How Executive Compensation Changes In Response to Personal Income Tax Shocks (Who Pays the CEO?s Income Taxes?)

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April 22, 2026

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Abstract

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Keywords: Executive compensation; personal income tax;

JEL Classification: G3, H24, H71, J33, M12

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US CEOs receive an abnormal increase in pay of 6.4% to 7.4% following large state personal income tax increases. The pay increase substantially compensates the CEO for the increased tax liability. The increase in pay is larger when: the CEO has more employment options, is less tied to the company, or corporate governance is doubtful. Reflecting CEO outside options, the CEO's supply curve for managerial input is far more elastic than the firm's demand curve. Indicating agency concerns, CEOs do not experience an abnormal pay cut following a tax decrease.

Keywords: Executive compensation; personal income tax; elasticity of CEO supply curve; governance; agency concerns.

JEL codes: G3, H24, H71, J33, M12

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1. Introduction, Framework, and Summary

The level and structure of executive pay are complex, controversial concerns (Bettis et al., 2018; Coles et al., 2024; Albuquerque et al., 2025). Persistent interest among investors, regulators, politicians, and executives has spawned a substantial scholarly literature as well as a considerable compensation consulting industry. Each addresses the determinants and consequences, economic and otherwise, of the level and incentive properties of executive pay.

Edmans, Gabaix, and Jenter (2017), in their survey of the theories and empirical evidence on managerial compensation, note that the various empirical designs arise from at least three, non-mutually-exclusive perspectives: shareholder value maximization; rent extraction by executives; and institutional forces. The focus in the literature has been on the first two perspectives.

> Most recent analyses of executive compensation have focused on efficient-contracting or managerial-power rationales for pay, while ignoring or downplaying the causes and consequences of disclosure requirements, **tax policies**, accounting rules, legislation, and the general political climate. (Murphy, 2013; emphasis added)

We emphasize this third approach. While interesting in itself, we do so in large part as an empirical means to examine the other two. We use state income tax shocks to ascertain how competitive and agency-based forces affect pay formation in the executive labor market.

Several prior studies that have examined income taxes and executive compensation report negligible effects of US *federal* income tax policy on managerial pay (Goolsbee, 2000a; Hall and Liebman, 2000; Rose and Wolfram, 2002). Frydman and Molloy (FM, 2011, p. 1434) conclude that "(I)n summary, we have found little evidence that changes in tax rates are related to changes

in executive pay…". Given the finding that federal income tax shocks have negligible effects, a plausible initial view is that there would be no change in executive pay in response to a change in personal state income tax. We argue instead that *state* tax rate changes are fundamentally different.

The top federal income tax rate and shocks to that rate apply uniformly to all U.S. executives across all states. Consequently, the employment options that would avoid a US federal personal income tax increase would require relocation to another country, not just another state, with a lower personal income tax rate. Differences across states in rates can be substantial. For example, in 2020 California's top marginal personal income tax rate was 13.3 percent, as compared to no state personal income tax in Texas, Florida, Nevada and several other states.[1] Accordingly, the threat by an executive of relocating to another US state with a lower state personal income tax rate is likely to be credible. Along these lines, it appears that "elite" US executives, managers at the apex of the firm, are attuned to such differences in state tax rates and will threaten to relocate or actually will relocate.[2] Firms, as well, show awareness of the issue. For instance, the March 22, 2016, Nacco Industries proxy states that:

> When the frozen accounts are paid, a determination will be made whether the highest incremental personal income tax rates and applicable employment tax rates in the year of payment exceed the rates that were in effect in 2008 when all other participants received their nonqualified plan payments. In the event the [tax] rates have increased, an additional tax gross-up payment will be paid to the NEO.[3]

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[1] Figure A1 (Appendix 2) provides additional specifics for all US states.

[2] We thank Carola Frydman and Wayne Guay for bringing locational concerns to our attention. See https://www.bizjournals.com/sanfrancisco/news/2020/11/17/california-exodus-roared-on-even-before-covid-hit.html and https://www.wsj.com/tech/elon-musk-to-discuss-teslas-banner-year-despite-pandemic-silicon-valleys-future-11607449988. Moreover, top athletes in team sports have limited locational flexibility but are acutely aware of how income tax rates vary across jurisdictions. For example, see reporting on NHL hockey players (https://www.wsj.com/sports/hockey/stanley-cup-low-tax-states-florida-panthers-7d15ecff?mod=hp_featst_pos4). Likewise, Kleven, Landais, and Saez (2013) report evidence of strong mobility responses by superstar European football players across national borders to national tax rates. Finally, Moretti and Wilson (2017) find that the levels of US state income tax rates have a significant effect on the geographical location of superstar scientists in the US. Our analysis examines related questions for "star" managers, specifically top executives in US firms.

[3] https://www.sec.gov/Archives/edgar/data/0000789933/000078993316000080/ncdef14a2016.htm. See Table A1 (Appendix 2) for more details and three additional examples.

We reject the null hypothesis of no state income tax effect on CEO pay. Our empirical analysis indicates that the response of CEO compensation to state personal income tax *increases* is economically and statistically significant. The size of the pay increase depends on supply and demand considerations, such as outside employment opportunities for CEOs, as well as on agency concerns and rent extraction. The effect is asymmetric. Tax increases lead to compensation increases, while tax *decreases* have no effect on pay for CEOs and other named executive officers.

To frame our analysis, suppose that top executives and firms are assortatively matched based on attributes of each that are reciprocally-synergistic, costly-to-transfer, and differentiated (Rosen 1981; Tervio 2008; Pan 2017). Then there are several reasons why a change in personal income tax rate would affect executive pay. First, higher income taxes can directly reduce executives' after-tax income, thereby shifting the supply curve for executive input inward, which implies upward pressure on CEO pay, especially if the demand curve for CEO input is inelastic. The version of the supply curve we have in mind includes both the intensive and extensive margins, though we think of the intensive margin as largely irrelevant. CEOs have significant span of control and demands on their time and rise to the apex of the organization because they supply maximal feasible managerial input. The participation decision, in contrast, is likely to matter. By this we do not mean whether the CEO decides to leave the labor market. Rather, as intimated above, the location and shape of the supply curve will depend on the existence and extent of external opportunities the CEO has for CEO positions at employers offering higher pay or in alternative low-tax domiciles, and on the frictions, benefits, and costs to the CEO of switching.[4]

[4] More generally, migration associated with tax differentials or changes in tax differentials does occur. Estimates of lost (gained) tax revenue over the last decade (2011-2021) due to interstate migration away from high-tax or to low-tax states include the following: New York lost $111 billion in AGI; California lost $102 billion; Illinois lost $63 billion; Florida gained $196 billion; and Texas gained $54 billion. See https://www.ntu.org/foundation/detail/florida-continues-to-attract-new-residents-new-york-california-and-illinois-lose-the-most-population.

Second, in the matching model some will prefer to understand the determination of pay in the transaction cost economics (TCE) framework. Again, think of firm and executive "endowments" matched based on the potential reciprocal synergies arising from the characteristics and capabilities of the firm and manager. This bilateral dependency can create a one- or two-sided holdup problem. Therein specific firm assets and a particular manager's specific human capital cannot generate surplus without the other, so that bargaining power in the hold-up problem can be ascribed to the firm or manager or both (Hart and Moore, 1990).[5]

Third and in addition, governance considerations likely affect the ability of the matched CEO to extract additional pay. Perhaps the firm is not disposed to implement governance that would hold managerial feet to the fire, or the costs of discovering and achieving an optimal governance structure are prohibitive.[6] Even if governance mechanisms are optimally configured, the presence of informational or other frictions implies second-best solutions (Holmstrom, 1979), resulting in a "residual loss" (Jensen and Meckling, 1976). In this setting, governance permitting, executives potentially can exercise influence or power to increase their pay over and above what would arise from the conventionally understood intersection of supply and demand. In summary, competitive supply effects, along with agency and governance problems - forces that are unlikely to be mutually exclusive - are the primary channels we address.

Over the 1992 – 2022 period there were 371 changes in the top marginal US state personal income tax rates, of which 116 were increases and 255 were decreases. Following Heider and Ljungqvist (HL, 2015), we focus primarily, though not exclusively, on the 46 "large" state tax rate

[5] Applying a different approach, Barry (2025) estimates a structural model of the managerial labor market with general and firm-specific human capital accumulation, bargaining power, and imperfect competition.
[6] Either way, the board of directors could be co-opted (Coles, Daniel, and Naveen, 2014), insufficiently independent (Weisbach, 1988), or staggered (Guernsey et al., (2025), or the sensitivity of CEO pay to firm performance could be suboptimal (Coles et al, 2012), for example.

shocks, meaning rate changes at least as large as one percentage point, including 27 tax increases and 19 tax cuts, in our sample (Figure 1). This approach is consistent with the likelihood that large tax changes are more salient than small ones and that the costs associated with adjusting compensation in response to very small income tax rate changes are large relative to the benefits.

We apply two empirical approaches to the question of the effect of state personal income tax changes on pay. First, we apply a difference-in-differences (DiD) approach to state personal income tax shocks. Second, following the prior literature on federal income tax changes (e.g., Frydman and Malloy, 2011), we estimate the elasticity of CEO pay in the net-of-tax rate.

In our DiD specifications, we use state-level personal income tax changes as plausibly exogenous shocks to tax rates. Compared with federal tax changes, state-level changes in personal income taxes are more frequent and do not affect all states at the same time. The staggered nature of state-level personal tax shocks potentially provides valid control firms as a set of counterfactuals for how executive compensation would have evolved without the tax changes. The treated group includes CEOs of firms headquartered in states experiencing increases or decreases in top personal income tax rates. The control group includes the remaining CEOs in the sample. Because states can and do experience repeated tax shocks, we define our treatment variable to indicate the appearance of each tax shock, while using fixed effects and the first difference of control variables on the right-hand side (per Heideret al. 2015).

Our DiD estimates show that CEOs receive economically and statistically higher pay two years after a large (≥1%) increase in personal income tax rates. CEOs receive an extra increase in pay of 6.4 up to 7.4% following large tax increases, relative to CEOs who do not experience such tax shocks, controlling for other determinants of the evolution of compensation. Furthermore, the effect is asymmetric. In contrast to tax increases, the effect of a state income tax cut is statistically

and economically insignificant. Thus, regardless of the direction of the change in tax rate, on average the CEO is never a loser.

The DiD results survive various hurdles for credible identification. First, we estimate stacked DiD (Cengiz et.al., 2019; Baker, Larcker, and Wang, 2022). Despite the smaller sample size, our estimates and conclusions are robust. Second, we investigate whether state tax changes arise from prior rapid growth in executive pay. They do not. Third, while there likely is no such thing as an exogenous tax change, we attempt to further remove political considerations by using applying a narrative approach (Romer and Romer, 2010; Giroud and Rauh, 2019). Our findings are the same.

Fourth, a concern is that both state tax changes and executive pay changes can be affected by local economic conditions. Exploiting the fact that local economic conditions tend to be more similar in bordering states, we use a control group including only CEOs of firms headquartered in bordering states that do not experience any tax shock. This neighboring control group establishes the counterfactual response of CEO compensation to the unobserved local factors excluding the effects of tax changes. The effect of state tax changes on CEO pay in our full sample is robust to the bordering-state setting. Fifth, the treated and control groups appear to exhibit parallel trends in CEO pay changes before both positive and negative shocks to tax rates. Sixth, we assess and then discard the possibility that our results on tax increases are attenuated towards zero by CEOs who avoid a state tax increase by a preemptive original choice of domicile. Finally, we apply DiD with a continuous treatment (Callaway et al., 2024) in order to address heterogeneity in "dosage" (size of the tax shock). The results again indicate that the response of CEO compensation to state personal income tax increases is economically and statistically significant, while tax decreases have no effect on CEO pay.

We provide triangulating results and other comparisons that address each of agency costs and the managerial supply curve. First, the pay increase is larger when the CEO has more outside options (e.g., more CEO slots in the industry) and is more disposed to exercise the outside option (non-founder). Second, the size of the pay response to a large state income tax change depends on governance. The CEO pay increase is larger when the board is less independent and when the entrenchment index (E-Index per Bebchuck et al., 2009) is high. Third, a named executive officer (NEO) who is not CEO is likely to have a similar ability to move but lower ability than the CEO to extract rents in a given governance setup. We find that they receive a much smaller pay increase of about 2.5%, about one-third of that of the CEO, in response to a large increase in personal state income tax rate. On the other hand, NEOs seem to have bargaining power insofar as, like CEO pay, non-CEO NEO pay does not decline relative to benchmark in response to a tax decrease. Finally, directly analogous to our DiD analysis of US state income tax changes, we collect *international* data on staggered national income tax shocks across 20 additional countries. We find that CEO pay increases significantly the second year following a national personal income tax increase. Like state personal income tax decreases in the US, we find that national income tax decreases do not lead to a decline in CEO pay relative to benchmark.

In our second empirical approach, we follow the method in Frydman et al. (2011) to regress the natural logarithm of the ratio of post-tax to pre-tax managerial pay on the logarithm of the inverse of the ratio of pre- to post-tax net-of-tax rates. This approach allows examination of the incidence of a shift in the managerial labor supply curve arising from an income tax shock. We find that when the net-of-tax rate (NOT) changes by 1% due to a state personal income tax shock CEO pay changes by 0.730% to 0.906%. These figures imply that CEO pay increases within two years by an amount three-quarters or more of the way to fully compensating the CEO for the

increased tax liability. The estimates indicate that the supply curve for CEO services is at least 2.70 times and perhaps as much as 9.64 times as elastic as the CEO demand curve.

Our analysis of the effects of state personal income tax changes on executive compensation contributes to several intersecting segments of the literature. We use changes in state personal income tax rates to advance the literatures on: (1) the determinants of the level and rate of change of managerial compensation; (2) firm demand and executive supply (especially the extensive margin) in the managerial labor market; (3) corporate governance and rent extraction; and (4) the incidence of personal income taxes. We build on prior studies that estimate the effects of taxes on executive pay, including Bird (2018) and Perry et al. (2001), who examine changes in the tax treatment of pay components, Frydman et al. (2011), who study federal tax reforms, and Goldman, Henley, and Lewellen (2024), who address convexity in the personal income tax schedule.

2. Empirical Design

We use two approaches to examine the changes, if any, in CEO pay in response to changes in personal income tax rates. We estimate: (1) a DiD model for repeated treatments, which we describe just here and implement in Section 4; and (2) an elasticity (in the net-of-tax rate) model, which we describe briefly here and deploy in detail in Section 5.

In a DiD analysis based on a single event, the treatment indicator (i.e., Treat x Post) typically is set to one in years after the event (as illustrated in the upper panel of Figure A2, Appendix 2). In our analysis, however, there are multiple shocks to tax rates through time. One tax increase may be followed by another tax increase or decrease in the same state in the future. In this case, a single treatment indicator equal to one after the first shock would fail to capture the subsequent shocks (lower panel of Figure A2).

One way to accommodate repeated events is to set the treatment variable as a count variable, or equivalently, use the first differences of all variables, including the treatment variable, in the DiD analysis (Heider aet al. 2015). Accordingly, we define a dummy variable, *Tax Increase* (*Decrease*), which equals one if a large tax increase (decrease) occurs in the headquartered state in a year, and zero otherwise, where a large tax change refers to a change of at least one percentage point. This is equivalent to the first difference of a count variable and captures all large tax shocks in a state (lower panel of Figure A2). We estimate:

$$\begin{aligned}\Delta Ln(y_{m,t}) = \beta_0 + \beta_{-2}^{Incr} \cdot Tax\ Increase_{m,t-2} + \beta_{-1}^{Incr} \cdot Tax\ Increase_{m,t-1} \\ +\beta_{-2}^{Decr} \cdot Tax\ Decrease_{m,t-2} + \beta_{-1}^{Decr} \cdot Tax\ Decrease_{m,t-1} \\ +\Delta X_{m,f,t}\Gamma\ + \mu_{m,f} + \vartheta_{ind,t} + \varepsilon_{m,t},\end{aligned} \quad (1)$$

where *y* is CEO compensation, the superscript *Incr* (*Decr*) indicates a coefficient for tax increase (decrease), the subscript -2 (-1) indicates a coefficient for a tax shock two years (one year) ago, *m* is the CEO index, *t* is the time index, *f* is the firm index, *ind* is the industry index, and *y* is CEO compensation. $X_{m,f,t}$ is the vector of control variables (including characteristics of the firm that employs the CEO), Δ is the first difference operator (within CEO-firm), Γ is the coefficient vector for the control variables, $\mu_{m,f}$ is the CEO-firm fixed effect, $\vartheta_{ind,t}$ is the industry-year fixed effect, and $\varepsilon_{m,t}$ is the error term. The control variables in *X* can be scaled, transformed using the natural logarithm function, or not transformed at all. We include the standard explanatory control variables from prior literature (per Edmans et al., 2017). Here and throughout $\Delta X_{m,f,t}\Gamma\ + \mu_{m,f} + \vartheta_{ind,t}$ is meant to capture determinants, other than tax rate changes, of the change in CEO pay.

