bonus, nonequity incentives, fair value of stock grants and fair value of option grants. *Cash Pay* is the natural log of one plus the total salary, bonus and nonequity incentives the CEO receives in a fiscal year. Column 1 (2) shows the results using an indicator variable (natural log of one plus the count) for whether (of how many shares) the manager reduced the pledge arrangement. All variables are defined in Appendix A. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, *** indicate statistics significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tailed *t*-test.

Panel A: Total pay

Dependent variable:	Pr. Sign	*Total Pay* (1)	*Total Pay* (2)
CEO Tax Burden (Lagged) × *Dec. Pledged Shares Ind.*	+	0.741** (2.29)	
CEO Tax Burden (Lagged) × *Dec. Pledged Shares Count*	+		0.059** (2.09)
Dec. Pledged Shares Ind.		-0.079** (-1.99)	
Dec. Pledged Shares Count			-0.007* (-1.90)
CEO Tax Burden (Lagged)		0.036 (0.42)	0.036 (0.43)
Controls		Yes	Yes
Year FE		Yes	Yes
Executive FE		Yes	Yes
S.E. clustered by executive		Yes	Yes
No. of observations		17,639	17,639
R-Squared		0.848	0.848

Table 6 (continued)

Panel B: Cash pay

Dependent variable:	Pr. Sign	Cash Pay (1)	Cash Pay (2)
CEO Tax Burden (Lagged) × Dec. Pledged Shares Ind.	+	0.910** (2.06)	
CEO Tax Burden (Lagged) × Dec. Pledged Shares Count	+		0.079** (2.03)
Dec. Pledged Shares Ind.		-0.012 (-0.39)	
Dec. Pledged Shares Count			-0.001 (-0.22)
CEO Tax Burden (Lagged)		0.086 (1.121)	0.086 (1.12)
Controls		Yes	Yes
Year FE		Yes	Yes
Executive FE		Yes	Yes
S.E. clustered by executive		Yes	Yes
No. of observations		17,639	17,639
R-Squared		0.848	0.848

Table 7
Stock sales by CEOs with pledged shares

This table presents the results examining the relation between CEOs who pledge shares in response to tax burdens and stock sales. The sample consists of firm-years from 2006-2019. *Pledged* is an indicator variable equal to one if the CEO pledges a nonzero amount of stock during the fiscal year, and zero otherwise. Column 1 (2) shows the results using *Sale* (*Num Shares Sold*) as the dependent variable. All variables are defined in Appendix A. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, *** indicate statistics significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tailed *t*-test.

Dependent variable:	Pr. Sign	*Sale* (1)	*Num Shares Sold* (2)
CEO Tax Burden		0.192***	0.629**
		(3.13)	(2.15)
CEO Tax Burden × *Pledged*	-	-0.672**	-2.698**
		(-2.40)	(-2.12)
Pledged		0.034	0.084
		(1.14)	(0.64)
Controls		Yes	Yes
Year FE		Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes
S.E. clustered by firm		Yes	Yes
No. of observations		22,536	22,536
R-Squared		0.144	0.183

Table 8
Executive tax burdens (excluding the CEO) and share pledging

This table presents the results examining the relation between executive tax burdens (excluding the CEO) and share pledging. The sample consists of executive-years from 2006-2019. In Panel A, columns 1-2 (3-4) show the results using *Pledged* (*Num Shares Pledged*) as the dependent variable. Panel B shows the results after using propensity score matching and entropy balancing to match executive-years with high executive tax burdens (*High Exec Tax Burden* = 1) to those with low executive tax burdens (*High Exec Tax Burden* = 0). *High Exec Tax Burden* is an indicator variable equal to one (zero) if the executive has a tax burden above (below) the median for the fiscal year. The propensity score matching procedure is performed using a caliper of 0.01. In Panel B, columns 1-2 (3-4) show the results using the propensity score matched (entropy balanced) sample. All variables are defined in Appendix A. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, *** indicate statistics significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tailed *t*-test.

