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Taxes and Pay Without Performance: Evidence From Executives

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Taxes and Pay without Performance: Evidence from Executives*

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Abstract

This paper contributes to the ongoing discourse on the taxation of top-income earners by empirically investigating the impact of tax policy changes on pay without performance. Using data on executive compensation in the United States, I compare the sensitivity of executive compensation to performance shocks beyond the executives control before and after a change in the federal and state tax rate. Performance shocks beyond the executives control are measured using exogenous export demand shocks. I find that the effect of taxes on pay without performance depends on the type of tax levied. Specifically, state tax hikes increase the sensitivity of executive compensation to performance shocks exogenous to executive effort. Conversely, changes in federal tax rates have a negative but statistically insignificant effect on pay without performance. Pay without performance changes most in response to state tax hikes for executives with greater mobility. Based on a Nash bargaining model, I outline that these heterogeneous findings can be explained by the importance of outside options for the pass-through of exogenous profit shocks to executive earnings. Firms need to increase compensation more in response to exogenous performance shocks after a state tax hike to retain the executive.

Keywords: Tax Incidence, Rent-Sharing, Executive Compensation
JEL classification: H22, H24, M12

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1 Introduction

Since the 1980s executive compensation has risen rapidly. One prominent explanation for this rise in executive compensation is the "rent extraction view" which argues that the increase in executive compensation is caused by executive's ability to capture the pay-setting process and extract rents from their company (Bebchuk and Fried, 2006). This view is supported by several studies who show that executive compensation responds strongly to profit shocks outside of the executive's control (Bertrand and Mullainathan, 2001; Ohrn, 2023; Keller and Olney, 2021). Beyond exacerbating inequality, it is also problematic from a shareholder's perspective when executives benefit from profit shocks outside of their control. While tying executive pay to the performance of their firms is central to solve the principal-agent problem between shareholders and executives, it is undesirable from the shareholder's perspective if executives are rewarded for profits accruing out of "luck" (Bertrand and Mullainathan, 2001). One measure proposed to reduce the incentive of executives to bargain over and consequently benefit from such profit shocks has been to increase executives' personal income taxes (Piketty et al., 2014).

Evaluating how personal income taxes affect the pass-through of profits to executive compensation is challenging since taxes also affect the executives incentive to exert effort. A reduction in effort could simultaneously affect executive compensation as well as firm productivity. Thus, it is necessary to find a time-varying measure of profit shocks outside of the executives control which is unaffected by a change in the tax rate. Typical measures of profit shocks such as changes in the performance of other firms operating in the same industry are not suitable in this setting, since the executives of firms in the same industry might be affected by the tax rate change as well. I overcome this challenge by measuring profit shocks outside of the executive's control as changes in export demand similar to Acemoglu et al. (2022) and Keller and Olney (2021).

This paper begins by illustrating how taxes can affect the pass-through of performance shocks to executive compensation in a Nash bargaining model. I derive two channels through which higher taxes can affect the pass-through of profit shocks to executive compensation. The "bargaining effort" channel assumes that bargaining over profits requires executives to exert costly effort.[1] Higher taxes discourage the returns to such bargaining efforts, leading to a decrease in the sensi-

[1] In line with the hypotheses from Piketty et al. (2014).

tivity of compensation to performance shocks following an increase in the top marginal tax rate. The "outside option" channel outlines that taxes can affect the value of the outside option an executive can earn, for example, in a different state. Profit shocks which do not exclusively affect the firm of the executive improve the value of the outside option in other jurisdictions facing a different tax rate. Thus, through the "outside option" channel, higher taxes can increase the sensitivity of executive compensation to profit shocks if the outside options of the executive are unaffected by the tax change.

To empirically test how higher taxes affect the pass-through of performance shocks to executives, I rely on data from Execucomp and Compustat for the time period 1992 until 2017. I measure profit changes outside of the executive's control as industry-wide profit changes caused by changes in export demand in the spirit of Acemoglu et al. (2022) and Autor et al. (2013) as a source of exogenous changes in firm profits obtained from UN Comtrade. I exploit identifying variation from two distinct sources. First, I exploit changes in the top marginal personal income tax rates on state-level. Second, I use the increase in the federal tax rate caused by the American Taxpayer Relief Act (ATRA).

This paper examines the impact of taxation on executive compensation by analyzing how firms adjust pay in response to exogenous changes in performance before and after a tax reform. Using world export demand as a measure of firm performance, I compare the responsiveness of executive compensation to a one-percentage-point change in export demand across the pre- and post-reform periods. Additionally, to assess the effects of state-level tax changes, I compare the responsiveness of executive compensation to changes in export demand between treated and untreated states.[2] The resulting triple difference-in-differences design allows us to ensure that the resulting effects are not driven by differential growth in executive compensation in certain industries.

Following a state tax increase I find that higher state taxes increase the pass-through of exogenous profit shocks to executive compensation. To facilitate interpretation, I use the change in world export demand as an instrument for the change in firm sales. After an increase in the

[2]Since there is no untreated control group in the federal tax setting, I only rely on examining the response of executive compensation pre and post-reform. To ensure that my results are not driven by differences in the identification strategy, I also estimate the effect of the state tax increase using the same difference-in-differences design.

state tax rate, a one percentage point increase in sales increases executive compensation by 2.3 percent more relative to an untreated control group. On the contrary, after a federal tax increase higher industry-wide profits are passed through less to executive compensation than before the reform. When using the change in world export demand as an instrument I find that a one percentage point increase in firm sales, caused by a change in export growth, increases executive compensation by 0.9 percent less than before the reform. However, it is important to note that the effect of the federal tax increase is only statistically significant in some specifications.

I then explore the mechanisms that drive the estimated effects. The heterogeneous impact of state tax rates and federal tax rates is in line with the "outside option" channel outlined in the theoretical model. I test whether the effect of the state tax increase on the pass-through of productivity shocks is stronger for executives with more available outside options. To measure the availability of outside options I use information on whether executives are covered by a non-compete contract.[3] I find that the effect of the tax increase on the pass-through of productivity shocks is higher for executives without a non-compete contract. I also find a smaller effect of taxes on the pass-through of profit shocks in industries with high industry concentration than in industries with low industry concentration.