The β coefficients show the treatment effects in the DiD analysis. For example, a significantly positive β_{-2}^{Incr} would indicate that CEO compensation increases two years following an increase in the state personal income tax rate. We consider changes in CEO compensation both one and

two years after shocks to top state personal income tax rates because benchmarking and pay-formation processes used by many listed US firms generally include lags in data and response.[7] For a state personal income tax shock in year *t*, any new compensation contract that responds to the shock will be effective no earlier than year *t+1* or perhaps more likely one more year later, in year *t+2*. Accordingly, we expect a lag of at least one year and more likely two years for a response in CEO pay, if any, to a change in the personal income tax rate.[8, 9]

In our second approach, per Frydman et al. (2011) and their antecedents, we regress the natural logarithm of the ratio of post-tax to pre-tax managerial pay, $y_{m,t}/y_{m,t-k}$, on the logarithm of the inverse of the ratio of post-tax-change (year *t*) *net-of-tax rate* (*NOT*) to the pre-tax-change (year *t-k*) net-of-tax rate, specifically $(NOT_{m,t-k}/NOT_{m,t}) = (1-\tau^{F}_{m,t-k}-\tau^{St}_{m,t-k})/(1-\tau^{F}_{m,t}-\tau^{St}_{m,t})$, with controls. The superscript denotes the federal (*F*) or state (*St*) personal income tax rate, *m* indexes the manager, and *t* and *t-k* index time. An estimate of the coefficient on the logarithm of the NOT equal to 1.0 would indicate that the proportional change in executive pay exactly offsets the tax increase, making the executive whole after-tax and fully shifting the incidence of the tax increase to the firm. Section 5 provides parameter estimates and shows how such estimates allow a comparison of the elasticities of demand and supply for managerial input.

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[7] The human resources director and board compensation committee, often in collaboration with a compensation consultant, set pay based on lagged pay data for size- and industry-based comparison firms and with a lag in pay determination based on those data (Murphy, 1999). The compensation consultant will collect compensation data on the various positions (CEO, CFO, SVP, Chief Legal Officer, Division Head, SVP, etc.) from those comparable companies and, as the benchmark, pick the median, mean or appropriate percentile, based on where the board determines the executive resides in effectiveness and performance relative to peer executives. To formulate contemporaneous benchmarks for setting pay, many firms apply an annual inflation factor, such as the 5% often suggested by compensation consultants, to the lagged benchmark data for overall pay and the components of pay.

[8] To elaborate further on timing (ibid.), US personal income taxes in year *t* usually need to be paid no later than October in year *t+1*, when any liquidity issue arises from the need to pay more income tax. The need for liquidity can motivate CEO option exercises and equity sales, which in turn can motivate the compensation committee of the board of directors to recalibrate the CEO's compensation contract, which would come into effect the following year.

[9] We also estimate a stacked DiD model and DiD with continuous treatment. See Section 4.

3. Sample Construction

For the US sample, we obtain data on personal income tax rates from the official website of the Tax Policy Center (https://www.taxpolicycenter.org). CEOs generally have high income, so for any state we use the change in the top personal marginal income tax rate. Over the period 1992 – 2022 there were 1,581 (= 51 x 31) state-years (including Washington, DC) and 371 changes in the top state personal income tax rate (Table 1). Of these, 116 (255) were increases (decreases), while 46 (325) were large (small) changes of at least (less than) one percentage point. Following Heider et al. (2015), we focus primarily, though not exclusively, on the 46 large tax rate shocks, meaning rate changes at least as large as one percentage point, including 27 tax increases across 18 states and 19 tax cuts across 17 states in our sample (Figure 1). Treated firms are those headquartered in states experiencing large tax shocks. In our baseline setting, control firms are those headquartered in states without contemporaneous large state income tax shocks.

Appendix 1 displays variable definitions. We obtain compensation data from Execucomp and corporate accounting data from Compustat. We extract information on the location of firms' executive offices directly from SEC 10K filings. To identify the relevant state for personal income tax rates, we use the "Mail Address" in 10K filings, which is the HQ address or the "Address of principal executive offices" for the firm.

Our sample reflects the merged intersection of the Execucomp and Compustat datasets. We only include CEOs who have worked in their current positions more than two years, so that their compensation in the current firms can be affected by the tax changes in the past couple of years and that CEO moves across firms do not contaminate the compensation data. Starting from 47,083 CEO-firm-year observations, we drop 12,745 because the CEO has less than 2 years of tenure, 595 when the firm has less than $50 million in market equity, 6,526 from banks and utilities, and 4,926

by eliminating firms that change state of domicile. Accordingly, over 1992–2022, the final sample includes 22,291 CEO-firm-year observations. About 2.6% and 1.3% (5.1% and 13.5%) of CEO-year observations reflect a large (small) increase or decrease, resp., in the CEO's top personal income tax rate.

Panel B of Table 1 reports summary statistics. The average CEO in the US sample earns US$5.88M per year. In our empirical analysis, we control for ln(book value of assets), market-to-book assets, and CEO-firm performance (ROA), as well as CEO-firm fixed effects and industry-year fixed effects. Firm-year averages are $6.489B for book assets, 2.189 for market-to-book assets, and 4.7% for ROA.[10]

We also collect data for CEOs and their firms for national personal income tax rate changes in 20 other countries. US federal and non-US national tax changes are less frequent but larger than US state personal income tax shocks (Table 1, Panel A). About 8.0% and 7.7% of CEO-year observations reflect a large increase or decrease, respectively, in the top personal national income tax rate faced by the CEO. CEO compensation data are from Incentive Lab Europe. Panel C reports the summary statistics for the international sample including US and non-US firms.

4. DiD Analysis: The CEO Pay Response to Personal Income Tax Rate Changes

The primary treatment group is CEOs at firms in states with a personal state income tax shock greater than or equal to 1%, up or down. The "base" control sample is CEOs at firms in states that did not have a *large* personal state income tax shock. Because small changes in personal income

[10] An extensive literature in accounting and corporate finance establishes that these variables are related to the level and structure of executive pay. For examples, see: Smith and Watts (1992); Bizjak et al. (1993); Core et al. (1999); Murphy (1999); Coles et al. (2006); and Frydman et al. (2011). Also see the Edmans et al. (2017) survey.

tax rates are less likely to trigger pay negotiations between CEOs and their firms, we expect CEO compensation in these states to remain relatively unaffected, making them suitable candidates for the control group. A potential concern, however, is that this control sample is not perfectly clean. Accordingly, following de Chaisemartin and D'Haultfoeuille (2020), as a robustness test we clean the base control sample further by eliminating CEOs of firms in states that had any small personal state income tax increase during the sample period. This removes 6,728 CEO-firm-year observations from the base control sample to yield a smaller overall sample (15,563) that includes a smaller but "spotless" control sample. The dependent variable is Δln(TDC1).

4.1. Large State Personal Income Tax Increases

Table 2 presents the results for the indicators for large tax shocks. Column 1 (2) shows the estimates of the effect on CEO compensation of tax increases (decreases) one year and two years prior. Column 3 includes indicator variables for both tax increases and decreases. The results show that CEO compensation significantly increases two years after a large tax increase. Controlling for other determinants of pay changes, column 1 (3) shows that CEO compensation increases by 6.4% (6.6%) two years after a state personal income tax increase, relative to normal pay growth based on firm performance, assets, MTB, and factors captured by CEO-firm and industry-year fixed effects. We observe no significant changes in compensation in the adjacent lagged year of a tax increase. It takes two years for CEO pay to adjust following a tax increase.

These estimates for large state personal income tax shocks may be attenuated towards zero insofar as they are based on the control sample that includes small state income tax shocks. To assess robustness, we use the smaller spotless control sample. Model 4 (6) of Table 2 indicates that CEO compensation increases by 7.2% (7.4%) two years after a state personal income tax

increase. These coefficients are somewhat larger, with lower *p*-values, than those in models 1 and 3, even though using the spotless control sample reduces the number of CEO-firm observations.[11]

4.2. Large State Income Tax Decreases

In stark contrast, there is no abnormal decrease in compensation following a tax decrease. As columns 2 and 3 of Table 2 report, the estimated coefficients on the lagged and twice-lagged tax decrease indicator variables are close to zero and insignificantly different from zero.

Using the spotless control sample does not alter the finding of asymmetry. In models 5 and 6 the estimated coefficients on the lagged and twice-lagged tax decrease indicator variables continue to be economically and statistically insignificantly different from zero.[12]

4.3. Further Evidence and Robustness Tests

4.3.1. Parallel Trends

We compare CEO pay changes [Δln(TDC1)] in the treated group and the control group in years around a shock to a state top personal income tax rate. Panel A (B) of Figure 2 plots the yearly differences for large tax increases (decreases). The dots represent the average yearly differences in CEO pay changes [Δln(TDC1)] between treated and control groups. The upper and lower bounds show the 90% confidence intervals. Consistent with the parallel trends assumption, in years before the event year (year *t*), i.e. year *t-2* and year *t-1*, the differences between treated and

[11] Using an intermediate control sample, which excludes state personal income tax shocks that occur within the three-year window starting with any large state tax shock, yields statistically significant estimates on the two lagged indicators of 6.6% and 6.7%. These figures, as well as the other parameter estimates, are similar in economic and statistical terms to those reported in Table 2. Moreover, for all results reported below, the estimates using the intermediate control sample are similar to those using the base and spotless control sample.

[12] For state income tax decreases, note that a reduction in nominal pay would not necessarily be required, all else equal, to equate after-tax CEO pay before and after a tax reduction. The specifications in Table 2 control for normal growth in pay associated with firm performance, size, and asset composition. While frictions in the pay-setting process for adjustment of *nominal* pay downward may be larger than for escalating pay, such is an unlikely explanation for the lack of a downward abnormal response in pay to tax rate decreases when benchmark pay grows for other reasons.

control groups are not statistically different from zero. Mirroring the results in Table 2, CEO compensation increases (is unchanged) after a large state personal income tax increase (decrease).

4.3.2. Changes in CEO Pay Do Not Precipitate State Income Tax Rate Changes

To alleviate the potential reverse causality concern that high growth in executive pay could trigger regulatory intervention in the form of a higher marginal tax rate for high earners, we regress the indicator *Tax Increase* (*Decrease*) on CEO pay growth in a state one and two years prior, controlling for state characteristics, including state debt, state GDP, tax revenues, cash savings, population, government indicator (democratic governor = 1, otherwise = 0), and unemployment rate. The test sample is at the state-year level, so we include state fixed effects and year fixed effects. CEO pay growth is the average change in firm-level CEO pay within a state-year. We have the relevant data for 1998-2020. Table A2 (tables labeled "A#" are located in Appendix 2) reports the results. State-level personal income tax changes do not appear to be associated with prior CEO pay growth in the specific state.

4.3.3. Exogenous Tax Shocks Identified by a Narrative Approach

To address political economy considerations as an omitted variable, Romer and Romer (2010) apply a narrative approach to classify tax changes larger than 1% into four categories based on the motivation of the tax changes. The categories are: (i) offsetting a change in government spending; (ii) offsetting some factor other than spending likely to affect output in the near future; (iii) dealing with an inherited budget deficit; and (iv) achieving some long-run goal, such as higher normal growth, increased fairness, or a smaller role for government. While in some sense it is possible to argue that *all* tax shocks are endogenous, Romer et al. (2010) define the last two categories as

exogenous tax shocks. Likewise, to form the treated group we include only the 38 (of 46 total) large tax shocks defined by the narrative approach as exogenous.[13]

Table A3 reports results somewhat larger than those in Table 2. Using the base (spotless) control sample, CEO pay increases by 6.8% to 6.9% (8.1% to 8.3%) two years following a large increase in personal income tax rates. There is no significant effect on pay for large tax decreases.

4.3.4. Neighboring Control States Without Tax Shocks

Local economic conditions potentially affect both executive compensation and local tax policies. Such effects are not necessarily removed in tests in which treated and control firms can be in different states far away from each other. Thus, we restrict control firms to those located in bordering states. Such states are more likely than distant states to share similar local economic conditions. For a treated state with a large tax shock, we include as control states only bordering states that do not experience a contemporaneous large shock to the personal income tax rates (Figure A3). Table A4 reports the results. The effects of tax increases on CEO pay remain positive and statistically significant [models 1 and 3 (4 and 6) for the base (spotless) control sample], while the effects of tax decreases remain insignificant [models 2 and 3 (5 and 6)].[14]

4.3.5. Preemptive Locational Choice: Distance to the Nearest Other State

[13] Giroud and Rauh (2019) use the same approach and study the effects of state taxation on the reallocation of business activity. We thank Giroud and Rauh for making their classification of tax shocks publicly available. Their latest tax increases were in 2011. For the tax changes (greater than 1%) after 2011 in our sample, we manually collect the information and apply the narrative approach proposed by Romer and Romer (2010). The sample period for this test is 1992-2021.

[14] Another potential concern might be that state tax increases often occur when state budgets are strained, which may coincide with changes in local business conditions and labor market tightness that independently affect CEO pay. To address this concern, in a robustness test we include state-level economic controls (e.g., state GDP growth, unemployment changes) directly in the DiD specification. Table A5 shows that our results are robust.

Supposing that a CEO should be proximate to corporate HQ for peak performance (Duchin and Sosyura, 2021), we interact the tax shock with the distance to the nearest state line. If that distance is large, it is less likely that the CEO is domiciled elsewhere and thereby insulated from the state tax shock. The estimated coefficient on the interaction term should be positive if a sizable number of CEOs in the sample are domiciled elsewhere and thereby avoid the state tax shock. Table A6 reports that the interaction coefficient estimate is essentially zero. CEO preemptive location and reactive relocation are unlikely to contaminate our main findings.

4.3.6. Placebo Test

To perform a placebo test, we randomly assign large tax increases and decreases to CEO-years, setting the mean of the increases and decreases equal to the actual sample mean at the CEO-year level. Table A7 reports the results as insignificant

4.3.7. Cleansing the Sample of State-level Corporate Income Taxes and Recession Years

During our sample period, there were some large shocks to state-level corporate income tax rates, which could influence corporate decisions, including executive compensation. Thus, we exclude firms headquartered in states with large shocks (no less than one percentage point) to state-level corporate income tax rates in any year of the sample. The DiD regression results remain robust for both tax increases and tax decreases (see Table A8). The Table 2 results also are robust to dropping Covid and other recession years (Table A9).

4.3.8. Stacked DiD

We also estimate the effects of changes in personal US state income tax rates on CEO compensation using a stacked DiD approach (e.g., Cengiz et.al., 2019). This setup addresses the possibility of heterogeneity in treatment effects. We construct a [-2, +2] stack window for each large tax increase or decrease (at least 1%). States with any other large changes (increases or

decreases) at any point within a stack window are excluded. This stacked DiD setting excludes any state experiencing more than one large tax shock within a five-year window. As a result, the sample includes only 12 large tax increases and 14 large tax decreases, compared with 27 increases and 19 decreases in the full sample. CEOs of firms headquartered in states with large changes are in the treatment group. The remaining CEOs are in the control group. For each stack, *Tax Increase* (*Tax Decrease*) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point at the central year of the stack, and zero otherwise. *Post1* (*Post2*) is an indicator variable for the first (second) year following a large tax shock. We estimate the model for tax increases and decreases separately.

Table 3 reports stacked DiD estimates that, despite the smaller sample size arising from the construction of clean stacks, are similar to the DiD estimates in Table 2.[15] The coefficient on the lagged tax indicator for increases is 0.073 ($p < 0.001$) while the estimate on the lagged tax-decrease indicator is close to zero. Moreover, the results are similar to those in Tables 2 and 3 when applying the stacked DiD procedure to the samples restricted using the narrative approach neighboring states approaches for control firms (Tables A10, A11).

4.3.9. DiD with Continuous Treatment

The DiD design compares outcomes between treated and untreated groups with and without the treatment (the tax shock). We follow the method of Callaway et al. (2024) to include the "dose" or intensity of the treatment, specifically the size of the tax shock, in the DiD model. Continuous Tax Increase (Decrease) is the CEO's state personal income tax rate increase (decrease), in percent when the magnitude of that change was at least one percent. Just as for the

[15] Figure A4 provides supportive evidence for the parallel trends assumption of the stacked DiD analysis.

DiD and stacked DiD estimates (Tables 2 and 3, resp.), the estimates in Table A12 are positive and economically and statistically significant for tax increases and negligible for tax decreases.

5. The Elasticity of CEO Compensation in the Net-of-Tax Rate

To assess further the nature of the pay response to state tax shocks, we estimate the elasticity of CEO pay in the net-of-tax rate. Our design follows that of Frydman et al. (2011). First, we directly estimate the elasticity of the CEO pay response in the inverse net-of-tax rate, both without and with adjusting for the state and local tax deduction. We consider both federal- and state-level changes in personal income tax rates and address large tax shocks alone and both small and large shocks together.[16] Second, we use the NOT estimates to derive ranges for the relative elasticities of demand and supply for managerial input.