Panel A: Main results

Dependent variable:		*Pledged*		*Num Shares Pledged*	
	Pr. Sign	(1)	(2)	(3)	(4)
Exec Tax Burden	+	0.128***	0.152***	1.452***	1.719***
		(6.56)	(6.67)	(6.61)	(6.72)
Size			0.001		0.007
			(0.61)		(0.68)
BTM			-0.000		-0.005
			(-0.07)		(-0.10)
Leverage			0.028***		0.307***
			(4.04)		(4.07)
ROA			-0.005		-0.074
			(-0.67)		(-0.86)
Ret 1 Yr			-0.002		-0.026
			(-1.54)		(-1.64)
Ret Volatility			0.002		0.024
			(0.40)		(0.46)
Analyst Coverage			0.003***		0.038***
			(3.22)		(3.26)
Inst Own			-0.027***		-0.294***
			(-3.95)		(-4.00)
Board Independence			-0.006		-0.082
			(-0.38)		(-0.49)
Year FE		No	Yes	No	Yes
Industry FE (SIC 2-digit)		No	Yes	No	Yes
S.E. clustered by firm		Yes	Yes	Yes	Yes
No. of observations		78,167	78,167	78,167	78,167
R-Squared		0.004	0.026	0.004	0.026

Table 8 (continued)

Panel B: Matching analysis

Matching method:		Propensity Score Matching		Entropy Balancing	
			Num Shares		*Num Shares*
Dependent variable:		*Pledged*	*Pledged*	*Pledged*	*Pledged*
	Pr. Sign	(1)	(2)	(3)	(4)
High Exec Tax Burden	+	0.015***	0.165***	0.014***	0.161***
		(7.33)	(7.49)	(7.01)	(7.30)
Controls		Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes	Yes	Yes
S.E. clustered by firm		Yes	Yes	Yes	Yes
No. of observations		56,572	56,572	78,167	78,167
R-Squared		0.027	0.027	0.026	0.026

Table 9
Variance decomposition

This table presents the results of a variance decomposition analysis. The sample consists of firm-years from 2006-2019. Using the regressions in Table 3, Panel A Columns 2 and 4 (Columns 1 and 3 here) and Table 9, Panel A Columns 2 and 4 (Columns 2 and 4 here), we individually remove each coefficient from the regression and note the change in the residual sum of squared errors. This change presents a value of how important that variable is in the overall regression. We sum up these changes in the sum of squared errors and divide each value by the total (so each column will sum to one).

Dependent variable:	Pledged		Num Shares Pledged	
	(1)	(2)	(3)	(4)
CEO Tax Burden	0.267	0.522	0.278	0.528
Size	0.036	0.017	0.030	0.018
BTM	0.000	0.013	0.000	0.005
Leverage	0.169	0.123	0.166	0.090
ROA	0.002	0.009	0.003	0.008
Ret 1 Yr	0.001	0.002	0.001	0.001
Ret Volatility	0.001	0.059	0.000	0.055
Analyst Coverage	0.000	0.003	0.000	0.001
Inst Own	0.042	0.028	0.038	0.024
Board Independence	0.063	0.016	0.063	0.017
CEO Own	0.039	0.071	0.059	0.160
CEO Tenure	0.380	0.137	0.360	0.094
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Executive FE	No	Yes	No	Yes
R-Squared Within	0.032	0.002	0.035	0.002

Table 10
Robustness tests

This table presents the results of robustness tests examining the relation between CEO tax burdens and share pledging. The sample consists of firm-years from 2006-2019. Panel A shows the results including firm (columns 1 and 3) and executive (columns 2 and 4) fixed effects. Panel B shows the results when negative values for the *CEO Tax Burden* variable are winsorized to be zero. Panel C shows the results when the continuous *CEO Tax Burden* variable is replaced with a variable based on quintile ranks within each year (*CEO Tax Burden Rank*). Panel D shows the results using the *CEO State Tax Burden* variable. Panel E shows the results using *Pct Shares Pledged* as the dependent variable. All variables are defined in Appendix A. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, *** indicate statistics significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tailed *t*-test.