Since I find that higher federal taxes have a slightly negative effect on the pass-through of profit shocks to executive compensation, I also examine if higher state taxes reduce the incentive of executives to exert effort to bargain over profits. To assess if higher state taxes discourage the incentive to exert bargaining effort, I analyze how state taxes affect the pass-through of firm-level profit shocks to executive compensation. Firm-level shocks only affect firm profits without affecting outside options, thus if taxes prompt executives to exert less bargaining effort, the sensitivity of executive compensation to firm-level shocks should decrease following a change in the state tax rate. I measure firm-level shocks to profits as changes in the market value of patents granted. Following a state tax increase there is no change in the pass through of such firm-level shocks to executive compensation.

I also carry out several robustness checks to strengthen the internal validity of my results. I assess whether the results of the state-level analysis are robust to using the same identification strategy

[3]Non-compete contracts typically prohibit executives from taking up employment in the same industry as their current employer for a duration of several years after leaving their current employer making less outside jobs available to them.

as in the federal analysis. When estimating the effect of state tax increases on the subsample of states experiencing a state tax increase, I find a positive effect. One threat to the identification strategy is that it assumes that the effort response of executives in high export shock and low export shocks firms should be the same in response to the change in the tax rate. Thus, I confirm that my results are not driven by changes in the pass-through of firm productivity shocks to other outcome variables. I find no evidence that export shocks are passed through differently to sales or market capitalization following an increase in the state or federal tax rate.

Related Literature This paper contributes to several distinct strands of literature. The pass-through of productivity shocks to worker wages has been widely documented in the literature (Guiso et al., 2005; Card et al., 2014). Quasi-experimental studies assessing the impact of such exogenous productivity shocks on wages typically use changes in firm's productivity caused by cash windfall shocks (Howell and Brown, 2023), being granted a patent (Kline et al., 2019; Van Reenen, 1996), changes in exposure to trade (Autor et al., 2013; Hummels et al., 2014) or oil price shocks (Cho and Krueger, 2022). These studies show that the gains in wages from such changes in productivity are not equally distributed among the income distribution, but disproportionately benefit top-income earners such as executives. Bertrand and Mullainathan (2001) were the first to document that executive compensation responds significantly to factors outside of the control of the executive. Cho and Krueger (2022), Ma and Ruzic (2020) and Keller and Olney (2021) document that executive compensation increases strongly in response to oil price shocks or changes in exports. Cho and Krueger (2022) for example outline that executive compensation responds four times stronger to a change in the oil price shock than the compensation of the average worker. Ohrn (2023) and Kennedy et al. (2022) also document that executives disproportionately benefit from changes in the corporate tax rate.

While the unequal pass-through of firm-specific profit changes has been documented, there is little evidence on which factors determine the pass-through of such firm-specific shocks on wages. Some studies investigate the role of collective bargaining networks or the role of the manager for the pass-through of profit shocks (Hermo, 2023; Acemoglu et al., 2022). Carlsson et al. (2016) and Garin and Silvério (2024) demonstrate that profit shocks, in particular if they are not idiosyncratic but affect for example an entire industry are passed through to workers by changing the wages workers could earn at other firms in the same sector. My paper contributes to under-

standing which factors determine the heterogeneity in the pass-through of productivity shocks to wages by studying the role of tax policy. While taxes have been typically studied as a source of increasing or decreasing firm profits (e.g Fuest et al., 2018; Kennedy et al., 2022; Ohrn, 2023) in this context, my study focuses on how taxes alter incentives to bargain over changes in profitability which can be caused by changes in corporate tax rates. I contribute to this literature by focusing on a subgroup of workers who have been shown to disproportionately benefit from such profitability shocks and for whom there is ample information to study the mechanisms driving the effect of taxes on the pass-through of such profit shocks. My findings corroborate evidence from Garin and Silvério (2024) and Carlsson et al. (2016) by showing that the pass-through of productivity shocks to worker earnings changes following a change in tax policy mostly by changing the outside option of the affected workers.

Further, my paper contributes to the literature on the taxation of top-income earners, in particular executives. Piketty et al. (2014) and Rothschild and Scheuer (2016) study in a theoretical model how taxes should affect rent-seeking by top-income earners. Frydman and Jenter (2010) and Gorry et al. (2017) study the effect of federal taxes on executive compensation and find that higher taxes do not affect the amount but the composition of executive compensation. Piketty et al. (2014) also provide some descriptive evidence suggesting that higher taxes reduce the incentive to extract rents. My findings add to the theory put forward by Piketty et al. (2014) by showing that in particular higher state taxes do not lead to less pass-through of firm-specific rents to executive compensation. Rather, I show that executives benefit more from productivity shocks to their firms in particular if they can easily change their employer. Thus, in a broader sense my paper also contributes to recent work on the effect of taxes on migration of top-income earners (e.g Kleven et al., 2013, 2014, 2020; Muñoz, 2021; Schmidheiny and Slotwinski, 2018; Agrawal and Foremny, 2019; Akcigit et al., 2016). While these papers have primarily focused on showing that higher taxes can lead to an out-migration of top-income earners, I show that the threat of migrating can influence the effects of tax policy. The fact that firms increasingly share changes in their profitability with top-income earners, in particular if they are mobile, might also provide an explanation for the small migration elasticities typically found in this literature.

Lastly, my paper also relates to the nascent literature studying the importance of outside options for wages. Caldwell and Harmon (2019) and Caldwell and Danieli (2024) assess that better

outside options can explain wage inequalities as well as rent-sharing dynamics. Caldwell et al. (2025) show that workers outside options are an important determinant of rent-sharing. Their paper finds that workers do not separate from their firms but use outside offers to increase their wage at the incumbent firm. Schubert et al. (2024) show that higher employer concentration represses wages by reducing the available outside options. My paper supports the findings of these papers in the context of the executive labor market. My paper highlights the crucial role of outside options in analyzing the impact of tax policy. The findings of this paper are also in line with recent evidence on the determinants of executive compensation by Edmans et al. (2023) who outline that the main concern of boards in the pay-setting process is to retain and attract the right executive.

The remainder of the paper proceeds as follows. Section 2 provides a theoretical framework for how taxes should affect the sensitivity of executive compensation to firm-level rents. Section 3 discusses the empirical strategy, while section 4 describes the data and the institutional background. Section 5 presents the results while section 6 discusses the mechanisms through which taxes can affect rent-sharing. Section 7 concludes.

2 Theoretical Framework

2.1 General Setup

To motivate my analysis, I rely on a Nash bargaining model that illustrates how taxes influence the pass-through of profit shocks to executive compensation. The model demonstrates that higher taxes affect this pass-through through two distinct channels, leading to testable implications for the empirical analysis.