5.1. Estimates of the Elasticity of CEO Compensation in the Inverse Net-of-Tax Rate

Let $g_{m,t}$ be the equilibrium growth rate in CEO pay, over period *t-k* to period *t*, based on CEO-firm performance, size, asset tangibility, etc. Denote $\hat{y}_{m,t}$ as the nominal pay of the CEO in period *t* that makes the CEO whole after-tax, holding all else constant: $\hat{y}_{m,t} \cdot (1 - \tau^{F}_{m,t} - \tau^{St}_{m,t}) = (1 + g_{m,t}) \cdot y_{m,t-k} \cdot (1 - \tau^{F}_{m,t-k} - \tau^{St}_{m,t-k})$, or $\hat{y}_{m,t} \equiv (1 + g_{m,t}) \cdot (NOT_{m,t-k}/NOT_{m,t}) \cdot y_{m,t-k}$. Dividing both sides by prior pre-tax pay, and allowing that tax rate changes can affect pay potentially with a lag, suggests the following specification to estimate the effect on actual period-*t* CEO pay, $y_{m,t}$, of a prior change in the personal income tax rate:

$$Ln\left(\frac{y_{m,t}}{y_{m,t-1}}\right) = \Pi^{q}_{0} + \Pi^{q}_{-2} Ln\left(\frac{NOT_{m,t-3}}{NOT_{m,t-2}}\right) + \Pi^{q}_{-1} Ln\left(\frac{NOT_{m,t-2}}{NOT_{m,t-1}}\right) \quad (2)$$

[16] Local income taxes are low (between 1% to 3%, with a few exceptions, https://taxfoundation.org/local-income-taxes-city-and-county-level-income-and-wage-taxes-continue-wane/), so we approximate the personal income tax rate as the sum of federal and state income tax rates and ignore municipal and local income tax rates.

$$+ \Delta X^{q}_{m,f,t} \cdot \Gamma^{q} + \mu^{q}_{m,f} + \vartheta^{q}_{ind,t} + \varepsilon^{q}_{m,t},$$

where *m* indexes the manager, *f* indexes the firm, *t* and *t-k* index time, superscript q = *St* (or *F*) signifies the data and parameter estimate are based on state (federal) personal income tax shocks, and $\Delta X^{q}_{m,f,t} \cdot \Gamma^{q} + \mu^{q}_{m,f} + \vartheta^{q}_{ind,t}$ captures determinants, other than tax rate changes, of the change in CEO pay. For state tax changes we expect the estimate of Π^{St}_{-2} to be positive because an increase (decrease) in the state personal income tax rate implies an increase (decrease) in the inverse *NOT* ratio, $NOT_{m,t-3}/NOT_{m,t-2}$. If compensation responds sooner, Π^{St}_{-1} could be positive. Note that the effect of a state tax rate change on the inverse net-of-tax ratio depends on the level of the federal tax rate.

Table 4 displays the results. Columns 1 and 2 consider large ($\Delta\tau^{St} \geq 0.01$ or $\Delta\tau^{St} \leq -0.01$) salient tax rate changes. We remove small state tax shocks by setting the maximum state tax rate (and NOT) in the adjacent following year to be equal to the earlier of the two years. That is, for columns 1 and 2, which are focused on large shocks, we set $NOT_{m,t-k}/NOT_{m,t-(k-1)}$ = 1 for all observations for which the tax rate change was less than one percentage point. This immunizes the analysis of large state tax shocks from contamination by small state tax rate changes.

The estimates on the lagged response coefficients are Π^{St}_{-2} = 0.906 (*t* = 2.30) and 0.730 (*t* = 2.01). That is, columns 1 and 2 indicate that a 1% decrease in the net-of-tax rate due to a state personal income tax rate increase is associated with a 0.906% or 0.730% increase in total compensation two years later, respectively. Moreover, the sum of the coefficients on the lagged once and twice NOT ratios are 0.947 (column 1) and 0.826 (column 2). An estimate of 1 would be consistent with an increase in pay that makes the CEO exactly whole in terms of after-tax pay.

Both estimates indicate that the CEO is substantially compensated two years later for a change in state personal income tax rate.

The estimates in Column 3 are based on both large and small state tax changes. It is possible that all tax rate changes, large or small, matter for CEO pay. The estimates on the inverse net-of-tax rate, however, are both statistically insignificant: Π_{-2}^{St} = 0.405 (*t* = 1.20) and Π_{-1}^{St} = 0.315 (*t* = 0.75). The sum of the two estimates is $\Pi_{-2}^{St} + \Pi_{-1}^{St}$ = 0.720, which is sizable but statistically insignificant.

To illustrate the economic significance of the parameter estimates, suppose the state personal income tax rate goes up by 0.0195 from period $t-3$ to $t-2$. Assume that prior to the tax increase that the federal and state rates are the CEO-year averages in the sample, 36.4% and 5.3%, respectively, so the federal and state rates sum to 0.417 at $t-3$ and 0.437 at $t-2$. Then $Ln(NOT_{m,t-3}/NOT_{m,t-2}) = Ln(1.0346)$ becomes 0.0340 rather than 0 (had there been no tax rate change) after the state tax increase. Using the elasticity estimates from columns 1 and 2 of Table 4 implies a 3.13% ($e^{(0.0340\ x\ 0.906)} - 1$) and 2.51% ($e^{(0.0340\ x\ 0.730)} - 1$) proportional abnormal (due to the tax shock) increase in CEO pay. Compared to a coefficient estimate of 1, which would be consistent with an increase in pay that makes the CEO exactly whole in terms of after-tax pay, the estimates indicate that the CEO is considerably compensated two years later for a change in state personal income tax rate.

The analysis above does not account for the state and local tax deduction (SALT). The SALT deduction, which has allowed itemizing taxpayers to deduct certain state and local taxes from their federal adjusted gross income, actually predates the establishment of the permanent federal income tax as instituted by the Revenue Act of 1913. Thus, the SALT deduction likely was relevant for

CEOs and other top executives until (but likely not after) the Tax Cuts and Jobs Act of 2017, which capped the deduction for itemizers at $10,000 (filing jointly) for years 2018-2025.

To adjust for the deductibility of state personal income taxes at the federal level, the net-of-tax for years 1992-2017 becomes $NOT_{m,t} \equiv (1 - \tau^{F}_{m,t}(1 - \tau^{St}_{m,t}) - \tau^{St}_{m,t})$, versus $NOT_{m,t} \equiv (1 - \tau^{F}_{m,t} - \tau^{St}_{m,t})$ for sample years 2018-2022. Based on this adjustment, we estimate Equation (2) for large state personal income tax shocks. Again, we set $NOT_{m,t-k}/NOT_{m,t-(k-1)}$ = 1 for all observations for which the tax rate change was less than one percentage point. Table 5 reports the estimates on the lagged response coefficients as Π^{St}_{-2} = 1.159 and 0.835. These figures indicate a an even larger response to changes in the net-of-tax rate arising from state personal income tax shocks than is given by the coefficient estimates in Table 4. [17]

5.2. Supply and Demand Elasticities for CEO Input.

We consider whether there is a combination of standard supply and demand effects that accommodate the elasticity estimates reported in Section 5.1. Setting aside the SALT deduction, denote equilibrium executive compensation as y, the sum of the federal and state tax rates as $\tau = \tau_f + \tau_s$, and CEO pay after income tax as $y \cdot (1 - \tau) = y \cdot NOT$. Denote the demand function of the firm for executive "labor" or input as $D(y)$ and the executive's supply function as $S(y \cdot NOT)$. In partial equilibrium in the executive labor market, $D(y) = S\big(y \cdot (1 - \tau)\big) = S(y \cdot NOT)$ determines the equilibrium level of compensation for a given net-of-tax rate.

Suppose that there is a shock to the net-of-tax rate. The shock could be an increase (a reduction) in federal or state tax rate, in which case NOT would fall (rise). To assess the effect of the tax shock on equilibrium pay, totally differentiate the expression equating demand and supply

[17] While Π^{St}_{-2} = 1.159 (Table 5, column 1) lies outside of the unit interval, the estimate is not statistically different from 1.

in y and NOT to get $D'(y) \cdot dy = S'(y \cdot NOT)[y \cdot dNOT + NOT \cdot dy]$. Rearranging gives $\varepsilon_{y,NOT}^{St} = -\varepsilon_S/(\varepsilon_S - \varepsilon_D)$, where $\varepsilon_{y,NOT}^{St} \equiv (NOT/y) \cdot (dy/dNOT)$ and the supply and demand elasticities in the CEO labor market are $\varepsilon_S \equiv y \cdot NOT \cdot S'(y \cdot NOT)/\, S(y \cdot NOT)$ and $\varepsilon_D \equiv y \cdot D'(y)/\, D(y)$. For $\varepsilon_S \in [0, \infty)$ and $\varepsilon_D \in (-\infty, 0]$, $-\varepsilon_{y,NOT}^{St} = \varepsilon_S/(\varepsilon_S - \varepsilon_D) \in [0, 1]$.

Note that the estimated coefficient from Equation (2) is the negative of the elasticity of executive pay in the inverse net-of-tax rate, $\Pi_{-k}^{St} = -\varepsilon_{y,NOT}^{St} \equiv -(NOT_{t-k}/y_t)(dy_t/dNOT_{t-k})$. Both of the estimates of $-\varepsilon_{y,NOT}^{St}$ (for *k* = 2) from Table 4, 0.906 from column 1 and 0.730 from column 2, fall inside the $[0, 1]$ interval. The estimated value of $-\varepsilon_{y,NOT}^{St}$ = 0.906 indicates that the supply curve for CEO input is almost ten times as elastic as the demand curve ($\varepsilon_S^{St} = -9.6383\ \varepsilon_D^{St}$). Using $\varepsilon_{y,NOT}^{St} = -0.730$ gives $\varepsilon_S^{St} = -2.7037\ \varepsilon_D^{St}$. Restated, the elasticity of demand is about one-tenth (to three-eighths) as elastic as the supply curve, with $\varepsilon_D^{St} = -0.1038\ \varepsilon_S^{St}$ (or $\varepsilon_D^{St} = -0.3699\ \varepsilon_S^{St}$).

Having located the assortative match between the firm and CEO by means of the firm-CEO fixed effect, for both estimates based on large tax shocks the firm's demand curve for the matched CEO's input appears to be highly inelastic relative to the executive's supply curve. The relatively elastic supply curve is consistent with the high responsiveness of CEO pay to state personal income tax shocks. If human capital is relatively mobile or deployable relative to the assets of the firm, the supply curve would be relatively more elastic than the demand curve. [18, 19]

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[18] Based on CEO-to-CEO transitions across firms (Execucomp data), when a CEO moves to the next CEO position, in 74% of cases the CEO moves to a different state. Geographical continuity is unlikely to be a hard and fast job search requirement for many CEOs.

[19] For context, we consider estimates of the supply and demand elasticities for other populations, such as rank and file" workers. The wide dispersion of such estimates has spawned a longstanding debate over methods and results (McClelland and Mok, 2012; Lichter et al., 2025). One hypothesis is that firms have substantial market power relative to the rank and file. For example, Azar et al. (2022) estimates that the market-level labor supply elasticity is 0.5, while the firm-level labor demand elasticity is 4.8, indicating that workers produce 21% more than their wage level and that firms have significant monopsony power. The estimates we produce herein indicate the opposite, specifically that

6. Supply and Demand Plus Agency Costs and Rent Extraction

The large, estimated response in CEO pay to a state income tax increase is consistent with low locational frictions and a credible threat by the CEO of moving to another job in a low-tax state. The extensive margin (supply) is one arena where the CEO can bargain. CEO influence, entrenchment, and rent extraction also arise as plausible explanations. It is likely that some firms are ineffective at devising good governance or choose not to do so. Even if governance is optimally configured, the governance mechanisms in place can be insufficient to fully prevent second-best residual losses.

In this section we provide evidence on both (i) CEO-firm negotiation in the context of supply and demand and (ii) residual loss from CEO power and rent extraction as potential explanations. It is likely that both mechanisms are at work. While we do not fully disentangle them, we do find traces of both in triangulating specifications. Moreover, some of the comparisons available hold constant one of the two explanations, enabling us to detect and quantify the other.

6.1 The Elasticity of CEO Compensation in the Net-of-Tax Rate: US Federal Tax Shocks

As a benchmark for comparison, we estimate the elasticity of CEO pay in the net-of-tax rate based on shocks to the US federal personal income tax rate. Frydman et al. (2011), using a sample of top executives in 50 large firms from 1946 to 2005, find very little response in the compensation of top executives, including some non-CEOs, to changes in federal tax rates on labor income. Other previous studies, relying in like manner on identification by time series variation within firms, report that changes in federal income tax rates have negligible effects on CEO compensation

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CEOs have significant market power and firms have highly inelastic demand curves for managerial input. Along these lines, Mui and Schoefer (2025), based on US and German data, report a short-run labor elasticity at the extensive margin (participation) above 3. Based on our estimates, a supply elasticity of 3 would imply a labor demand elasticity of 0.3114 = 3 x 0.1038 to 1.1097 = 3 x 0.3699.

(Goolsbee, 2000; Hall et al. 2000; Rose et al. 2002).

There are 6 large ($|\Delta\tau^F| \geq 0.01$) changes in the top US federal personal income tax rate in our sample period, ranging from -3.6% to 8.6%. We exclude state tax changes from the inverse NOT calculations. Those state shocks, while generally much smaller than federal income tax shocks, allow some noise to remain in the analysis of federal tax shocks.[20] Our reading of the prior literature is that those studies calculated the NOT based only on the federal tax rate. We include the standard control variables and CEO-firm and industry-year fixed effects. Federal tax changes apply to all CEOs in a year and potentially would mostly be washed away by time fixed effects.

Table 6 reports elasticity estimates that are consistent with the prior literature. In all four specifications the estimates on the inverse NOT ratio lagged once are small and statistically insignificant. Frydman et al. (2011) in every specification confidently reject an elasticity of taxable compensation with respect to the net-of-tax rate greater than +0.200. Thus, our results are consistent with Frydman et al. (2011) and, for example, with the negligible effect of tax rates found by Goolsbee (1999) for tax reforms prior to 1986.

The federal personal income tax applies to US CEOs regardless of location. The elasticity estimates for federal tax shocks should not be negligible if outside options in other countries for US CEOs are available and obtainable at low cost. Moreover, if CEO's have the ability to extract rents, because of asset specificity or ineffective governance, the federal estimates again should be materially positive. Insofar as the comparison holds constant the ability to extract rents, it appears that what is different for CEOs about state and federal tax shocks is the outside option, rather than the ability extract rents. Thus, comparison of the state and federal elasticities buttresses the notion

[20] The results are similar if we exclude in the NOT changes in the state personal income tax rate.

that outside options on the extensive margin are one important source of the significant pay response by firms to state personal income tax shocks.

6.2. The Components of Pay, the Extensive Margin, and Retention

Figure A5 tracks the components of CEO compensation over time, with stock pay becoming the largest component starting 2006. To supplement the results in Table 2 on total CEO compensation, we estimate variants of equation (1) for the individual components of pay (annual salary and bonus, long-term cash bonus, stock, options).

Including controls and CEO-firm and industry-year fixed effects, both long-term incentive plan cash pay (NonEqIncent) (Table 7, column 3) and stock pay (column 4) increase significantly two years following a large increase in the personal income tax rate. Relative to the base (spotless) control sample, two years after a large tax increase NonEqIncent (long-term cash) increases by 10.9% (12.2%) and the GDFV of stock pay increases by 6.6% (6.0%).[21] In contrast, the coefficients for yearly salary, annual bonus, GDFV of options awards, and perquisites on a state income tax increase are negligible. Awards that vest in the future, via time-based or performance-based vesting provisions, or otherwise accrue through time, serve the goal of employee retention.[22] Substantial rent extraction, in the absence of governance that restrains rent seeking, would likely appear in salary and bonus. The responses of the components of pay support the notion of retention of executives in the face of the threat to relocate.

6.3. At the Intersection of Supply and Demand (at the Nexus of the Assortative Match)

In terms of the threat to leave for another position in a low-tax domicile, CEOs can seek CEO positions (or take a demotion to CFO) in low-income-tax-rate states. Such locational

[21] Further examination of the data indicates that the increase in stock awards is not "replacement grants".
[22] Stock options with vesting provisions can also be used to retain talent. One likely reason the change in option awards is insignificant is that utilization of option awards has declined through time.

considerations at the extensive margin determine the elasticity of the CEO's response, as a supplier of managerial input to the employer, to a state personal income tax shock. For example, if there are many firms in an industry or a firm is in an industry with firms in many states, including states with lower state tax rates, the CEO has more attractive outside options. Then the threat of relocation will confer on the CEO more negotiating power and the supply of managerial input will be more elastic. In contrast, if the CEO is the founder of the firm and is attached to the firm for personal reasons, such as improper treatment of sunk costs or otherwise escalated commitment to the firm, then the threat of relocating is relatively empty. Table 8 reports that both of these notions are supported in the data.

Per model 1, the coefficient estimate (0.146, $p < 0.001$) on the interaction of the dummy variables for whether the CEO is **not** a founder of the firm and the lagged state tax increase is positive and significant. Likewise, in model 2 the estimate on the interaction of indicator variables for whether the number of firms in the industry exceeds the median in that year and for the positive lagged state tax shock is positive and significant (0.089, $p = 0.012$).

In model 3, we study cross-sectional heterogeneity in industry-level state coverage, using the geographic dispersion of firms within an industry. We define *High # State Industry* as an indicator equal to one if firms in the industry are present in more than 35 states, and zero otherwise. The intuition is that CEOs in more geographically dispersed industries face a thicker market for executive talent, giving them greater outside options and bargaining power. We therefore expect state personal income tax increases to have a larger effect on compensation in these industries. The estimates support this prediction: the coefficient on the interaction term is positive (0.068) and statistically significant at the 1% level.

The estimates in Table 8 all reinforce the notion that the availability of outside employment options and the willingness to pursue those outside options are associated with a larger increase in pay in response to a state personal income tax increase.

6.4. Agency, Influence, Governance, and Rent Extraction

Ill-conceived, ineffective or absent governance provides a context for opportunism and rent extraction. For governance we use two conventional measures, the E-index (Bebchuk et al., 2009) and board independence (Weisbach, 1988). A higher value of the entrenchment index and a lower proportion of non-employee and other non-conflicted directors on the board are conventionally understood to indicate less effective governance.