Panel A: Firm and executive fixed effects

Dependent variable:	Pr. Sign	Pledged		Num Shares Pledged	
		(1)	(2)	(3)	(4)
CEO Tax Burden	+	0.086**	0.095**	1.209***	1.272**
		(2.50)	(2.15)	(2.85)	(2.36)
Size		-0.002	-0.003	-0.035	-0.040
		(-0.41)	(-0.36)	(-0.50)	(-0.39)
BTM		-0.006	-0.006	-0.055	-0.050
		(-0.54)	(-0.41)	(-0.36)	(-0.26)
Leverage		0.031*	0.026	0.350	0.297
		(1.67)	(0.97)	(1.53)	(0.89)
ROA		-0.006	-0.009	-0.095	-0.114
		(-0.39)	(-0.42)	(-0.45)	(-0.42)
Ret 1 Yr		0.000	-0.001	0.004	-0.008
		(0.06)	(-0.23)	(0.08)	(-0.14)
Ret Volatility		-0.009	-0.014	-0.123	-0.174
		(-0.79)	(-0.95)	(-0.84)	(-0.98)
Analyst Coverage		0.003	0.001	0.028	0.008
		(0.75)	(0.15)	(0.51)	(0.12)
Inst Own		-0.006	-0.010	-0.079	-0.121
		(-0.46)	(-0.54)	(-0.48)	(-0.56)
Board Independence		-0.012	-0.021	-0.198	-0.282
		(-0.33)	(-0.45)	(-0.45)	(-0.51)
CEO Own		0.069	0.064	1.290	1.274
		(1.17)	(0.76)	(1.63)	(1.21)
CEO Tenure		0.011***	0.010	0.133***	0.109
		(3.02)	(0.87)	(3.03)	(0.78)
Year FE		Yes	Yes	Yes	Yes
Firm FE		Yes	Yes	Yes	Yes
Executive FE		No	Yes	No	Yes
S.E. clustered by firm		Yes	Yes	Yes	Yes
No. of observations		22,342	21,730	22,342	21,730
R-Squared		0.554	0.647	0.563	0.655

Table 10 (continued)

Panel B: Tax burdens winsorized below zero

Dependent variable:	Pr. Sign	*Pledged* (1)	*Num Shares Pledged* (2)
CEO Tax Burden (winsorized below zero)	+	0.422***	5.485***
		(5.31)	(5.47)
Controls		Yes	Yes
Year FE		Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes
S.E. clustered by firm		Yes	Yes
No. of observations		22,536	22,536
R-Squared		0.075	0.079

Panel C: Tax burden quintile ranks

Dependent variable:	Pr. Sign	*Pledged* (1)	*Num Shares Pledged* (2)
CEO Tax Burden Rank	+	0.046***	0.590***
		(5.25)	(5.62)
Controls		Yes	Yes
Year FE		Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes
S.E. clustered by firm		Yes	Yes
No. of observations		22,536	22,536
R-Squared		0.071	0.075

Panel D: State tax burdens

Dependent variable:	Pr. Sign	*Pledged* (1)	*Num Shares Pledged* (2)
CEO State Tax Burden	+	0.375**	4.948**
		(2.10)	(2.21)
Controls		Yes	Yes
Year FE		Yes	Yes
Industry FE (SIC 2-digit)		Yes	Yes
S.E. clustered by firm		Yes	Yes
No. of observations		22,536	22,536
R-Squared		0.067	0.070

Panel E: Percentage of shares pledged

Dependent variable:	Pr. Sign	*Pct Shares Pledged* (1)	(2)	(3)
CEO Tax Burden	+	0.072***	0.072***	0.048*
		(3.22)	(2.81)	(1.79)
Controls		No	Yes	Yes
Year FE		No	Yes	Yes
Industry FE (SIC 2-digit)		No	Yes	No
S.E. clustered by firm		Yes	Yes	Yes
No. of observations		22,536	22,536	21,721
R-Squared		0.003	0.054	0.647