Consider a firm matched with an executive, jointly producing revenue $R(\theta_i, \theta_f)$.[4] Revenue $R(\theta_i, \theta_f)$ depends on an idiosyncratic firm-specific demand θ_f as well as an industry-specific demand θ_i. The executive and the firm can bargain over the distribution of revenue $R(\theta_i, \theta_f)$, which determines the executive's wage w_i.[5] However, executives receive outside job offers from

[4] I assume that firms operate in monopolistic competition similar to Kline et al. (2019).

[5] I assume that a firm can engage in bargaining with an executive multiple times and not only when the executive joins the firm.

other firms providing a wage $W_{oo}(\theta_i)$, which is influenced by industry-specific market conditions θ_i. The executive has complete hold-up power, meaning that if the executive leaves, the firm does not produce any revenue $R(\theta_i, \theta_f)$.[6] Consequently, the payoff of the firm is $R(\theta_i, \theta_f) - w_i$, while the executive's payoff is $w_i - W_{oo}(\theta_i)$. The firm and the executive then engage in Nash bargaining over the executive's wage w_i:

$$\max_{w_i} \left(R(\theta_i, \theta_f) - w_i\right)^{(1-\beta)} \left(w_i - W_{oo}(\theta_i)\right)^{\beta}$$

where β represents the executive's bargaining power, with $1 - \beta$ representing the firm's power. The resulting gross wage is:[7]

$$w_i^* = W_{oo}(\theta_i) + \beta \times R(\theta_i, \theta_f)$$

The effect of profit shocks on executive compensation depends on the nature of these shocks. Following an increase in industry-wide profitability, the executives gross wage changes as follows:

$$\frac{\partial w_i}{\partial \theta_i} = \frac{\partial W_{oo}(\theta_i)}{\partial \theta_i} + \beta \frac{\partial R(\theta_i, \theta_f)}{\partial \theta_i}$$

Following an increase in firm profitability, the executives gross wage changes as follows:

$$\frac{\partial w_i}{\partial \theta_f} = \beta \frac{\partial R(\theta_i, \theta_f)}{\partial \theta_f}$$

Here, industry-wide profitability shocks increase the executive's gross wage by raising both the outside option value and firm profits, whereas firm-specific profitability shocks increase the wage only through its effect on firm profits.

[6] This assumption can be relaxed by allowing the firm to hire a new executive, in which case the firm can still produce $R(\theta_i, \theta_f)$. Here, rent-sharing arises because replacing the executive incurs a cost $C(R(\theta_i, \theta_f))$ that depends on the firms profitability. The firm's payoff then becomes $R(\theta_i, \theta_f) - w_i - C(R(\theta_i, \theta_f))$, and the Nash bargaining solution is $w_i^* = W_{oo}(\theta_f) + \beta \times C(R(\theta_i, \theta_f))$. The implications for rent-sharing and the effect of taxes on profit shock pass-through remain unchanged.

[7] I denote everything in gross wages, since I observe gross wages in the data.

2.2 Incorporating Personal Income Taxes

I now incorporate personal income taxes into the framework outlined above. There are two channels through which taxes can affect the distribution of profits to executives. First, taxes can affect the pass-through of profit shocks to executive compensation by reducing the executive's incentive to bargain over profits in the spirit of Piketty et al. (2014). After the tax change, for an additional unit of bargaining the executive now receives a lower net wage in return. Thus, higher taxes should discourage the effort executives put into bargaining, making β decrease in t. Second, taxes can affect the pass-through of profit shocks to executive compensation through the value of the outside options available to the executive. Taxes insert a wedge between the wages paid to the executive and the wages the executive receives. For the executive to receive w_i, the firm needs to pay the executive a gross wage $w_{g,i} = (1+t)w_i$. Thus, the payoff of the firm changes to $(R(\theta_i, \theta_f) - (1+t)w_i)$. To illustrate how the availability of outside options affects the pass-through of profit shocks to executive compensation, I assume that a fraction of firms willing to hire the executive $\frac{s}{n}$ are also affected by a change, while the remaining fraction $\frac{n-s}{n}$ of firms making outside offers to the executive is not affected by the change in the tax rate. After incorporating taxes the optimal gross wage of the executive is determined as follows:

$$\max_{w_{g,i}} \left(R(\theta_i, \theta_f) - w_{g,i} \right)^{1-\beta(t)} \left(w_i - (1+t)\frac{s}{n} W_{oo}(\theta_i) - \frac{n-s}{n} W_{oo}(\theta_i) \right)^{\beta(t)}$$

This yields the optimal gross wage of the executive:

$$w_{g,i} = (1+t)\frac{n-s}{n} W_{oo}(\theta_i) + \frac{s}{n} W_{oo}(\theta_i) + \beta(t) \times R(\theta_i, \theta_f)$$

The derivative with respect to the tax rate is:

$$\frac{\partial w_{g,i}}{\partial t} = \underbrace{\frac{n-s}{n} W_{oo}(\theta_i)}_{\text{Outside Option Channel}} + \underbrace{\frac{\partial \beta(t)}{\partial t} \times R(\theta_i, \theta_f)}_{\text{Bargaining Effort Channel}}$$

This equation illustrates how taxes should affect the sensitivity of executive compensation to profit shocks. Taxes reduce this sensitivity through the "bargaining effort" channel but may increase it through the "outside option" channel. The relevance of the "outside option" channel

should depend on the outside options available to the executive as well as the nature of the profitability shock. If all outside options available to the executive are affected by the change in tax rates $\frac{n-s}{n} = 0$, there is no change in the pass-through of industry-wide profit shocks to executive compensation. The sensitivity of executive compensation to profitability shocks which are firm-wide in nature should not be affected through the "outside option" channel but only through the "bargaining effort" channel.

3 Empirical Strategy

3.1 Measuring Profit Shocks

I use changes in world export demand as a measure of profit shocks outside of the executive's control. Several studies use changes in world export demand to measure changes in firm rents (Acemoglu et al., 2022). One advantage of using changes in world export demand is that they are unaffected by domestic changes. This is of particular importance when analyzing how taxes, which typically affect entire states or industries, impact the pass-through of exogenous profit changes. Other measures, such as the performance of firms operating in the same industry, are not suitable measures of profits outside of the executive's control since they might also be affected by a for example a drop in executive effort caused by a change in the tax rate.