In Table 9, the coefficients of interest are those on the interaction of the tax increase dummy and the measure of governance effectiveness. The estimates in both columns are positive and economically and statistically significant. An E-Index above the yearly median is associated with a 10.8% (p = 0.003) abnormal increase in pay two years following a large increase in the state personal income tax rate. Similarly, the estimate on the interaction of the lagged state personal income tax increase with a dummy for board independence being lower than the yearly median indicates a 6.7% abnormal increase (p = 0.049).[23] Variation of the pay response in governance is consistent with CEO entrenchment and rent extraction as material forces in setting CEO pay.

6.5. Outside Options versus Agency and Rent Extraction: NEO Pay versus CEO Pay

We investigate the compensation tax effects for non-CEO named executive officers. In terms of the threat to leave for another position in a low-tax state, CEOs can seek CEO positions (or take

[23] A staggered (classified) board is thought to be an effective means by which executives can insulate themselves from the market for corporate control (Guernsey et al., 2025). Nonetheless, in the model specification directly analogous to those reported in Table 9, the estimate on the interaction of the state tax shock and the indicator for the presence of a staggered board, though positive, is economically small and statistically insignificant.

a demotion to CFO or similar position) in low-income tax states, while CFOs can seek CFO positions or lower in other states and also, perhaps, move up into the role of CEO. Let us suppose for simplicity that non-CEO NEOs have a set of outside opportunities similar to that of CEOs. Then, if there is a difference in the extent to which a CEO versus a non-CEO NEO in the compensation response to the state income tax shock, it is potentially attributable to differences in the executive's influence, power, and ability to extract rents. We surmise that NEOs are less able to extract rents than CEOs.

Columns 1 and 3 of Table 10 report that the effect on abnormal non-CEO NEO pay of state income tax increases is modest compared to the effect for CEOs. For an increase in state tax rate, the estimate of the response in non-CEO NEO pay to a state tax increase is approximately 2.5%, about one-third of the response for CEOs (Table 2). Decreases in the state tax rate have negligible effect on pay for both CEOs and other NEOs (columns 2 and 3). In sum, tax increases (decreases) matter less (the same) for non-CEO NEO pay than for CEO pay. This suggests that CEOs possess additional ability, beyond that of other NEOs, to extract rents under existing governance arrangements, whatever they may be, and that they utilize that ability to obtain a larger upside response in CEO pay to a state income tax rate increase.

7. International Evidence: National Personal Income Tax Shocks

To further frame the evidence on US state personal income tax shocks, we examine the response of CEO compensation to large national tax changes. In the face of an increase in the national tax rate, if a CEO can relocate at low cost to a different country with a lower national income tax rate, then we would expect the estimate on the national tax rate increase indicator to

be positive. Of course, if agency problems and associated rent extraction are considerable the effect on CEO pay again would be positive.

We collect changes in the top national personal income tax rate for the US and 20 additional countries or regions across the 2011-2022 period.[24] Over the sample period there were 14 increases in 8 different countries and 9 decreases in 6 different countries. To remove potentially confounding effects of state tax shocks, we exclude US CEOs experiencing state tax changes.

Table 11 displays the results. Like state tax shocks in the US, the coefficient estimates on a tax decrease are negative and statistically insignificant. Nonetheless, the international estimates are about four times as large downward relative the US state estimates in Table 2. A tentative notion is that non-US CEOs have less ability to extract rents than US CEOs.

For national tax rate increases, the parameter estimates indicate a significant positive response two years after the tax increases. In our sample of CEOs and firms in 21 countries, CEO compensation increases in response to an increase in national income tax rates. To compare the response in pay for US state tax shocks versus international national tax shocks, we normalize the coefficients on the large state (Table 2) and national (Table 11) income tax indicators by size of the tax shock. The twice-lagged US state (international national) coefficient estimate of 7.4% (8.3%) is 3.79 (1.99) times the average US state (international) tax increase, 3.96 (2.08) times the median, and 2.51 (1.28) times the range of large tax shocks. The normalized response in US CEO pay to US state tax increases appears to be larger per unit of tax rate increase than for international CEOs to national personal income tax rate increases. One likely reason is that the costs of

[24] The countries and regions are Belgium, Bermuda, Canada, the Czech Republic, Germany, Denmark, Spain, Finland, France, Great Britain, Hong Kong, Ireland, Israel, Italy, Luxembourg, the Netherlands, Norway, Portugal, Singapore, and Sweden, as well as the US.

relocating across national borders for international CEOs are likely larger than the costs for US CEOs relocating across states and international CEOs relocating across countries.

8. Further Considerations

8.1. Data

Several data items warrant brief attention. First, a departing or arriving CEO could introduce noise into our empirical analysis. CEOs who move obtain higher pay (e.g., Fee and Hadlock, 2013; Coles et al., 2018), and the former reports that the compensation change can be explained in part by reimbursement for the equity position forfeited at the prior employer and by the prior employer's performance. Accordingly, we have restricted observations on the change in compensation to include those for which the CEO stays at the same firm for the two years following the relevant change in the personal income tax rate. Second, about 2.5% of our sample of CEO-year observations have a tax change in two consecutive years. First-differencing removes unobserved firm-specific fixed effects in the corresponding levels equation.

Third, significant elements of our empirical analysis rely on the idea that changes in TDC1 reflect pay adjustments that arise in response to changes in the personal income tax rate. Total compensation includes some or all of annual salary, annual bonus, and long-term cash bonus, as well as the grant date fair value (GDFV) estimates for stock and option awards. While annual salary and bonus are part of taxable income in the year they are paid, the grant date fair values of stock and option grants need not be. Under standard time-based vesting, the receipt of stock and options occurs in the future, with the actual taxable date and taxable value possibly being uncertain

at the time of the award.[25] Performance-vesting provisions (Bettis et al., 2010, 2018), under which the number of units of cash, stock, or options ultimately received depends on one or more accounting or market performance metrics, introduce additional uncertainty about taxable income.

In estimating the value of stock and option awards, compensation committees and consultants often apply standard SEC- and FASB-sanctioned methods to capture the range and likelihood of possible outcomes (Bettis et al., 2018). The very act of generating a grant date fair value to disclose requires some understanding of these uncertainties. Thus, we believe that GDFV provides a reasonable estimate of the present discounted taxable value of those awards. Furthermore, even if GDFV is biased one way or another relative to the present value of taxable income, if the bias is similar from year to year then there is some hope that using the *change* in GDFV removes that bias. Then $\Delta Ln(y_{m,t})$ would be an appropriate proxy for the change in the discounted value of taxable income, reinforcing the use of $\Delta Ln(y_{m,t})$ on the left-hand side of regression specifications.

8.2. Do Locational Choices Attenuate the Estimates?

The large, estimated response in CEO pay to a state income tax increase is consistent with low locational frictions and a credible threat by the CEO of moving to another job in a low-tax state. Locational considerations, however, potentially have a countervailing effect. Some CEOs may already be taxed in another state that differs from the firm's domicile and was not treated with an income tax shock.

[25] In our sample period, a stock award is taxed at the ordinary rate at market value at the time it vests. If the executive holds the stock, then subsequent tax is based on the gain or loss since vesting at either the ordinary income tax rate or the capital gains rate, depending on holding period since vesting. Most options are issued at the money and are taxed at exercise, with the ordinary rate applied to the difference between the market value of the stock acquired net of the exercise price. Again, if the executive continues to hold the stock, then subsequent tax is based on the gain or loss since exercise and either the ordinary income tax rate or the capital gains rate applies, depending on the holding period.

To supplement Table A6, we argue further that such pre-emptive tax avoidance is unlikely to significantly attenuate our estimates of the sensitivity of executive pay to changes in the personal state income tax rate. First, there are few relevant reciprocal state tax agreements. Likewise, one-way agreements appear in only 2.51% of the 2,550 possible one-way arrangements among the 50 states and Washington, DC. Moreover, a number of states, including New York, have erected additional barriers to the locational approach to avoiding state income tax. Second, Duchin and Sosyura (2021) define a "long-distance CEO" as one who commutes at least 50 miles each way to corporate headquarters and does not own a residence within 50 miles of headquarters. Duchin and Sosyura (2021) report that the percentage of CEO-firm-years with such a commuter CEO is 1.82%, which likely represents an upper bound on the proportion of CEOs who preemptively avoid a state tax increase in their work state. Third, we find in our sample that in 99.3% of CEO-year cases the CEO owns a residence located in the same state as the corporate headquarters.

We conclude that our coefficient estimates on the effect of state personal income tax changes on CEO pay are unlikely to be attenuated by the presence in the sample of a significant number of CEOs avoiding taxes by way of prior locational choices.[26]

8.3. CEO Departures, Retention, and Firm Performance. Firm Relocations.

To provide additional context, we examine actual changes in location by both firms and CEOs. There are 22,291 CEO-firm-year observations in the sample, with 1,131 or 5.1% (580 or 2.6%) total (large) firm-year-CEO increases in the state personal income tax rate.

The association of a CEO with a firm, as indicated in Execucomp, changes 3100 times in our sample. Of these, 3010 disappear from Execucomp while 90 assume another position as CEO. Of these, 42 assume that position in another state and 48 stay in the same state.

[26] Appendix 3 contains a more detailed discussion of whether preemptive tax avoidance attenuates the estimates.

Of CEOs faced with an increase in state personal income tax rate, significantly fewer turnover when the firm provides an abnormal rise in response (Table A13). In contrast, a CEO experiencing an increase in state personal income tax rate who fails to get a pay raise in the current firm is more likely to depart. One possibility is that the affected firm "invites" the CEO to voluntarily depart by not adjusting pay in response to a tax increase. Under this narrative, the firm benefits from the departure. In contrast, perhaps the firm is distressed or otherwise constrained in the extent to which it can raise pay to the prevailing after-tax market pay for a CEO. A CEO turnover under such circumstances is more likely to damage the firm.

Table A14 assesses subsequent firm performance contingent on whether the firm responds to a state personal income tax increase with a pay increase. The changes in both in ROA and stock performance are significantly higher if the firm responds with a pay increase (Panel A). Panel B reports estimates from models that include controls for prior CEO-firm performance, as a measure of CEO quality, as well as other covariates. The change in ROA and stock return again are significantly higher for firms that increase CEO pay following a large personal income tax increase. These findings are consistent with the idea that boards can offset personal income tax shocks and, by doing so, retain valuable talent to facilitate firm performance.

Firms as well can relocate in response to state personal income tax shocks or differentials. If the difference in tax rates is large, the net present value of the reduction in wages required by the rank and file and executives combined potentially would be large enough to offset the costs of relocating the firm to a low-tax domicile. In our sample, there are 1,975 firm-year domicile changes (8.9% of CEO-firm-year observations). Of these changes, 277, or 14.0%, were associated with a state personal income tax increase within the last two years. It appears that a state personal

income tax increase provides some impetus for a firm to relocate. This is consistent with evidence that state corporate income tax shocks can motivate firm relocations (e.g., Chow et al, 2021)

9. Conclusion

Depending on the empirical specification, the firm pays much of, nearly all, or more than all of the increase in the CEO's state personal income taxes. In stark contrast we find that state personal income tax rate decreases have minimal effects on CEO pay. The effects on CEO pay of tax increases and decreases are decidedly asymmetric.

With triangulating empirical specifications, we quantify the degree to which both (1) labor market forces, on the one hand, and (2) agency problems, governance, and rent seeking, on the other, shape the way that CEO pay responds to shocks to state, federal, and national personal income tax rates. Evidence that highlights labor market forces includes:

- a relatively elastic CEO supply curve, presumably on the extensive margin, relative to the firm demand curve;
- a small US federal elasticity, which likely reflects the absence of outside options (that avoid the tax shock) in the US for US CEOs; and
- the pay increase is larger when there are more outside employment options and when the CEO is less tied to the firm (not the founder).

Our estimates are consistent with a demand curve for managerial input that is highly inelastic compared to the supply curve. The extensive margin for CEO labor supply, driven by outside employment options in low-tax domiciles, appears to confer substantial market power to CEOs.

Evidence pertaining to agency costs, governance issues, and rent extraction includes:

- the lack of a decline in CEO and NEO pay growth when the state personal income tax declines;
- similar results for CEOs for declines in the US federal personal income tax rate and for international CEOs when the national income tax rate declines;
- the pay increase in response to a state personal income tax increase is larger when corporate governance, measured by board independence and the E-index, is weaker; and

- non-CEO NEOs, who likely have outside options like those of CEOs but less ability to extract rents, receive smaller pay increases than CEOs when there is a state tax increase.

A question we are unable to address is the incidence at the firm level of the changes in CEO pay. To know the extent to which the cost to the firm is spread across shareholders, bondholders, employees, other factors of production, customers, or suppliers would require additional data. We leave this issue for future research.

Our analysis has implications for policy. For example, there are recent calls at the state and federal level to increase income tax rates for high earners, such as CEOs and other NEOs. Our results highlight the implication that changing state personal income tax rates differently across income levels need not reduce the inequalities in earnings between top executives and the median or rank-and-file worker. Whether such inequalities diminish in response to changes in state personal income tax rates depends on the elasticities of demand and supply, as well as the size of the tax shock, for each type, high versus low income, of employee.

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Figure 1. Large State Personal Income Tax Rate Shocks Over Time

This figure shows the yearly number of large increases and decreases in state-level personal income tax rates between 1992 and 2022, where the large changes are those exceeding one percentage point for earners in the top tax bracket. The blue (orange) bars are for increases (decreases) in tax rates.

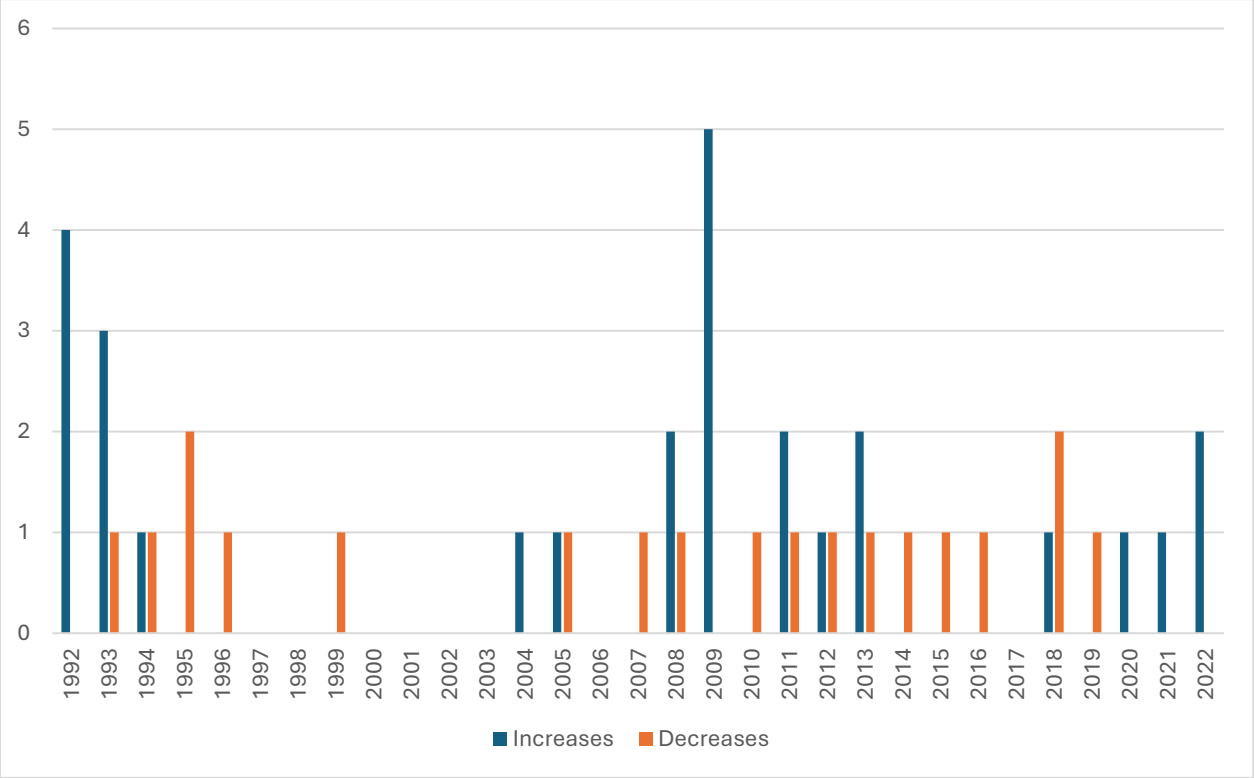
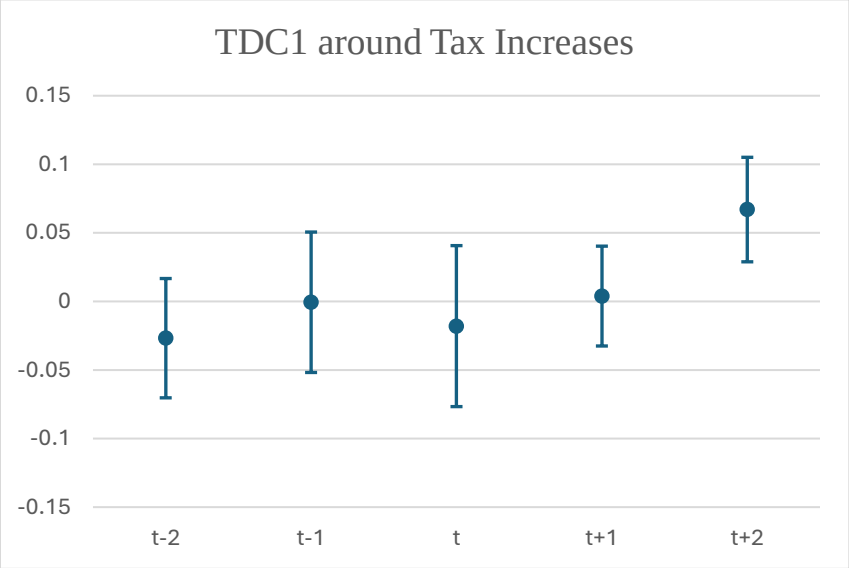


Figure 2. Differences in CEO Pay Changes Between Treated and Control Groups in Years Around Tax Changes

This figure shows the differences in CEO pay changes between the treated group and control group around tax changes. The treated group includes CEOs in firms headquartered in states experiencing large personal income tax rate changes (greater than one percentage point). The control group includes CEOs in firms headquartered in states without personal income tax changes. Panel A (B) is for tax increases (decreases). The x-axis shows the year relative to an event year (as year t). The y-axis shows the difference in CEO pay changes [Δln(TDC1), to be used as the dependent variable in DiD analysis]. The dots represent the average yearly differences in Δln(TDC1) between treated and control groups. The bars show the 90% confidence intervals.

Panel A. Tax increases



Panel B. Tax decreases

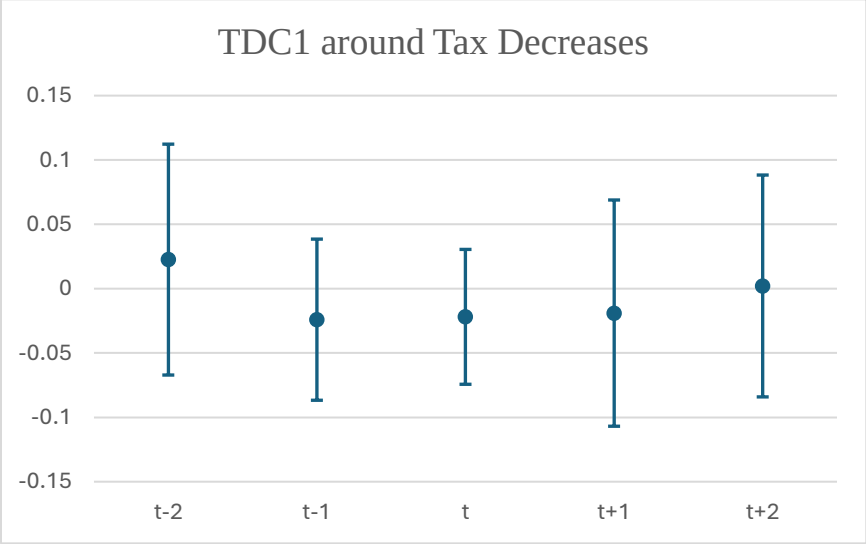


Table 1. Summary Statistics

This table presents summary statistics for US data for state tax shocks (Panels A and B) and international data on national tax shocks (Panel C). Panel A displays changes in the top personal income tax rates at the state and federal levels. Panel B provides summary statistics for the US at the level of CEO-firm-year on compensation, personal income tax rate changes and firm characteristics. The US sample consists of firms in the intersection of Execucomp and Compustat for the years 1992 – 2022 inclusive. The compensation-related variables are in thousands of US dollars. Assets are in millions of dollars. The international data sample is based on national tax shocks for 21 countries (including US) for the years 2011– 2022 (Panel C). Variables (except dummy variables) are winsorized at the 1st and 99th percentile values. Variable definitions are in Appendix 1.

Panel A: Top State and US Federal Personal Income Tax Rate Changes

	US STATE Mean | Count		
	Mean Increase	Mean Decrease	Both
Large	1.95% | 27	-1.60% | 19	NA | 46
Small	0.22% | 89	-0.22% | 236	NA | 325
Total	0.62% | 116	-0.32% | 255	NA | 371

	US FEDERAL Mean | Count		
	Mean Increase	Mean Decrease	Both
Large	6.60% | 2	-3.10% | 2	NA | 4
Small	NA	-0.50% | 2	NA | 2
Total	6.60% | 2	-1.80% | 4	NA | 6

Panel B: CEO-Firm-Year Summary Statistics, US Sample

Variable	Mean	SD	p25	p50	p75	N
CEO-Firm-Year						
Large State Tax Increase (0, 1)	0.026	0.160	0	0	0	22,291
Large State Tax Decrease (0, 1)	0.013	0.114	0	0	0	22,291
Small State Tax Increase (0, 1)	0.051	0.219	0	0	0	22,291
Small State Tax Decrease (0, 1)	0.135	0.342	0	0	0	22,291
Total Pay (TDC1) ($1,000s)	5,879	6,070	1,836	3,925	7,611	22,291
Salary ($1,000s)	769	357	501	725	990	22,291
Bonus ($1,000s)	335	732	0	0	374	22,291
Noneq Incentives ($1,000s)	837	1,363	0	198	1,162	22,291
Stock Pay ($1,000s)	1,971	3,155	0	558	2,673	22,291
Option Pay ($1,000s)	1,609	3,004	0	540	1,838	22,291
Perquisites ($1,000s)	237	665	13	52	180	22,291
Firm-Year						
Assets ($1,000,000s)	6,489	19,635	552	1,477	4,531	22,291
MTB	2.189	1.468	1.279	1.711	2.536	22,291
ROA	0.047	0.104	0.021	0.057	0.095	22,291

Panel C: CEO-Firm-Year Summary Statistics, International Sample (Belgium, Bermuda, Canada, the Czech Republic, Germany, Denmark, Spain, Finland, France, Great Britain, Hong Kong, Ireland, Israel, Italy, Luxembourg, the Netherlands, Norway, Portugal, Singapore, Sweden, the U.S.)

Variable	Mean	SD	p25	p50	p75	N
CEO-Firm-Year						
Large National Tax Increase (0, 1)	0.078	0.268	0	0	0	7,358
Large National Tax Decrease (0, 1)	0.078	0.268	0	0	0	7,358
Total Pay (TDC1) ($1,000s)	7,013	5,813	3,027	5,489	9,379	7,358
Firm-Year						
Assets ($1,000,000s)	12,635	36,295	878	2,606	9,071	7,358
MTB	2.168	1.535	1.251	1.669	2.481	7,358
ROA	0.046	0.098	0.018	0.051	0.088	7,358

Table 2. CEO Compensation Responsiveness to State Personal Income Tax Changes (DiD)

This table shows the effects of changes in personal US state income tax rates on CEO compensation. *Tax Increase* (*Decrease*) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. TDC1 is total pay from the Execucomp database. The dependent variable is Δln(TDC1) and the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	Base Control Sample			Spotless Control Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	ΔLn(TDC1)			ΔLn(TDC1)		
Tax Increase$_{t-1}$	0.008		0.008	0.013		0.012
	[0.41]		[0.41]	[0.61]		[0.60]
Tax Increase$_{t-2}$	0.064***		0.066***	0.072***		0.074***
	[3.75]		[3.89]	[4.76]		[5.13]
Tax Decrease$_{t-1}$		-0.011	-0.014		-0.013	-0.016
		[-0.32]	[-0.43]		[-0.28]	[-0.37]
Tax Decrease$_{t-2}$		0.016	0.021		0.013	0.020
		[0.44]	[0.58]		[0.31]	[0.47]
ΔLn(Assets)	0.328***	0.327***	0.328***	0.336***	0.335***	0.336***
	[12.35]	[12.34]	[12.29]	[10.63]	[10.55]	[10.54]
ΔMTB	0.074***	0.074***	0.074***	0.072***	0.072***	0.072***
	[9.61]	[9.55]	[9.59]	[8.58]	[8.52]	[8.53]
ΔROA	0.392***	0.394***	0.392***	0.303***	0.304***	0.303***
	[5.88]	[5.88]	[5.89]	[5.37]	[5.38]	[5.39]
Observations	22,291	22,291	22,291	15,563	15,563	15,563
R-squared	0.196	0.196	0.196	0.212	0.212	0.212
CEO-Firm FE	Y	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y	Y

Table 3. Stacked DiD: CEO Compensation Responsiveness to State Personal Income Tax Changes

This table shows the effects of changes in personal US state income tax rates on CEO compensation, using a stacked DiD approach (Cengiz et.al., 2019). For each large tax increase or decrease (at least 1%), a [-2, +2] stack window is used. States with any large changes (increases or decreases) at any point within a stack window are excluded (for example, if a state has large tax changes in both 2010 and 2012, both shocks are excluded from the test sample). CEOs of firms headquartered in states with large changes are in the treatment group. The remaining CEOs are in the control group. For each stack, Tax Increase (Decrease) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point at the central year of the stack, and zero otherwise. $Post_1$ ($Post_2$) is an indicator variable for the first (second) year following a large tax shock. TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1) and the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) ΔLn(TDC1)	(2) ΔLn(TDC1)
Tax Increase x $Post_1$	-0.010	
	[-0.30]	
Tax Increase x $Post_2$	0.073***	
	[4.11]	
Tax Decrease x $Post_1$		-0.015
		[-0.29]
Tax Decrease x $Post_2$		0.017
		[0.55]
ΔLn(Assets)	0.279***	0.263***
	[6.17]	[8.47]
ΔMTB	0.107***	0.084***
	[7.93]	[7.58]
ΔROA	0.516***	0.444***
	[4.69]	[4.51]
Observations	22,609	34,394
R-squared	0.271	0.272
CEO-Firm FE	Y	Y
Industry-Year FE	Y	Y

Table 4. Elasticity of US CEO Compensation in the US Inverse Net-of-Tax Rate

This table shows the elasticity of US CEO compensation in the net-of-personal-income-tax rate. The dependent variable is transformed CEO total compensation, Δln(TDC1), control variables include Assets, MTB, and ROA, Δ denotes difference, Ln(.) is the natural logarithm, and NOT_t is the after-tax multiple for pay $(1-\tau_{m,f,t}-\tau_{m,s,t})$ for CEO m in year t (f (s) denotes federal (state)). In columns 1 and 2 we consider large tax rate changes only (at least one percentage point) and so set $NOT_{t-s}/NOT_{t-(s-1)}$ = 1 for all CEO-year observations when the tax rate change is less than one percentage point. In column 3 the calculation of NOT_t considers all tax changes of any size. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Appendix 1 provides variable definitions. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Large (≥1%) State Tax Changes		All State Tax Changes
Variables	ΔLn(TDC1)		ΔLn(TDC1)
Ln(NOT_{t-2}/NOT_{t-1})	0.041	0.096	0.315
	[0.08]	[0.20]	[0.75]
Ln(NOT_{t-3}/NOT_{t-2})	0.906**	0.730**	0.405
	[2.30]	[2.01]	[1.20]
ΔLn(Assets)		0.327***	0.327***
		[12.42]	[12.41]
ΔMTB		0.074***	0.074***
		[9.55]	[9.57]
ΔROA		0.393***	0.393***
		[5.87]	[5.87]
Observations	22,575	22,291	22,291
R-squared	0.177	0.196	0.196
CEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

Table 5. Elasticity of US CEO Compensation in the US Inverse Net-of-Tax Rate, Adjusted for SALT

This table reports the robustness tests for the elasticity of US CEO compensation in the net-of-personal-income-tax rate, accounting for changes in federal tax rules governing the deductibility of State and Local Taxes (SALT). The dependent variable is transformed CEO total compensation, Δln(TDC1), and control variables include Assets, MTB, and ROA. Δ denotes difference and Ln(.) is the natural logarithm. NOT_t is the after-tax multiple for pay, which equals to $(1-\tau_{m,f,t})(1-\tau_{m,s,t})$ in or before 2017 and $(1-\tau_{m,f,t}-\tau_{m,s,t})$ in years after 2017 for CEO *m* in year *t* (*f* (*s*) denotes federal (state)). We consider large tax rate changes only (at least one percentage point) and so set $NOT_{t-s}/NOT_{t-(s-1)}$ = 1 for all CEO-year observations when the tax rate change is less than one percentage point. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Appendix 1 provides variable definitions. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
VARIABLES	ΔLn(TDC1)	ΔLn(TDC1)
Ln(NOT_{t-2}/NOT_{t-1})	-0.102	-0.227
	[-0.21]	[-0.49]
Ln(NOT_{t-3}/NOT_{t-2})	1.159***	0.835**
	[3.07]	[1.98]
ΔLn(Assets)		0.327***
		[12.40]
ΔMTB		0.074***
		[9.55]
ΔROA		0.393***
		[5.88]
Observations	22,575	22,291
R-squared	0.177	0.196
CEO-Firm FE	Y	Y
Industry-Year FE	Y	Y

Table 6. Elasticity of US CEO Compensation in the Federal Net-of-Tax Rate

This table shows the elasticity of US CEO compensation in the net-of-personal-income-tax rate following the framework by Frydman and Molloy (2011). The dependent variable is transformed CEO total compensation, Δln(TDC1), control variables include Assets, MTB, and ROA, Δ denotes difference, Ln(.) is the natural logarithm, and NOT_t is the after-tax multiple for pay $(1-\tau_{m,f,t})$ for CEO m in year t (f denotes federal). Columns 1 and 2 do not include fixed effects. Columns 3 and 4 include firm and year fixed effects. Robust standard errors are clustered at the state level. Appendix 1 provides variable definitions. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	US Federal Tax Changes Only			
Variables	ΔLn(TDC1)			
Ln(NOT_{t-2}/ NOT_{t-1})	-0.231	-0.238	-0.047	-0.076
	[-1.43]	[-1.47]	[-0.07]	[-0.12]
Ln(Initial Pay)		-0.002		0.016**
		[-0.53]		[2.11]
ΔLn(Assets)	0.375***	0.373***	0.346***	0.347***
	[16.82]	[16.63]	[16.92]	[16.95]
ΔMTB	0.073***	0.073***	0.075***	0.075***
	[11.74]	[11.73]	[14.36]	[14.42]
ΔROA	0.428***	0.428***	0.392***	0.390***
	[8.80]	[8.79]	[9.38]	[9.32]
Observations	23,384	23,382	23,187	23,185
R-squared	0.035	0.035	0.090	0.090
Firm FE	N	N	Y	Y
Year FE	N	N	Y	Y

Table 7. CEO Compensation Components and Large State Personal Income Tax Changes

This table shows the effects of changes in US state personal income tax rates on the components of CEO compensation. *Tax Increase* (*Decrease*) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. The dependent variable is the change in the logarithm of the component of CEO compensation. The control variables are transformed Assets, MTB, and ROA, where Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Base Control Sample

	(1)	(2)	(3)	(4)	(5)
VARIABLES	ΔLn(Salary)	ΔLn(Bonus)	ΔLn(NonEqIncent)	ΔLn(Stock)	ΔLn(Option)
Tax Increase$_{t-1}$	-0.008	-0.064	0.017	-0.035	-0.049
	[-0.71]	[-0.63]	[0.40]	[-0.74]	[-1.37]
Tax Increase$_{t-2}$	-0.012	0.014	0.109***	0.066**	0.008
	[-0.76]	[0.20]	[2.88]	[2.35]	[0.20]
ΔLn(Assets)	0.027*	0.360***	0.315***	0.182***	0.386***
	[2.00]	[6.16]	[6.75]	[5.06]	[8.57]
ΔMTB	0.002	0.135***	0.179***	0.028	0.045***
	[1.33]	[8.16]	[6.35]	[1.59]	[4.32]
ΔROA	0.073***	1.445***	1.060***	0.173	0.175***
	[3.07]	[7.51]	[7.45]	[1.56]	[2.86]
Observations	22,201	7,473	9,745	11,469	12,453
R-squared	0.315	0.343	0.303	0.247	0.279
CEO-Firm FE	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y

Panel B: Spotless Control Sample

	(1)	(2)	(3)	(4)	(5)
VARIABLES	ΔLn(Salary)	ΔLn(Bonus)	ΔLn(NonEqIncent)	ΔLn(Stock)	ΔLn(Option)
Tax Increase$_{t-1}$	-0.009	-0.147	0.013	-0.015	-0.067*
	[-0.75]	[-1.46]	[0.32]	[-0.34]	[-1.78]
Tax Increase$_{t-2}$	-0.012	-0.029	0.122***	0.060**	0.033
	[-0.70]	[-0.54]	[3.76]	[2.18]	[0.98]
ΔLn(Assets)	0.016	0.311***	0.326***	0.207***	0.408***
	[1.00]	[3.41]	[6.30]	[4.38]	[8.83]
ΔMTB	0.001	0.138***	0.168***	0.035	0.037***
	[0.87]	[7.43]	[5.91]	[1.57]	[3.16]
ΔROA	0.087***	1.442***	0.831***	0.218	0.131**
	[2.94]	[6.35]	[6.66]	[1.69]	[2.33]
Observations	15,477	5,123	6,690	7,796	8,803
R-squared	0.320	0.373	0.305	0.264	0.291
CEO-Firm FE	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y