Several studies have relied on changes in world export demand caused by one-time events, for example by the Great Recession or the accession of China to the World Trade Organization.[8] However, this approach is inadequate to analyze the impact of federal tax changes on the pass-through of profit shocks due to the lack of variation in tax rates during these events. Thus, I will rely on time-varying changes in export shocks such as Keller and Olney (2021) and Acemoglu et al. (2022).[9]

Industry-Level Performance Shocks I construct my measure of world export demand, similar to Keller and Olney (2021) and predict exports for the different industries. The idea behind this measure is to isolate variation in firm profitability arising due to changes in the world export

[8] As studied by Garin and Silvério (2024) and Autor et al. (2013).

[9] However, I also assess whether the pass-through of such one-time shocks varies with the state tax rate in section A.3.

demand for certain products based on exporting patterns from other countries. I measure changes in world export demand as follows:

$$\Delta WED_{j,t} = \sum_{c} S_{US,c,j,t-4} \times \Delta Exp_{NonUS,c,t}$$

c denotes the six-digit product level, j the industry and t the time period. $S_{US,c,j,t-4}$ is defined in the following manner:

$$S_{US,c,j,t-4} = \frac{Exp_{US,c,t-4}}{\sum_c Exp_{US,c,t-4}}$$

$Exp_{US,c,t}$ is the nominal value of six-digit product c the US exported in period $t-4$. Consequently, $S_{US,j,t-4}$ measures the share of US exports of product c in industry j in period $t-4$ over total exports of industry j in $t-4$. I assign six-digit products to four-digit NAICS industries based on Schott (2008).

$$\Delta Exp_{NonUS,c,t} = \frac{Exp_{NonUS,c,t} - Exp_{NonUS,c,t-1}}{Exp_{NonUS,c,t-1}}$$

$\Delta Exp_{NonUS,c,t}$ measures how the nominal value of exports of six-digit country c changed for non US countries between periods t and $t-1$.[10]

$\Delta WED_{j,t}$ identifies variation in US exports resulting from world-wide demand shocks for this good. For instance, an increase in the demand for cars from China leads to an increase in exports of cars from the US as well as from other countries. Importantly, this measure does not capture shocks in the export demand for goods which are driven by a change in executive effort. However, an increase in the demand for a specific line of cars from the US due to a successful marketing campaign does not affect this measure of export demands.

While Keller and Olney (2021) construct shares of exports of a good at the beginning of their sample period, I use the sample shares from t-4. Due to the long sample period I consider, there are substantive changes in world export demand over this time period rendering the predictive power of pre-sample shares from actual industry exports to be very low. The main reason for

[10]I follow Keller and Olney (2021) and use non US exports from Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain and Switzerland.

using sample shares for a previous period is that the current level of exports might be influenced by executive effort. Hence, the underlying assumption is that the share of exports from four periods before is unaffected by executive effort.

I also depart from Keller and Olney (2021) by measuring changes in world export demand rather than levels, as my focus is on exploring the interaction between world export demand changes and tax rates. Interacting the level of world export demand with the change in the tax rate would capture the differential responses of executives in firms with high export activity compared to those in firms with low export activity. However, my interest lies in assessing the differential impact between executives in firms experiencing high profit growth versus those in firms with low profit growth.

Further, I explore the asymmetry in rent-sharing by differentiating between the impact of positive and negative export shocks. I define a positive export shocks as $\Delta WED^{+}_{j,t} = \max\{\Delta WED_{j,t}, 0\}$ while a negative export shock is defined as $WED^{-}_{j,t} = \min\{\Delta WED_{j,t}, 0\}$. Several studies have shown that the pass-through of profit shocks is asymmetric with positive profit shocks having a stronger effect on compensation than negative profit shocks (Acemoglu et al., 2022; Cho and Krueger, 2022). Thus, taxes should primarily affect the pass-through of positive export shocks.

Validity of the Export Shock As a first step I assess whether the world export demand measure I employ actually influences executive compensation and firm performance. I measure

Table 1: Validity Check: Export Shocks

	Compensation	Sales
$\Delta WED_{j,t}$	0.021***	0.030***
	(0.007)	(0.005)
Observations:	89344	89226
Year-Fixed Effects	✓	✓
Exec-Firm Fixed Effects	✓	✓
Performance Controls	✓	✓
Size Controls	✓	✓
Share Stocks	✓	✓

Note: Table 1 shows the effects of the industry-wide export shocks on the log of executive compensation and sales. All regressions include year-fixed effects and executive-firm fixed effects. Performance is measured as return on assets, firm size as logarithm of assets, and share stock denotes the share the executive receives in stock compensation. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

firm performance as the log of sales. Table 1 shows that a change in the world export demand measure has a positive and statistically significant effect on both exports as well as compensation. This confirms findings from prior literature and proves the validity of the profitability measure I employ.

3.2 Empirical Strategy: State Taxes

To identify the tax effects on the pass-through of exogenous profits, I compare executive compensation in firms operating in an industry experiencing a large change in world export demand to firms in an industry experiencing no or only a small change in world export demand before and after a state tax increase. Additionally, I examine executive compensation in firms operating in an industry experiencing a large change in world export demand to firms in an industry experiencing no or only a small change in world export demand in states that did not experience a state tax increase. I then contrast the former difference-in-differences with the latter in a triple difference-in-differences design. Using changes in world export demand as exogenous profit shocks, the first difference-in-differences approach essentially compares executive compensation in firms operating in industries with large changes in world export demand to those in industries with small changes before and after a state tax increase. The second difference-in-differences approach compares executive compensation in firms in industries with large changes in world export demand to those in industries with small changes in states where the tax rate remained unchanged. Contrasting the former difference-in-differences to the latter difference-in-differences, absorbs any industry-specific trends that might have coincided with the reform. I implement this triple difference-in-difference design by estimating the following model:

$$\begin{aligned} ln(Y_{f,j,i,t}) = \beta_0 + \beta_1 Post_t \times \Delta WED_{j,t} \times Treat_i + \beta_2 \Delta WED_{j,t} + \beta_3 Post_t \times Treat_i \qquad (1) \\ + \quad \beta_4 Post_t \times \Delta WED_{j,t} + \beta_5 Treat_i \times \Delta WED_{j,t} + \gamma X_{f,i,t} + \delta_t + \delta_{fi} + \epsilon_{f,j,i,t} \end{aligned}$$

The subscripts i, f, j, t index executives, firms, industry and time respectively. In all specifications I include executive-firm fixed effects δ_{fi} as well as year fixed effects δ_t. The year fixed effects absorb any time variation in executive compensation, while the executive-firm fixed effects absorb any executive-firm specific differences in pay. By using executive-firm fixed effects, the results

obtained do not capture changes in executive compensation caused by firms hiring different executives or executives moving to a different firm. The coefficient β_1 is the main coefficient of interest. It captures the sensitivity of executive compensation to changes in export demand after a state tax increase. $\Delta WED_{j,t}$ measures the change in world export demand for a specific industry. I control for a general effect of world export changes on compensation $\Delta WED_{j,t}$ and allow the effect of world export demand on executive compensation to vary over time $Post_t \times \Delta WED_{j,t}$ as well as between treatment and control group $Treat_i \times \Delta WED_{j,t}$.[11] Further, I control for a general effect of taxes on executive compensation $Post_t \times Treat_i$. The $Post_t \times Treat_i$ interaction absorbs any general response in executive compensation to a tax increase. $X_{f,i,t}$ denotes time-varying firm and executive control variables.

To assuage concerns that any change in executive compensation is driven by a differential effort response between high and low profit firms, I add control variables in some specifications for current firm performance and firm size as a proxy for executive effort. One way in which higher taxes can change the sensitivity of executive compensation to profit shocks is through changing the composition of executive compensation.[12] Since stock prices change in response to profit shocks, an increase in the share of stock compensation the executive receives could mechanically increase the sensitivity of executive compensation to profit shocks.[13] While this can be a channel through which the "tax" effects works, I want to assess whether the effect of taxes persists when controlling for this change in composition of executive compensation. Thus, I also control for the share of executive compensation awarded in stocks in some specifications. Since the source of variation is on state and industry-level I cluster standard errors on state and industry level as well.

The central assumption underlying the identification strategy is that, absent the reform, industry differences in executive compensation would have followed the same trend. While this assumption is inherently not testable, I validate the identification strategy by estimating the dynamic effect

[11] $Treat_i$ is an indicator taking on the value one if executives live in state experiencing a state tax increase. $Post_t$ is an indicator taking on the value one in the years after the state tax reform. Both $Treat_i$ and $Post_t$ are absorbed by the fixed effects.

[12] Gorry et al. (2017) show that changes in the federal tax rate lead to changes in the composition of executive compensation.

[13] However, this concern is partially mitigated by using the amount of granted compensation as a outcome variable. The amount of compensation granted is less affected by changes in stock market prices than the amount of compensation realized.

of the tax increase on the pass-through of profit shocks to executive compensation in the following manner:

$$ln(Y_{f,j,i,t}) = \beta_0 + \sum_{l=-4,4} \beta_{1,l} D_l \times \Delta WED_{j,t} \times Treat_i + \beta_2 \Delta WED_{j,t} + \beta_3 Post_t \times Treat_i \quad (2)$$
$$+ \quad \beta_4 Post_t \times \Delta WED_{j,t} + \beta_5 Treat_i \times \Delta WED_{j,t} + \gamma X_{f,i,t} + \delta_t + \delta_{fi} + \epsilon_{f,j,i,t}$$

D_l now takes on the value one if a tax change happened l years from t. The coefficient of interest $\beta_{1,l}$ captures the dynamic effect of profit shocks. I normalize D_{-1} to be zero one year prior to the reform.

Stacked Regression To address potential biases arising from heterogeneous treatment effects (Goodman-Bacon, 2021; Sun and Abraham, 2021), I use a stacked regression approach. I estimate the stacked regression as follows. For each event, a year in which one or more states experience a tax increase, I create a clean control group consisting of states which did not have a tax change within four years prior to the tax change and four years after the tax change. Further, I restrict the tax increases I analyze to clean treatments, meaning that I exclude all tax changes which were followed by a reversal of the tax change. I create separate data sets for each event in my sample which I then stack together. The underlying assumption to ensure that the stacked regression approach yields unbiased estimates in the presence of heterogeneous treatment effects is that more than four years after the reform there are no more dynamic effects of the reform. To account for the fact that observations may enter into my sample multiple times since they are used as controls for two different events, I interact the fixed effects with an event indicator.

3.2.1 Empirical Strategy: Federal Taxes

To estimate the effect of the federal tax change on the pass-through of profit shocks on executive compensation, I compare the difference in executive compensation in high-profit industries to executive compensation in low-profit industries. I am not able to implement the triple difference-in-difference design used for the analysis of state tax changes, since all executives in the sample are affected by the federal tax change. It is important to note, that in contrast to the classic difference-in-differences design the definition of being treated, in the sense that the executive

works for a firm with a high profit shock, can change every year.

$$ln(Y_{f,j,i,t}) = \alpha + \gamma_1 \Delta WED_{j,t} + \beta_1 Post_t \times \Delta WED_{j,t} + \gamma_2 X_{f,i,t} + \delta_t + \delta_{fi} + \epsilon_{f,j,i,t} \quad (3)$$

The variables are specified in the same manner as before. The main coefficient of interest is the coefficient β_1 which captures the differential effect of changes in export demand on executive compensation after the ATRA. Standard errors are clustered on 4-digit industry-level.
The central assumption underlying this identification strategy is that there are no differential industry-trends in executive compensation. I assess whether this assumption is likely to hold by verifying that there are no pre-trends in the pass-through of profit shocks to executive compensation prior to the ATRA:

$$ln(Y_{f,j,i,t}) = \alpha + \gamma_1 \Delta WED_{j,t} + \sum_{l=-4,4} \beta_l D_l \times \Delta WED_{j,t} + \gamma_2 X_{f,i,t} + \delta_t + \delta_{fi} + \epsilon_{f,j,i,t} \quad (4)$$

D_l is a dummy which takes on the value of one l years prior to t. β_l is the year-specific coefficient measuring the impact of a change in $\Delta WED_{j,t}$ before and after the tax reform. I normalize D_{-1} to be zero one year prior to the reform.