Table 8. Supply and Demand, Relative Bargaining Power, and CEO Compensation

This table shows triangulating estimates of the effects of tax increases on CEO compensation. *Non Founder* is a dummy variable equal to one if a CEO is not a firm founder, and zero otherwise. *High # Firms in Ind* is a dummy variable equal to one if the number of firms in its industry is above median in a year, and zero otherwise. *High # State Industry* is a dummy variable equal to one if a firm is in an industry (Fama-French 12) with firms in more than 35 states, i.e., Manufacturing (3), Business Equipment (6), Shops (9), and Others (12). *Tax Increase* is a dummy variable that equals one if a CEO's state personal income tax rate increases by at least one percentage point in a year and zero otherwise. The dependent variable is Δln(TDC1). The control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm fixed effects and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in the Appendix. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1)	(2)	(3)
	Non-Founder	# Firms in Industry	# States of Industry
Tax Increase$_{t-2}$	-0.056	0.017	0.019
	[-1.49]	[0.62]	[0.81]
Tax Increase$_{t-2}$ x Non Founder	0.146***		
	[3.70]		
Tax Increase$_{t-2}$ x High # Firms in Ind		0.089**	
		[2.49]	
Tax Increase$_{t-2}$ x High # State Industry			0.068***
			[2.81]
ΔLn(Assets)	0.337***	0.327***	0.327***
	[12.25]	[12.51]	[12.41]
ΔMTB	0.073***	0.073***	0.074***
	[9.35]	[9.49]	[9.57]
ΔROA	0.386***	0.373***	0.392***
	[5.68]	[5.66]	[5.89]
Observations	21,708	22,291	22,291
R-squared	0.198	0.197	0.196
CEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

Table 9. Agency/Governance Concerns and CEO Compensation

This table shows the role of governance in the effects of tax increases on CEO compensation. *High E Index* is a dummy variable equal to one if a firm's E Index is above median in a year, and zero otherwise. *Low BoD Indep* is a dummy variable equal to one if board independence is below median in a year, and zero otherwise. *Tax Increase* is a dummy variable that equals one if a CEO's state personal income tax rate increases by at least one percentage point in a year and zero otherwise. The dependent variable is Δln(TDC1). The control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm fixed effects and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in the Appendix. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1)	(2)
	ΔLn(TDC1)	
	E Index	Board Independence
Tax Increase$_{t-2}$	-0.018	0.016
	[-0.97]	[0.59]
Tax Increase$_{t-2}$ x High E Index	0.108***	
	[3.02]	
Tax Increase$_{t-2}$ x Low BoD Indep		0.067**
		[1.97]
ΔLn(Assets)	0.309***	0.288***
	[10.02]	[7.28]
ΔMTB	0.072***	0.075***
	[8.71]	[8.01]
ΔROA	0.463***	0.471***
	[6.30]	[7.57]
Observations	16,665	15,226
R-squared	0.210	0.216
CEO-Firm FE	Y	Y
Industry-Year FE	Y	Y

Table 10. NEO (Non-CEO) Compensation Responsiveness to Personal Income Tax Changes

This table shows the effects of changes in US state personal income tax rates on non-CEO named executive officer (NEO) total compensation. *Tax Increase* (*Decrease*) is a dummy variable that equals one if a NEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1), the control variables are transformations of Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include NEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
VARIABLES		ΔLn(TDC1)	
Tax Increase$_{t-1}$	-0.023		-0.022
	[-1.16]		[-1.07]
Tax Increase$_{t-2}$	0.024		0.025*
	[1.52]		[1.73]
Tax Decrease$_{t-1}$		0.003	-0.001
		[0.08]	[-0.03]
Tax Decrease$_{t-2}$		0.032	0.032
		[0.67]	[0.69]
ΔLn(Assets)	0.250***	0.250***	0.250***
	[11.51]	[11.40]	[11.38]
ΔMTB	0.063***	0.063***	0.063***
	[8.69]	[8.73]	[8.72]
ΔROA	0.335***	0.336***	0.335***
	[3.79]	[3.81]	[3.79]
Observations	75,934	75,934	75,934
R-squared	0.212	0.212	0.212
NEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

Table 11. CEO Compensation and International National Personal Income Tax Changes: DiD Analysis

This table shows the effects of changes in national personal income tax rates on CEO compensation. *Tax Increase* (*Decrease*) is a dummy variable that equals one if a CEO's national personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. The dependent variable is ΔLn(TDC1) from Execucomp (US) or a transformed component of CEO compensation from Incentive Lab Europe, the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
VARIABLES		ΔLn(TDC1)	
Tax Increase$_{t-1}$	0.003		0.004
	[0.08]		[0.09]
Tax Increase$_{t-2}$	0.085**		0.083**
	[2.13]		[2.14]
Tax Decrease$_{t-1}$		0.015	0.020
		[0.42]	[0.56]
Tax Decrease$_{t-2}$		-0.043	-0.036
		[-1.45]	[-1.14]
ΔLn(Assets)	0.221***	0.221***	0.222***
	[7.63]	[7.75]	[7.66]
ΔMTB	0.040***	0.040***	0.039***
	[13.06]	[12.10]	[11.95]
ΔROA	0.252***	0.252***	0.251***
	[7.12]	[7.18]	[7.17]
Observations	7,358	7,358	7,358
R-squared	0.200	0.199	0.200
CEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

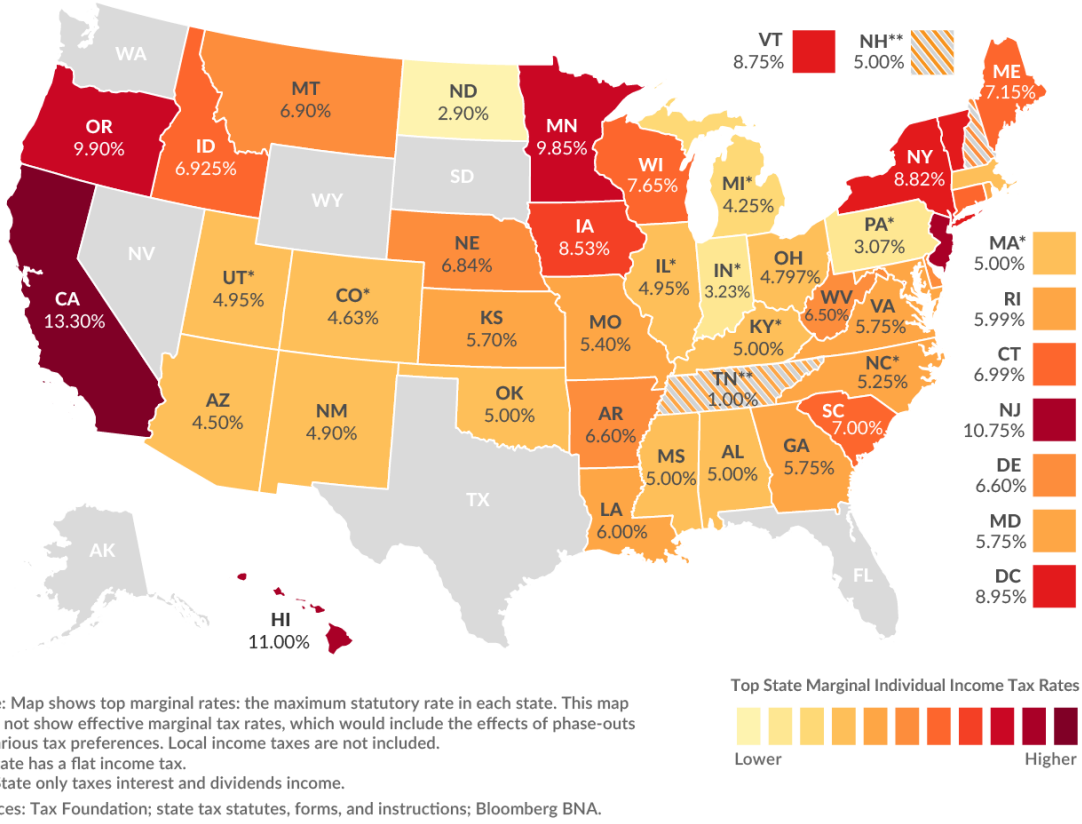
Appendix 1: Variable Definitions

Assets	total book value of assets
Bonus	CEO discretionary bonus
Democrat Gov	dummy variable equal to one if the state had a democratic governor in a particular year, zero otherwise
NonEqIncent	value of a CEO's cash performance pay in a given year
NOT	$NOT_t \equiv (1 - \tau_{f,t} - \tau_{s,t})$ means "net of tax" rate, where $\tau_{f,t}$ ($\tau_{s,t}$) is the top marginal federal (state) tax rate at time *t*
Options	value of a CEO's options awards in a given year
Population	the total state population within a specific year
MTB	market value of equity plus book value of debt divided by the sum of the book values of debt and equity
ROA	net income scaled by total assets
SCash	the total cash holdings of a given state in a specific year
SDebt	the total debt of a given state in a specific year
State GDP	the gross domestic product within a state-year
Stock	value of a CEO's stock awards in a given year
Tax Increase	a dummy variable equal to one if a CEO experienced a personal income tax rate increase (in some instances only if the tax rate increase is at least as large as one percentage point), and zero otherwise
Tax Decrease	a dummy variable equal to one if a CEO experienced a personal income tax rate decrease (in some instances only if the tax rate decrease is at least as large as one percentage point), and zero otherwise
Tax Revenue	total tax revenue within a state-year
TDC1	total CEO compensation in a given year
Unemployment	the percentage of workers that are unemployed within a state-year

Appendix 2: Supplemental Figures and Tables

Figure A1. Top Marginal State Personal Income Tax Rates in the United States

This figure reports US top state marginal personal income tax rates in 2020.



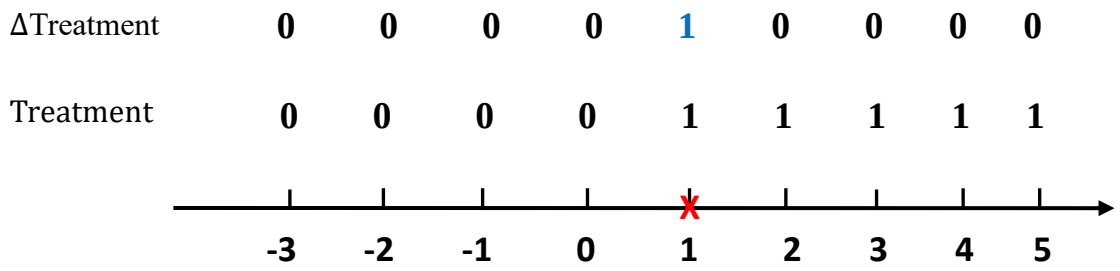
Note: Map shows top marginal rates: the maximum statutory rate in each state. This map does not show effective marginal tax rates, which would include the effects of phase-outs of various tax preferences. Local income taxes are not included.
(*) State has a flat income tax.
(**) State only taxes interest and dividends income.

Sources: Tax Foundation; state tax statutes, forms, and instructions; Bloomberg BNA.

See https://taxfoundation.org/data/all/state/state-individual-income-tax-rates-and-brackets-for-2020/.

Figure A2. The First-difference Setting of the DiD Analysis

This figure illustrates the correspondence of the level of treatment dummy and the first difference in the treatment dummy. The upper (lower) panel shows the event study based on a single (two) event(s) as indicated by the red cross(es) on the time axis. *Treatment* is the treatment dummy (counter) variable that equals one (the number of treatments) after the corresponding shock(s). *ΔTreatment* is the first difference in *Treatment* and indicates an appearance of a new shock.



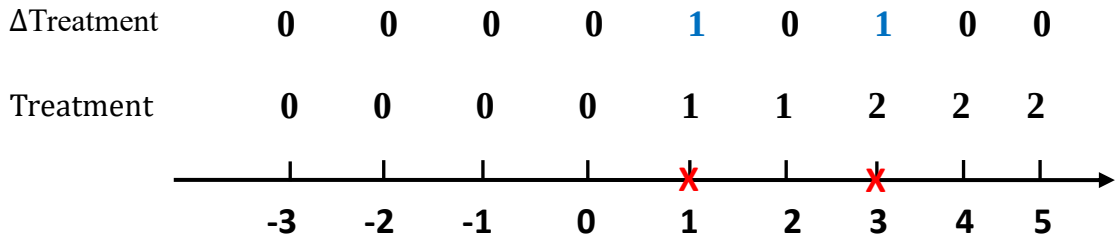


Figure A3. Examples for Neighbor States Without Tax Shocks

This figure shows examples for neighboring control states for treated states with tax increases or increases. For example, North Dakota (ND) had a tax increase [in Red]; Montana (MT) and South Dakota (SD) are neighbors without shocks [in Yellow]; Minnesota (MN) had a tax increase, so is not designated as a neighbor control state. In our sample, in total we have 15 (14) unique states with large tax increases (decreases) and correspondingly have 20 (21) unique neighboring control states without tax shocks.

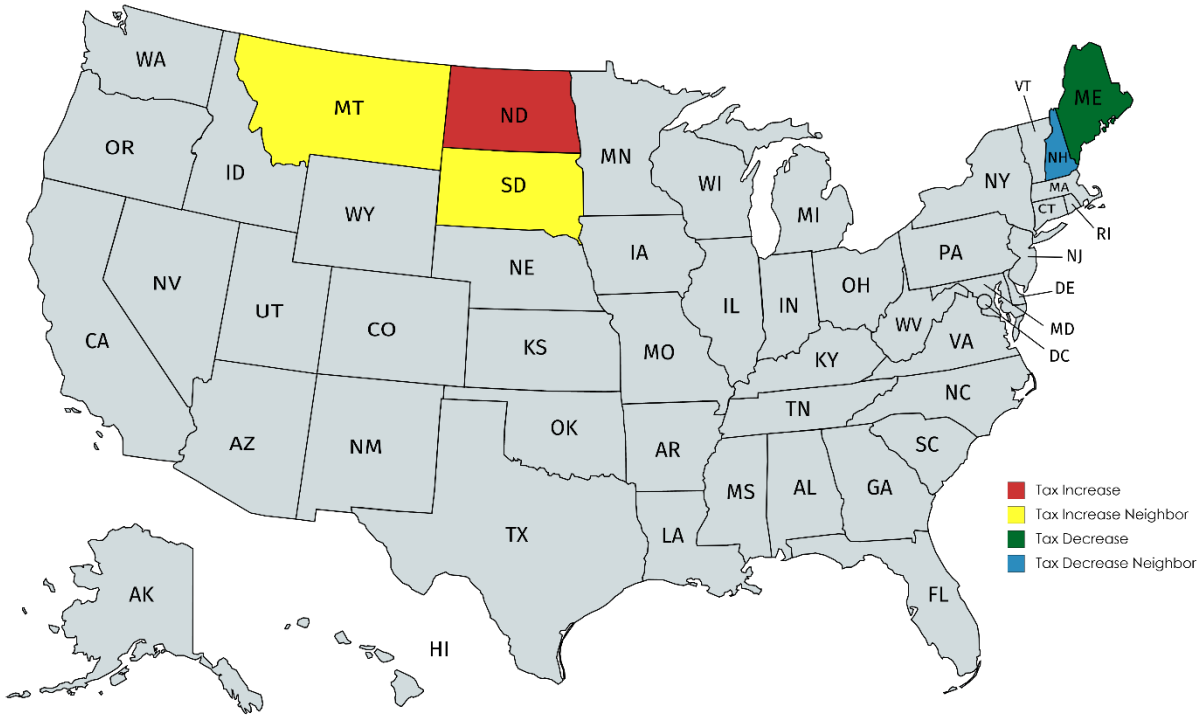
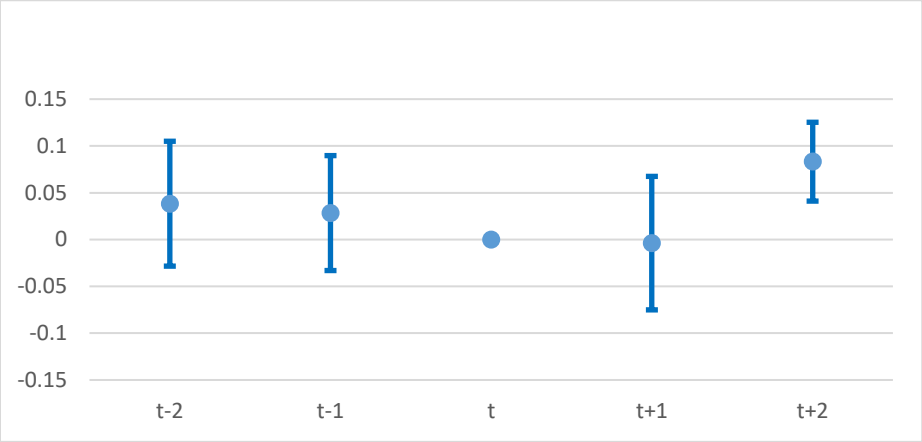


Figure A4. Pre-trends for Stacked DiD Analysis: Personal Income Tax Shocks and CEO Compensation

This figure illustrates the effect of US state personal income tax rates on CEO compensation. Using a stacked DiD approach, ΔLn(TDC1) is regressed on yearly indicator variables (relative to the year of a tax shock), and CEO-firm and industry-year fixed effects included. The y-axis plots the coefficient estimates on each yearly indicator variable. The x-axis shows the year relative to the shock to state personal income tax rates. Year *t* is the benchmark year. The sample is at the CEO-firm-year level. Treated firms are those headquartered in states with large changes in personal income tax rates (at least 1%), and control firms are those headquartered in remaining states. The error bars illustrate the 90% confidence intervals of the coefficient estimates. The confidence intervals are based on standard errors clustered at the state level.

Panel A. Tax Increases



Panel B. Tax Decreases

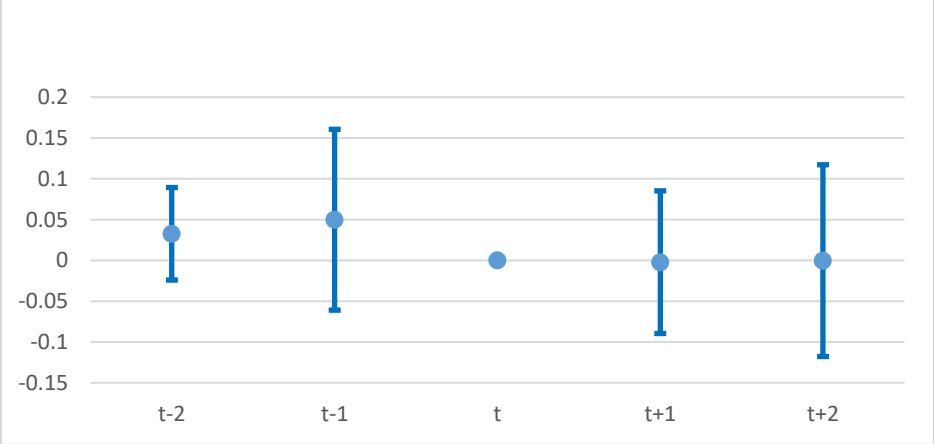
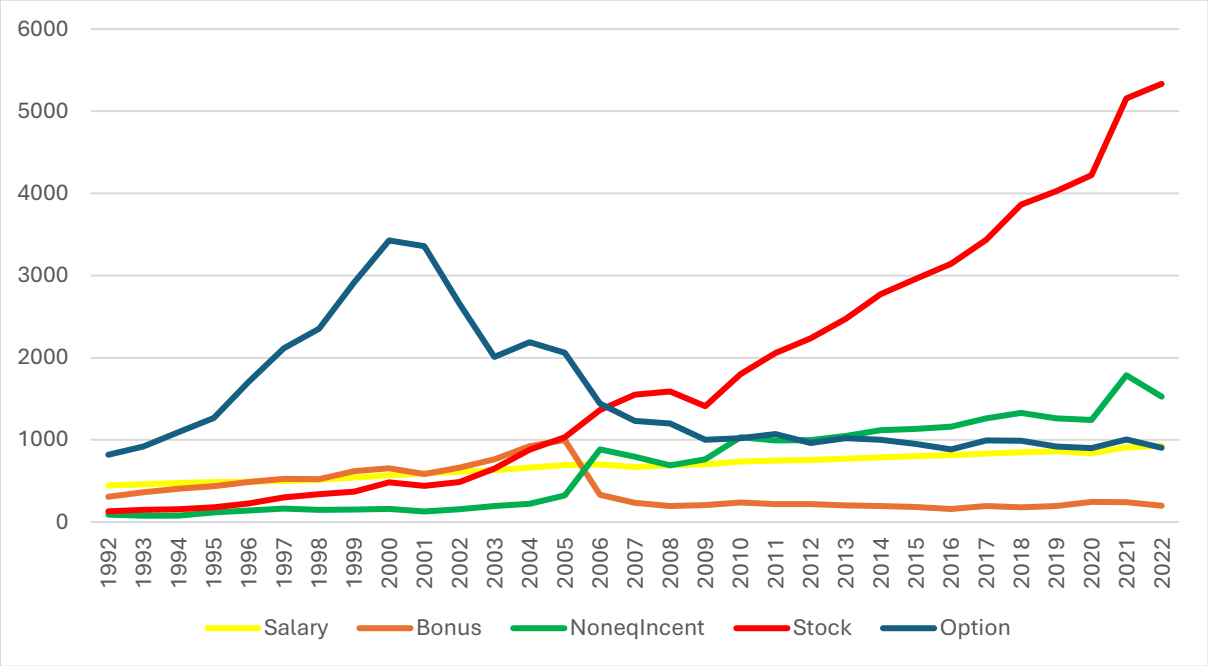


Figure A5. Components of CEO Compensation

This figure illustrates the yearly average of the components of CEO compensation between 1992 and 2022 inclusive. Panel A reports the level of components, which include salary, bonus, non-equity incentives, stock, and options in thousands of US dollars. Panel B shows the fraction of each component. The data are from Execucomp.

Panel A: Level of Components



Panel B: Share of Components

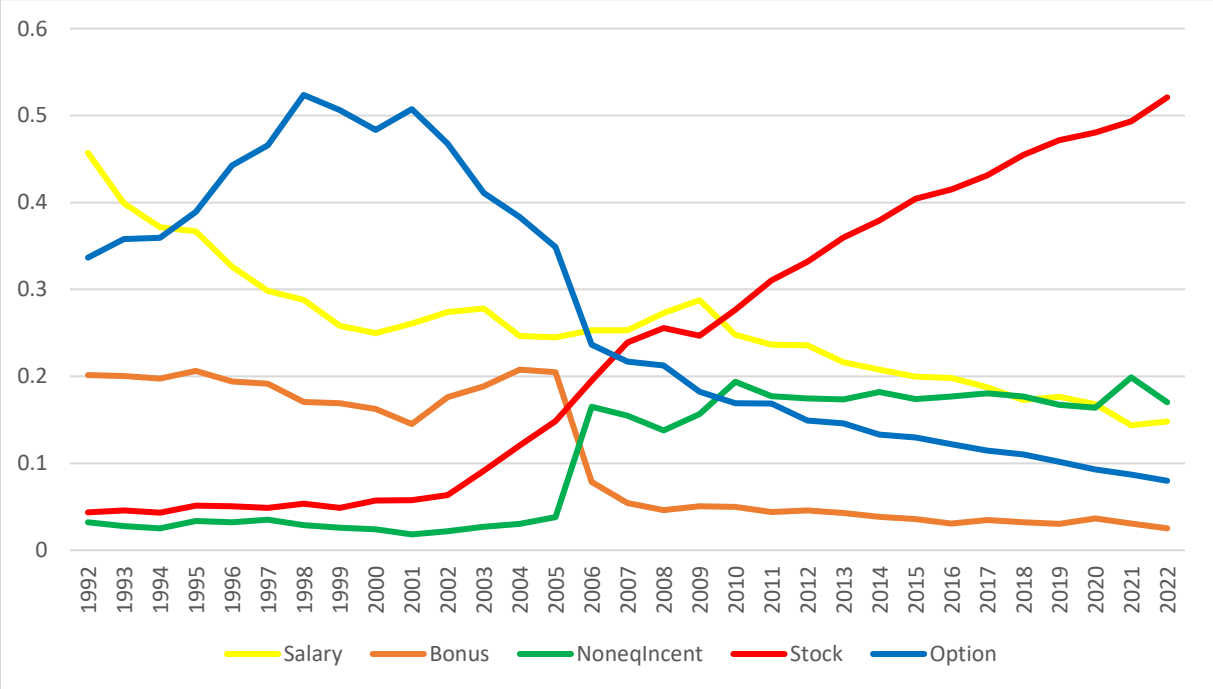


Table A1. Examples in Proxy Statements of the Posture of the Firm on State Personal Income Tax Increases.

FILING_DATE	FIRM	BLURB	URL
20030228	Versata	In April 2001, we paid the Named Executive Officers a bonus to cover the estimated personal income tax impact of making an IRS Code Section 83b election following the grant of the restricted shares.	https://www.sec.gov/Archives/edgar/data/0001034397/000101287003000957/ddef14a.htm
20210721	Blink Charging	All stock awards will include a cash payment upon vesting to cover expected ordinary income tax charges and will be calculated at the highest individual personal income tax rate.	https://www.sec.gov/Archives/edgar/data/0001429764/000149315221017450/formdef14a.htm
20170317	Hyster-Yale Materials Handling	Upon payment of the frozen account, a determination will be made whether the highest incremental state and federal personal income tax rates in the year of payment exceed the rates that were in effect in 2008 when all other participants received their payments from the Frozen Unfunded Plan. In the event the rates have increased, an additional tax gross-up payment will be paid to Mr. Wilson. The Compensation Committee determined that we, and not the executive, should bear the risk of a tax increase after 2008 because Mr. Wilson would have received payment of his frozen account in 2008 were it not for the adverse cash flow and income tax impact on us.	https://www.sec.gov/Archives/edgar/data/0001173514/000117351417000029/hydef14a2017.htm
20160322	Nacco Industries	When the frozen accounts are paid, a determination will be made whether the highest incremental personal income tax rates and applicable employment tax rates in the year of payment exceed the rates that were in effect in 2008 when all other participants received their nonqualified plan payments. In the event the rates have increased, an additional tax gross-up payment will be paid to the NEO. The Compensation Committee determined that we and not the NEOs should bear the risk of a tax increase after 2008 because the NEOs would have received payment of their frozen accounts in 2008 were it not for the adverse cash flow and income tax impact on us.	https://www.sec.gov/Archives/edgar/data/0000789933/000078993316000080/ncdef14a2016.htm

Table A2. Do CEO Pay Changes Precede State Personal Income Tax Rate Changes

This table shows the relationship between US state personal income tax rate changes and prior CEO pay changes. Tax Increase (Decrease) is a dummy variable, which equals one if a state experiences an increase (decrease) in personal income tax rate greater than one percentage point in a year and zero otherwise. The CEO pay growth (ΔCEO pay) is the average change in firm-level CEO pay within a state-year. The test sample is at the state-year level. We use the linear probability model. State-level controls include transformed debt, state GDP, tax revenues, cash savings, population, democrat government indicator, and unemployment rate. Δ denotes the first difference. All specifications include state fixed effects and year fixed effects. State financial data is from the Urban Institute. The sample period is 1998 to 2020. Robust standard errors are clustered at the state level. Appendix 1 provides variable definitions. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
VARIABLES	Tax Increase	Tax Decrease
ΔCEO pay$_{t-1}$	0.024	-0.019
	[1.36]	[-1.17]
ΔCEO pay$_{t-2}$	-0.008	-0.031
	[-0.73]	[-1.63]
ΔLn(State GDP)	0.188	-0.096
	[1.22]	[-0.83]
ΔLn(Population)	0.003	-0.201
	[0.01]	[-0.58]
ΔDemocrat Gov	0.014	-0.028*
	[1.03]	[-1.71]
ΔUnemployment	0.003	-0.050
	[0.10]	[-1.38]
ΔLn(SDebt)	0.025	0.056
	[0.52]	[1.31]
ΔLn(Tax Revenue)	-0.088	0.015
	[-1.64]	[0.77]
ΔLn(SCash)	-0.031	0.022
	[-1.36]	[0.77]
Observations	1,129	1,129
R-squared	0.114	0.066
State FE	Y	Y
Year FE	Y	Y

Table A3. CEO Pay and State Tax Shocks: A Narrative Approach

This table shows the effects of changes in personal income tax rates on CEO compensation. We define exogenous state tax shocks following the narrative approach by Romer and Romer (2010) and Giroud and Rauh (2019), and only these shocks are included in the test sample. Specifically, 38 (out of 46) large tax changes in our sample are identified as exogenous tax changes. *Tax Increase* (*Decrease*) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1) or a transformed component of CEO compensation, the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	Base Control Sample			Spotless Control Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	ΔLn(TDC1)			ΔLn(TDC1)		
Tax Increase$_{t-1}$	0.012		0.012	0.017		0.016
	[0.72]		[0.71]	[0.84]		[0.80]
Tax Increase$_{t-2}$	0.068***		0.069***	0.081***		0.083***
	[3.94]		[4.15]	[5.21]		[5.80]
Tax Decrease$_{t-1}$		-0.006	-0.008		-0.012	-0.014
		[-0.16]	[-0.24]		[-0.25]	[-0.32]
Tax Decrease$_{t-2}$		0.018	0.024		0.016	0.025
		[0.48]	[0.65]		[0.38]	[0.58]
ΔLn(Assets)	0.325***	0.327***	0.326***	0.333***	0.335***	0.333***
	[12.29]	[12.37]	[12.27]	[10.48]	[10.55]	[10.39]
ΔMTB	0.074***	0.074***	0.074***	0.072***	0.072***	0.072***
	[9.63]	[9.52]	[9.58]	[8.63]	[8.52]	[8.58]
ΔROA	0.393***	0.394***	0.394***	0.304***	0.304***	0.304***
	[5.92]	[5.87]	[5.92]	[5.49]	[5.36]	[5.48]
Observations	22,228	22,275	22,212	15,498	15,558	15,493
R-squared	0.196	0.196	0.196	0.212	0.212	0.212
CEO-Firm FE	Y	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y	Y

Table A4. CEO Pay and State Tax Shocks: Neighboring Control States

This table shows the effects of changes in US state personal income tax rates on CEO compensation using neighboring control states. *Tax Increase* (*Decrease*) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. The left (right) panel reports the results using the base (spotless) control sample. Column 1 (4) includes tax-increase treated states and neighboring control states (that have never had a tax rate change). Column 2 (5) includes tax-decrease treated states and neighboring control states (that have never had a tax rate change). Column 3 (6) includes tax-increase treated states, tax-decrease treated states and neighboring control states to both tax-increase and tax-decrease states (that have never had a tax rate change). TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1). The control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	Base Control Sample			Spotless Control Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	ΔLn(TDC1)			ΔLn(TDC1)		
Tax Increase$_{t-1}$	0.006		0.004	0.009		0.008
	[0.31]		[0.20]	[0.44]		[0.40]
Tax Increase$_{t-2}$	0.069***		0.064***	0.072***		0.073***
	[4.26]		[3.91]	[5.15]		[5.34]
Tax Decrease$_{t-1}$		-0.006	-0.008		-0.011	-0.014
		[-0.17]	[-0.26]		[-0.24]	[-0.33]
Tax Decrease$_{t-2}$		0.009	0.016		0.006	0.013
		[0.26]	[0.47]		[0.16]	[0.34]
ΔLn(Assets)	0.306***	0.317***	0.315***	0.320***	0.320***	0.321***
	[10.41]	[12.22]	[11.80]	[9.84]	[9.82]	[9.83]
ΔMTB	0.072***	0.073***	0.073***	0.071***	0.071***	0.071***
	[8.35]	[9.05]	[9.18]	[8.29]	[8.28]	[8.29]
ΔROA	0.316***	0.353***	0.355***	0.291***	0.293***	0.292***
	[5.85]	[5.81]	[5.87]	[4.97]	[4.99]	[4.99]
Observations	17,827	20,403	20,598	14,696	14,735	14,735
R-squared	0.207	0.202	0.201	0.215	0.215	0.215
CEO-Firm FE	Y	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y	Y

Table A5. CEO Pay and State Tax Shocks: Include State Level Control Variables

This table shows the robustness tests for the effects of changes in personal US state income tax rates on CEO compensation, including state-level control variables. Tax Increase (Decrease) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. TDC1 is total pay from the Execucomp database. The dependent variable is Δln(TDC1) and the control variables are transformed Assets, MTB, ROA, and state level variables, where Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
VARIABLES	ΔLn(TDC1)	ΔLn(TDC1)
$\text{Tax Increase}_{t-1}$	0.012	0.012
	[0.60]	[0.58]
$\text{Tax Increase}_{t-2}$	0.053***	0.053***
	[3.90]	[3.97]
$\text{Tax Decrease}_{t-1}$	0.025	0.024
	[0.83]	[0.77]
$\text{Tax Decrease}_{t-2}$	0.011	0.010
	[0.36]	[0.31]
ΔLn(Assets)	0.268***	0.198***
	[9.59]	[6.22]
ΔMTB	0.077***	0.075***
	[8.46]	[8.67]
ΔROA	0.386***	0.309***
	[5.49]	[4.03]
ΔLog(StateGDP)	0.551**	0.521**
	[2.56]	[2.43]
ΔDem Governor	0.416	0.409
	[0.61]	[0.62]
ΔLog(Unemployment)	-0.009	-0.008
	[-0.75]	[-0.64]
ΔLog(StatePopulation)	0.093	0.099
	[1.51]	[1.63]
ΔLog(StateDebt)		-0.053
		[-1.11]
ΔLog(StateRevenue)		0.169***
		[5.27]
ΔLog(StateCash)		0.017
		[0.39]
Observations	16,308	16,308
R-squared	0.192	0.194
CEO-Firm FE	Y	Y
Industry-Year FE	Y	Y

Table A6. Distance to State Border, Tax Increases, and CEO Compensation

This table shows the effects of changes in personal income tax rates on CEO compensation. *Tax Increase* is a dummy variable that equals one if a CEO's state personal income tax rate increases by at least one percentage point in a year and zero otherwise. *Miles to nearest state border* is the number of miles from a firm's address to its nearest neighbor state border. TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1). The control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Base Control Sample	(2) Spotless Control Sample
Dep. Variable	ΔLn(TDC1)	ΔLn(TDC1)
Tax Increase$_{t-1}$	0.013	0.022
	[0.65]	[0.96]
Tax Increase$_{t-2}$	0.062**	0.068**
	[2.00]	[2.31]
Tax Increase$_{t-2}$ × Miles to nearest border state	0.000	0.000
	[0.16]	[0.31]
ΔLn(Assets)	0.322***	0.329***
	[12.71]	[11.04]
ΔMTB	0.072***	0.069***
	[7.45]	[6.42]
ΔROA	0.370***	0.282***
	[5.35]	[4.83]
Observations	20,776	14,519
R-squared	0.198	0.214
CEO-Firm FE	Y	Y
Industry-Year FE	Y	Y