4 Institutional Background and Data

4.1 Tax Changes

State Taxes I exploit variation in the top marginal personal income tax rates across different states in the US. The information on top marginal personal income tax rates stems from NBER TaxSim. In addition to the federal tax rate, states have the power to levy a tax rate on personal income. There is substantial variation in the rates states charge. While in 2018 states such as Florida or Texas did not charge any additional personal income tax rates, California charged a tax rate of 13.3% on individuals earnings more than 1 million USD.[14] Figure 1 shows the increases in top income tax rates used in the analysis. The largest state tax change over the

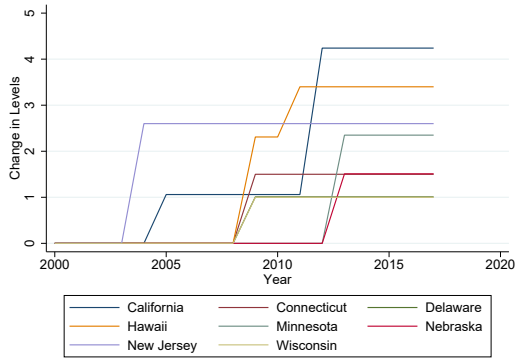
[14]While tax rates can be adjusted on state-level, states do not have the power to change the tax base.

sample period is the increase in the top marginal income tax rate in California by 3.3 percentage points in 2012. Since the tax decreases I observe over the sample period only occur in states with few listed companies, I focus on the effect of increases.[15] The tax rate which applies to income earned is the tax rate in the state of employment. I assume that the executive works at the headquarters.[16]

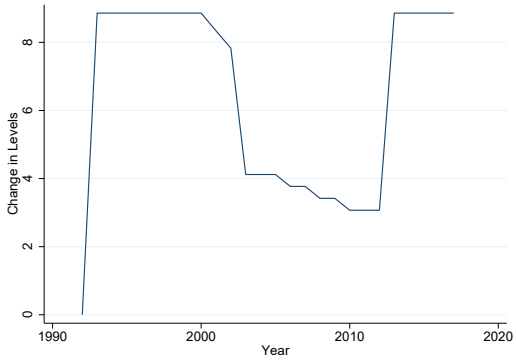
Federal Taxes I also analyze the effect of a change in the federal income tax rate on the

Figure 1: Key Tax Variation

(a) State Taxes



(b) Federal Taxes



Note: Figure 1a presents variation in the state tax rates for the states used in the analysis. Figure 1b presents the variation in the federal income tax rate during the sample period.

pass-through of profit shocks to executive compensation. I use the increase in the federal income tax rate prompted by the American Taxpayer Relief Act (ATRA). The ATRA was enacted in 2013. It repealed the tax cuts for high-income earners enacted during the Bush administration as part of the jobs and growth tax relief reconciliation act in 2003. For individuals earning more than 400,000 USD, when married earning more than 450,000 USD, the federal marginal tax rate was increased by 4.6 percentage points from 35% to 39.6% in 2013. Tax rates for low-income individuals were essentially unchanged. Figure 1 shows the evolution of the federal tax rate from 1992 until 2017. Although several federal tax changes occurred during the sample period

[15]Figure A.2 in the Appendix shows the decreases over the sample period based on the stacked regression setting.

[16]This rule applies if states do not have reciprocity agreements with each other. If a reciprocity agreement exists the taxpayer will receive a tax credit in the amount of taxes paid in the state of employment on the taxes owed in the state of residence. Thus, in the presence of reciprocity agreements the relevant tax rate for the executive is the highest tax rate of the state of employment and the state of residence. Instances in which the executive is employed in a state in which the tax rate is higher than in her state of residence will downward bias my estimates.

I consider, I focus on the tax change enacted through the ATRA, as I lack sufficient pre-period data to analyze the impact of the 1993 tax increase. Additionally, the tax rate reductions under the Jobs and Growth Tax Relief Reconciliation Act are not a suitable source of tax variation, as the concurrent major overhaul of dividend taxation during that time could have also influenced executive compensation.

It is important to note that until 2017 taxes paid to the state could be deducted entirely from the federal tax burden. Thus, while an increase in the state tax burden, for example by 3 percentage points in California in 2012, increases the overall tax burden the executive has to pay, the increase only amounts to $(1 - \tau_{federalrate}) \times 3.3$ percentage points. Further, it is important to regard deductibility of state taxes from federal taxes when interpreting the results.

4.2 Data

To analyze the effect of taxes on the sensitivity of executive compensation to firm-specific shocks I combine information from several databases over the sample period 1992 until 2017. My analysis is restricted to publicly listed firms since these firms are required to disclose a detailed overview of compensation paid to executives.[17]

Executive Compensation and controls Information on executive compensation comes from ExecuComp. ExecuComp contains detailed information on the composition of the compensation of the five highest paid executives at publicly listed firms in the US starting from 1992 onwards. ExecuComp also records information such as executive age or tenure at the firm or in the current position. I measure executive compensation as the amount of compensation granted to the executive.[18] I add information on whether the executive is covered by a non-compete contract collected Shi (2023). Executive contracts including information on non-compete clauses are available through SEC EDGAR. Non-compete clauses in executive contracts typically prohibit the executive from taking up employment in a competing industry after the termination of the

[17] I stop my analysis in 2017, since some of the provisions enacted with the Tax Cuts and Jobs Act (TCJA) might interfere with my analysis. The TCJA capped the deductibility of state taxes for individuals at 10.000 USD, effectively increasing the tax burden for all individuals in states with a non-zero tax rate and high incomes. Further, the TCJA changed the deductibility of executive compensation from the corporate tax bill.

[18] An alternative measure of executive compensation available is the amount of realized compensation. Realized compensation captures the actual value of compensation the executive receives after realizing stock options. Since, I want to assess the effect of taxes on bargaining the amount of executive compensation the board decides to award to the executive seems like the more appropriate measure.

current employment contract, for an average duration of 1.5 years.[19] I define coverage by non-compete clauses as an indicator, taking on the value one, if executives ever had a non-compete contract with their current employers. I further add firm-level balance sheet information from Compustat, which covers all firms in the ExecuComp dataset

Shocks to Firm Performance I use Comtrade data to construct the industry-level growth in exports and use the mapping provided by Schott (2008) from goods to the industries which export them. To capture idiosyncratic shocks to firm productivity I use increase in the nominal value of patents granted to the firm. Information on the nominal value of patents of publicly listed firms stems from Kogan et al. (2017).