Table A7: Placebo Test

This table reports the results of placebo tests of the effect of US state personal income tax shocks on CEO pay. We randomly assign tax increases and decreases to CEOs, setting the mean of the increases and decreases equal to the actual sample mean at the CEO-year level, and regress ΔLn(TDC1) on the simulated tax shocks. *Tax Increase (Tax* Decrease) is a dummy variable that equals one if a CEO's allocated personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. The control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
VARIABLES	ΔLn(TDC1)	ΔLn(TDC1)	ΔLn(TDC1)
Tax Increase$_{t-1}$	-0.010		-0.009
	[-0.52]		[-0.50]
Tax Increase$_{t-2}$	0.008		0.008
	[0.25]		[0.26]
Tax Decrease$_{t-1}$		0.028	0.028
		[0.68]	[0.67]
Tax Decrease$_{t-2}$		0.017	0.017
		[0.39]	[0.39]
ΔLn(Assets)	0.327***	0.327***	0.327***
	[12.43]	[12.38]	[12.42]
ΔMTB	0.074***	0.074***	0.074***
	[9.56]	[9.55]	[9.53]
ΔROA	0.394***	0.394***	0.394***
	[5.87]	[5.88]	[5.87]
Observations	22,291	22,291	22,291
R-squared	0.196	0.196	0.196
CEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

Table A8. CEO Compensation Responsiveness to State Personal Income Tax Changes: Drop Large Shocks to State-level Corporate Income Tax Rates

This table reports the robustness tests for the effects of US state personal income tax on CEO compensation, dropping firms headquartered in states with large shocks (no less than one percentage point) to state-level corporate income tax rates in any year of the sample. Tax Increase (Decrease) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. TDC1 is total pay from Execucomp. State corporate income tax data is from the Tax Foundation (https://taxfoundation.org/). The dependent variable is ΔLn(TDC1) and the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
VARIABLES	ΔLn(TDC1)	ΔLn(TDC1)	ΔLn(TDC1)
Tax Increase$_{t-1}$	0.038		0.039
	[1.63]		[1.60]
Tax Increase$_{t-2}$	0.072***		0.075***
	[4.01]		[4.25]
Tax Decrease$_{t-1}$		-0.021	-0.012
		[-0.38]	[-0.21]
Tax Decrease$_{t-2}$		0.045	0.057
		[0.79]	[1.05]
ΔLn(Assets)	0.322***	0.320***	0.322***
	[10.43]	[10.34]	[10.41]
ΔMTB	0.072***	0.072***	0.072***
	[8.25]	[8.23]	[8.22]
ΔROA	0.287***	0.287***	0.288***
	[6.55]	[6.55]	[6.54]
Observations	14,405	14,405	14,405
R-squared	0.218	0.218	0.218
CEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

Table A9. CEO Compensation Responsiveness to State Personal Income Tax Changes: Drop COVID-19 Period and other Recession Years

This table reports the robustness tests for the effects of US state personal income tax on CEO compensation, dropping the years during COVID-19 and other recession years (2001, 2007, 2008, 2009, 2020, 2021, and 2022). The recession years follow the business cycle dating defined by NBER (https://www.nber.org/research/business-cycle-dating). Tax Increase (Decrease) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point in a year and zero otherwise. TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1) and the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classifications. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
VARIABLES	ΔLn(TDC1)	ΔLn(TDC1)	ΔLn(TDC1)
$\text{Tax Increase}_{t-1}$	-0.003		-0.002
	[-0.17]		[-0.10]
$\text{Tax Increase}_{t-2}$	0.076***		0.078***
	[3.81]		[3.88]
$\text{Tax Decrease}_{t-1}$		-0.007	-0.010
		[-0.21]	[-0.34]
$\text{Tax Decrease}_{t-2}$		0.032	0.038
		[0.74]	[0.88]
ΔLn(Assets)	0.340***	0.340***	0.340***
	[14.03]	[13.94]	[13.91]
ΔMTB	0.090***	0.090***	0.090***
	[10.12]	[10.14]	[10.10]
ΔROA	0.346***	0.347***	0.346***
	[4.40]	[4.41]	[4.42]
Observations	16,883	16,883	16,883
R-squared	0.217	0.217	0.218
CEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

Table A10. Stacked DiD: CEO Pay and State Tax Shocks (A Narrative Approach)

This table shows the effects of changes in personal income tax rates on CEO compensation using a stacked DiD approach (Cengiz et.al., 2019). We define exogenous state tax shocks following the narrative approach by Romer and Romer (2010) and Giroud and Rauh (2019), and only these shocks are included in the test sample. For each large tax increase or decrease (at least 1%), a [-2, +2] stack window is used. States with any large changes (increases or decreases) at any point within a stack window are excluded (for example, if a state has large tax changes in both 2010 and 2012, both shocks are excluded from the test sample). CEOs of firms headquartered in states with large changes are in the treatment group. The remaining CEOs are in the control group. For each stack, Tax Increase (Decrease) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point at the central year of the stack, and zero otherwise. $Post_1$ ($Post_2$) is an indicator variable for the first (second) year following a large tax shock. TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1) and the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) ΔLn(TDC1)	(2) ΔLn(TDC1)
Tax Increase x $Post_1$	0.001	
	[0.04]	
Tax Increase x $Post_2$	0.084***	
	[5.25]	
Tax Decrease x $Post_1$		0.004
		[0.08]
Tax Decrease x $Post_2$		0.005
		[0.13]
ΔLn(Assets)	0.276***	0.217***
	[6.03]	[6.90]
ΔMTB	0.107***	0.086***
	[7.88]	[5.84]
ΔROA	0.517***	0.419***
	[4.67]	[4.27]
Observations	22,491	27,044
R-squared	0.271	0.268
CEO-Firm FE	Y	Y
Industry-Year FE	Y	Y

Table A11. Stacked DiD: CEO Pay and State Tax Shocks Using Neighboring Control States

This table shows the effects of changes in personal income tax rates on CEO compensation using a stacked DiD approach (Cengiz et.al., 2019). Only neighboring control states are included in the test sample. For each large tax increase or decrease (at least 1%), a [-2, +2] stack window is used. States with any large changes (increases or decreases) at any point within a stack window are excluded (for example, if a state has large tax changes in both 2010 and 2012, both shocks are excluded from the test sample). CEOs of firms headquartered in states with large changes are in the treatment group. The remaining CEOs are in the control group. For each stack, Tax Increase (Decrease) is a dummy variable that equals one if a CEO's state personal income tax rate increases (decreases) by at least one percentage point at the central year of the stack, and zero otherwise. $Post_1$ ($Post_2$) is an indicator variable for the first (second) year following a large tax shock. TDC1 is total pay from Execucomp. The dependent variable is ΔIn(TDC1) and the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classification. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) ΔLn(TDC1)	(2) ΔLn(TDC1)
Tax Increase x $Post_1$	-0.013	
	[-0.39]	
Tax Increase x $Post_2$	0.058**	
	[2.48]	
Tax Decrease x $Post_1$		-0.043
		[-0.81]
Tax Decrease x $Post_2$		-0.022
		[-0.52]
ΔLn(Assets)	0.281***	0.268***
	[6.57]	[10.83]
ΔMTB	0.105***	0.086***
	[6.17]	[6.55]
ΔROA	0.463***	0.460***
	[2.84]	[4.25]
Observations	12,368	27,886
R-squared	0.310	0.288
CEO-Firm FE	Y	Y
Industry-Year FE	Y	Y

Table A12. CEO Compensation Responsiveness to State Personal Income Tax Changes: Continuous Treatment

This table reports the robustness tests for the effects of US state personal income tax on CEO compensation using continuous treatment values, per Callaway et al (2024). *Continuous Tax Increase* (*Decrease*) is the CEO's state personal income tax rate increase (decrease), in percent, when the magnitude of that change was at least one percent. TDC1 is total pay from Execucomp. The dependent variable is Δln(TDC1) and the control variables are transformed Assets, MTB, and ROA, Δ denotes difference, and Ln(.) is the natural logarithm. All specifications include CEO-Firm and Industry-Year fixed effects, where industries are defined using the Fama-French 49 classifications. Robust standard errors are clustered at the state level. Variables are defined in Appendix 1. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
VARIABLES	ΔLn(TDC1)	ΔLn(TDC1)	ΔLn(TDC1)
Continuous Tax Increase$_{t-2}$	0.030***		0.031***
	[3.82]		[3.95]
Continuous Tax Decrease$_{t-2}$		-0.013	-0.017
		[-0.59]	[-0.77]
ΔLn(Assets)	0.327***	0.327***	0.327***
	[12.38]	[12.36]	[12.35]
ΔMTB	0.074***	0.074***	0.074***
	[9.58]	[9.58]	[9.58]
ΔROA	0.393***	0.394***	0.393***
	[5.89]	[5.89]	[5.90]
Observations	22,291	22,291	22,291
R-squared	0.196	0.196	0.196
CEO-Firm FE	Y	Y	Y
Industry-Year FE	Y	Y	Y

Table A13. CEO Turnover following State Tax Increases

This table shows the effects of state tax increases and subsequent CEO pay raises on CEO turnover. *Tax Increase* is a dummy variable that equals one if an CEO's state personal income tax rate increases by at least one percentage point in the previous two years and zero otherwise. *CEOTurnover* is equal to one if there was a turnover in a given firm-year. *PayRaise* is equal to one if a CEO received an increase in pay within 2 years of a state tax increase and zero otherwise. All specifications include firm and year fixed effects. Robust standard errors are clustered at the state level. Variables are defined in the Appendix. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
VARIABLES	CEOTurnover	CEOTurnover
PayRaise	-0.044**	-0.045**
	[-2.14]	[-2.18]
Log(Assets)	-0.002	-0.003
	[-0.22]	[-0.29]
MTB	-0.014	-0.013
	[-0.82]	[-0.73]
ROA	-0.271*	-0.235*
	[-1.92]	[-1.80]
Return	-0.011	-0.012
	[-0.38]	[-0.39]
Debt/Assets		0.151
		[1.33]
Observations	1,501	1,501
R-squared	0.546	0.546
Firm FE	Y	Y
Year FE	Y	Y

Table A14. Firm Performance and CEO Pay Raises Following Large Personal Income Tax Increases

This table presents univariate and multivariate evidence on the relationship between firm performance and CEO pay raises following personal tax increases. All CEOs in this subsample faced a large personal income tax increase in year *t*-3. We split the subsample based on whether the CEO received a pay increase. We measure firm performance in year *t*. Panel A presents univariate tests on firm performance split based on CEOs who received (or did not receive) a pay increase following a personal income tax rate increase (at least one percentage point). The *p*-value is for the *t*-test of the equal means of the performance measure between the two groups. Panel B presents multivariate tests of firm performance on CEO pay raises. The CEO pay raise dummy, *Pay Raise*, is equal to one for CEOs who received a pay increase within two years of a personal income tax increase and zero for those who did not. All variables except the pay raise dummy are in first difference in both panels. All specifications include firm fixed effects and year fixed effects. Robust standard errors are clustered at the state level. Variables are defined in the Appendix. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Univariate Comparison

	ΔROA	ΔStock Return
Pay Raise$_{t-1}$	0.004	0.065
No Pay Raise$_{t-1}$	-0.010	0.005
p-value	0.001	0.001

Panel B: Multivariate Model

	(1)	(2)
VARIABLES	ΔROA	ΔStock Return
Pay Raise$_{t-1}$	0.014**	0.116***
	[2.00]	[3.13]
Log(Assets $_{t-1}$)	0.011	-0.463***
	[0.33]	[-3.76]
ΔMTB$_{t-1}$	0.008*	0
	[1.88]	[0.15]
Cash $_{t-1}$	0.158***	0.738***
	[2.93]	[3.19]
Debt $_{t-1}$	0.148***	0.827***
	[2.80]	[4.14]
R&D $_{t-1}$	0.371	-0.484
	[1.55]	[-0.61]
ROA $_{t-1}$	-0.434***	
	[-3.52]	
ROA $_{t-2}$	-0.207	
	[-1.56]	
Return $_{t-1}$		-0.682***
		[-13.89]
Return $_{t-2}$		-0.232***
		[-4.35]
Observations	943	920
R-squared	0.551	0.673
Firm FE	Y	Y
Year FE	Y	Y

Appendix 3

Preemptive Locational Choice

One possible reason for the high responsiveness of CEO pay to state personal income tax shocks is that CEOs can threaten to quit for another position in a state with a lower top tax rate. If the costs of relocating are low, then such a threat is credible. Locational considerations, however, potentially have a countervailing effect. Some executives may already be taxed in another state or can move to another state that differs from the firm's domicile and was not treated with an income tax shock but still serves as CEO. Some reciprocal state tax agreements can make this feasible.[27,28] Such a prior preemptive locational choice would eliminate the need for the firm to compensate the CEO for an increase in the state personal income tax rate and would attenuate our parameter estimates of the effect of a tax shock on CEO pay. We argue that locational choices that insulate executives from state tax shocks are unlikely to significantly attenuate our estimates of the sensitivity of executive pay to changes in the personal state income tax rate.

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[27] For example, until 2017 Pennsylvania and New Jersey operated under a reciprocity agreement. If a Pennsylvania (New Jersey) resident worked in New Jersey (Pennsylvania), that person was taxed in their state of residence. Pennsylvania's top rate was 3.07% while the top rate in New Jersey was 8.97%. Pennsylvanians (New Jersey residents) who worked in New Jersey (Pennsylvania) paid a top rate of 3.07% (8.97%). All else (such as property taxes) equal, the incentive for a CEO of a Garden State firm to live in the Pennsylvania would have been substantial. States are fully aware of the incentive to locate in a low-tax tax domicile and to source employment income in a low-tax state. Not surprisingly, after nearly forty years, in September 2016 New Jersey Governor Chris Christie terminated the New Jersey agreement with Pennsylvania, effective January 1, 2017 (though the Pennsylvania side remains). While at the time Governor Christie's office declined to provide an estimate of the gain in tax revenue, a former State Treasurer of New Jersey estimated that ending the agreement could generate an additional $180 million annually for New Jersey. Since then, New Jersey has increased the top personal income tax rate further to 10.97% (2024). See https://www.inquirer.com/philly/news/politics/20160903_Christie__seeking_revenue__ends_40-year_tax_agreement_with_Pa_.html.

[28] On the other hand, some interstate tax agreements are asymmetric. For example, if a CEO worked in Arizona but lived in California, Indiana, Oregon, or Virginia, the CEO could ask for an exemption from Arizona state personal income tax and withholding of that tax. Then a tax increase in Arizona would not affect the CEO. The reverse is not true. If the CEO worked in California but was a resident of Arizona, California did not accord symmetric treatment. The CEO would pay state income tax to California. If the rate in the state of residence were higher than that in California, the tax paid to California would be credited towards the tax due in the state of residence and the CEO would pay any shortfall to the state of residence. In cases such as this, the effective top income tax rate is the higher of the two state tax rates.

First, there are few relevant state reciprocity agreements. As of the end of 2016, in 17 states including the District of Columbia, nonresident workers who live in reciprocal states did not have to pay state taxes in the work state.[29] Moreover, one-way agreements are infrequent. In 2016 there were 64 ordered state pairs with an asymmetric one-way arrangement, which was only 2.51% of the 2,550 possible one-way arrangements among 51 jurisdictions, the 50 states and Washington, DC. States have erected additional barriers to the locational avoidance of state income tax.[30]

Second, Duchin and Sosyura (2021) examine how remote management by CEOs affects their financial decisions and ability to create shareholder value. They define a "long-distance CEO" as one who commutes at least 50 miles each way to corporate headquarters and does not own a residence within 50 miles of headquarters. Because some corporate headquarters are farther than 50 miles from the nearest bordering state, such long-distance CEOs are likely to live in their work state. Thus, the set of long-distance CEOs should contain almost all CEOs who would be insulated from a state personal income tax increase in their work state, as well as other commuting CEOs who still would be subject to a state tax change. Duchin and Sosyura (2021) find 1,925 long-distance CEO-firm-years among US domiciled firms listed in the US over the period 2000 – 2020. Over that period there were 105,819 US-firm-year US listings, so the percentage of firm years with a commuter CEO is 1.82%. We view this small percentage as an upper bound on the proportion of CEOs who preemptively avoid a state tax increase in their work state.

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[29] See https://www.thebalance.com/state-with-reciprocal-agreements-3193329.

[30] We have in mind, for example, New York's "convenience of the employer" rule. New York is one of several states with a statute that specifies whether an employee working from a home office outside of the state is liable for nonresident income tax. (See https://taxnews.ey.com/news/2020-2543-new-york-issues-guidance-on-the-nonresident-income-tax-liability-to-employees-working-temporarily-outside-of-the-state-due-to-covid-19.) Under this test, nonresident income tax applies if the employee is working outside of the state for the employee's own convenience rather than the necessity of the employer and the employee spends at least one day in New York in the calendar year. Conversely, if the remote work arises from the convenience or necessity of the employer, nonresident NY income tax does not apply.

Third, as did Duchin and Sosyura (2021), we obtain the CEO residential address data used by Bernile, Bhagwat, and Yonker (2018).[31] In our sample, we find that in 99.3% of CEO-year cases the CEO owns a residence located in the same state as the corporate headquarters. While it is possible that some of these CEOs reside in another abode in a different state, almost all CEOs have the option to make their work state their tax domicile as well. Fourth, Duchin and Sosyura (2021) report that long-distance CEOs do not perform as well as local CEOs. One reason for why there are so few long-distance CEOs is that it is likely that some firms require their CEO to be local.

In summary, our coefficient estimates on the effect of state personal income tax changes on CEO pay are unlikely to be attenuated by the presence in the sample of a significant number of CEOs avoiding taxes by way of prior locational choices.

[31] We thank Scott Yonker for sharing data on executives' home addresses.

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