4.2.1 Descriptive Statistics

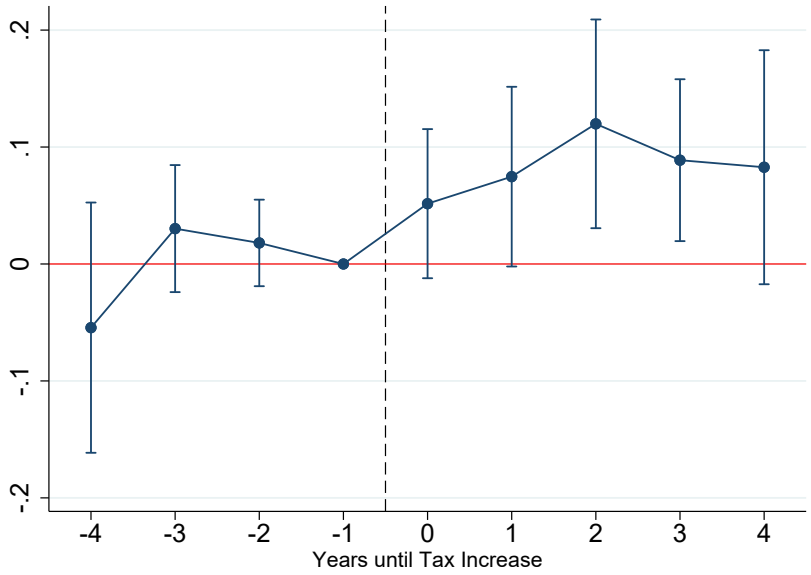
Table A.1 presents descriptive statistics for treated and untreated executives. The average executive in my sample earns 2,424,530 USD during our sample period of interest. Executive compensation is slightly higher for executives in states which experience a tax change. The average firm in my sample holds 13.21 billion USD in assets, average firm profitability, measured as return on assets, is 0.07. Executives usually have been working at the firm for 10.65 years and 64 percent of executives are covered by a non-compete contract. The average state tax rate amounts to 5.36 percent. States which experience tax rate changes are also states which on average have a higher state tax rate. The nominal value of patents granted is 579.20 million USD. The nominal value of industry exports amounts to 202.90 billion USD. Table A.2 presents the same statistics for the sample of federal tax changes.

[19]The details of which firms the employee is prohibited from switching to are specified in each non-compete contract. These firms are either competitors or clients, but mostly firms operating in the same industry. Figure A.3 in the Appendix shows an example of this provision in a non-compete contract.

5 Main Results

5.1 Main Results: State Taxes

Figure 2: Main Results: State Tax Increase



Note: Figure 2 presents results from an event study regression. The dependent variable is the log of executive compensation. The Figure shows the year-specific coefficients on a dummy which takes the value one if the tax change exceeds 1 percentage points interacted with industry-wide market capitalization or world export demand. Event time -1 is the year before the reform. The coefficient one year prior to the reform is normalized to zero. All figures are made using the stacked event study design with clean controls. Standard errors are clustered at the four digit industry, state and event level the vertical bars depict 95% confidence intervals.

Figure 2 plots the estimates β_l from equation 2. The effect of profit shocks on executive compensation is similar for treated and untreated states prior to the reform. Following the reform, I observe an increase in the pass-through of export shocks to executive compensation. The increase in pass-through is immediate and stabilizes at 0.1 two periods after the reform. Since executive compensation is usually determined by shareholders meeting on a yearly basis, the immediate effect of the reform is not surprising. Columns (1) to (3) of Table 2 present the triple difference-in-differences estimate on the log of executive compensation. The effect is robust to the inclusion of control variables and remains stable across different specifications. The increase in the sensitivity of executive compensation to profit shocks is not driven by an increase in the share of stock compensation the executive receives. The coefficient is unchanged when controlling for the share of stock compensation. Column (4) presents the differential effect of positive and negative

Table 2: The Effect of Industry-Wide Shocks on Compensation: State Tax Changes

	(1)	(2)	(3)	(4)
$Post_t \times Treat_i \times \Delta WED_{j,t}$	0.084**	0.086***	0.085***	
	(0.034)	(0.031)	(0.030)	
$Post_t \times Treat_i \times \Delta WED^{+}_{j,t}$				0.118***
				(0.041)
$Post_t \times Treat_i \times \Delta WED^{-}_{j,t}$				0.038
				(0.042)
Observations:	90958	90824	89344	85326
Year-Fixed Effects	✓	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓	✓
Performance Controls		✓	✓	✓
Size Controls		✓	✓	✓
Share Stocks			✓	✓

Note: Table 2 shows the results from estimating equation (2). $Post_t \times Treat_i \times \Delta WED_{j,t}$ measures the differential effect of a change in the world export demand measure on the log of executive compensation following a state tax increase. All regressions are estimated using the stacked regression design with "clean" treatments and "clean" controls. The regressions include year-event-fixed effects as well as executive-firm-event fixed effects. $\Delta WED^{+}_{j,t}$ indicates positive export shocks, $\Delta WED^{-}_{j,t}$ indicates negative export shocks. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

shocks to export demand in executive compensation. I find that the positive pass-through of profit shocks to executive compensation can be explained by a higher pass-through of positive shocks. The coefficient for negative export shocks is three times smaller than the baseline effect and not statistically significant. To gauge the magnitude of the effect I further use the growth in export demand as an instrument for growth in the firms own sales. Table A.3 presents the effects of a percentage change in sales on executive compensation following the reform. Following the tax increase a one percentage point change in sales growth caused by a change in industry demand increases executive compensation by 2.3 percent more than in the control group.

5.2 Main Results: Federal Taxes

Figure 3 presents the year-specific coefficients from estimating the simple difference-in-differences model specified in equation 3. Prior to the reform there is no evidence of different industry trends. Following the reform the effect of productivity shocks on executive compensation becomes slightly more negative, however none of the year-specific coefficients is statistically significant.

Figure 3: The Dynamic Effect of Industry-Wide Shocks on Compensation: Federal Tax Changes

Note: Figure 3 presents results from an event study regression. The dependent variable is the log of executive compensation. The Figure shows the year-specific coefficients of the effect of world export demand on the log of executive compensation around the ATRA normalized to the effect in 2012. Standard errors are clustered at the four digit industry level the vertical bars depict 95% confidence intervals.

Table 3: The Effect of Industry-Wide Shocks on Compensation: Federal Tax Changes

	(1)	(2)	(3)	(4)
$Post_t \times \Delta WED_{j,t}$	-0.026*	-0.025*	-0.025*	
	(0.015)	(0.015)	(0.014)	
$Post_t \times \Delta WED^{+}_{j,t}$				-0.044*
				(0.024)
$Post_t \times \Delta WED^{-}_{j,t}$				0.034
				(0.035)
Observations:	28903	28857	28857	27305
Year-Fixed Effects	✓	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓	✓
Performance Controls		✓	✓	✓
Size Controls		✓	✓	✓
Share Stocks			✓	✓

Note: Table 3 shows the results from estimating equation (3). $Post_t \times \Delta WED_{j,t}$ measures the differential effect of a change in the world export demand measure on log of executive compensation following a state tax increase. $\Delta WED^{+}_{j,t}$ indicates positive, $\Delta WED^{-}_{j,t}$ negative export shocks. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Columns (1) to (3) of Table 3 summarize the main estimate. Following the ATRA a shock to exports is passed through less to executive compensation, the effect is statistically significant at the ten percent level. When analyzing the differential impact of positive and negative export shocks, I find that the result is driven by lower pass-through of positive export shocks. Table A.4 shows results of instrumenting sales growth with the change in world export demand. I find that after the federal tax increase a one percentage point growth in sales increases executive compensation between 0.6 percent to 0.8 percent less than prior to the reform. However, the effect is only borderline statistically significant at the 10 percent level. The magnitude of the effect is four times smaller than the increase in pass-through following the state tax increase.

5.3 Robustness Checks

I carry out several tests to assess the robustness of the results. A first concern when comparing the results from the federal tax increase to the results from the state tax increase is that I use a different identification strategy to determine the effect of the federal tax increase on the pass-through of profit shocks to executive compensation. Thus, I check whether the results of the state-level analysis also hold when estimating the effect of the state tax increase using a simple difference-in-difference design. To this end, I drop all control states which did not experience a tax increase from the analysis. Table A.6 shows the result when estimating the effect of the state tax increase in this simple difference-in-differences design. The results are of a similar magnitude as the results obtained in Table 2 and statistically significant. Figure A.4 shows the dynamic results of estimating the difference-in-differences model on state level. Prior to the reform there is no differential trend in executive compensation between industries with a high export shock and industries with a low export shock.

Apart from the assumption that the compensation for the treated and control groups would have grown at a similar rate absent the tax change, I also need to assume that executives in high-profit and low-profit firms show a similar response to the tax increase. This assumption would be violated for example, if executives reduce their effort supply in response to the change in the tax rate more in the low profit firm than in the high profit firm. To test the validity of this assumption I assess whether other outcome variables indicative of executive effort change more in high export shock firms rather than low export shock firms. Table A.5 shows that

there is no differential effect of export shocks on market capitalization or sales following the tax increase. This result holds for both the triple difference-in-differences design as well as for the simple difference-in-difference design. Thus, it seems that there is no observable change in other performance variables in high and low profit firms which can influence executive compensation.

6 Mechanisms

The effect of taxes on the pass-through of profit shocks to executive compensation depends on the type of tax change. The results from the analysis of the state tax increases are in line with the predictions from the "outside option" channel. The results from the federal tax increase suggest that higher taxes also reduce the incentive of the executive to bargain over profit shocks. It seems plausible that the "outside option" channel is more prevalent when analyzing state tax increase since executives are more mobile within the US than outside of the US. In international comparison the US has by far the highest level of executive compensation, thus even after a tax increase outside offers from other countries are presumably still less attractive. In the following section I explore whether the "outside option" channel drives the differential results between federal and state tax increases and whether there is additional evidence corroborating the existence of the "bargaining effort" channel.

6.1 The Availability of Outside Options

Non-Compete vs. No Non-Compete To verify that state tax rate changes in one state make it less attractive for executives to work in this state and thus decrease the value of their outside option, I explore whether executives with more and less available outside options respond differently to the state tax increase. To measure mobility I exploit information on whether an executive is covered by a non-compete contract. Since non-compete contracts prevent executives from taking up employment with a competing firm, executives subject to a non-compete contract have less outside options available to them than executives not covered by a non-compete contract. Table A.7 shows summary statistics for executives with and without a non-compete contract. Executives with and without non-compete contracts work in firms with similar levels of sales and return on assets. Executives without a non-compete contract tend to work in slightly

larger firms than executives with a non-compete contract. Further, executives with and without a non-compete contract receive similar amounts of compensation and work in firms with similar levels of world export demand. A higher share of executives works in states who are affected by a tax increase.[20] Figure A.1 presents the mobility patterns of executives. I observe around 2 percent of executives moving to a different firm each year, while between 10 and 15 percent of executives have ever moved to a different firm.[21] Given that 63 percent of executives have a non-compete contract, it is not surprising that the fraction of mobile executives is low. Further, it is important to note that I can only observe if the executive moves from one C-level position to another C-level position at a publicly listed company. If executives move, the majority of them move within the same industry, but to a different state.

Triple Difference-in-Differences Design Table 4 shows results for executives with and without a non-compete contract. I find that after the tax increase compensation of executives responds more strongly to a change in export shocks if they are not covered by a non-compete contract. The compensation of executives without a non-compete contract responds twice as much to a positive export shock following the change in the state tax rate. Further, compensation of executives without a non-compete contract seems to respond less strongly to a negative change in export shocks following a tax increase. Figure A.5 presents the dynamic effect for executives with and without a non-compete contract. It is important to note that being covered by a non-compete contract is only an imperfect predictor of the availability of executive's outside options since non-compete contracts are prohibited in some states. Executives with a non-compete contract can still move to these states, since the enforcement of non-compete contracts depends on the regulations in the destination state.

Difference-in-Differences Design One caveat when employing the triple difference-in-differences design is that, in the presence of the outside options channel, the control group is also affected by the tax change, violating the stable unit treatment value assumption. A tax increase in California also deteriorates the value of outside options of executives working for example in Texas.

[20] This can be explained by the fact that the state of California is part of the treatment group. Non-compete contracts are prohibited in California. Since the enforcement of non-compete contracts strongly predicts coverage by a non-compete contract (see e.g. Shi, 2023) is is not surprising that a larger share of executives without a non-compete contracts live in treated states.

[21] I define moving to a different firm as the year in which I observe an executive who was previously employed at a different publicly listed company at a new listed company.

Table 4: Triple Diff-in-Diff: Mobile vs. Immobile Executives

	Non-Compete		No Non-Compete	
	(1)	(2)	(3)	(4)
$Post_t \times Treat_i \times \Delta WED_{j,t}$	0.074*		0.098**	
	(0.044)		(0.047)	
$Post_t \times Treat_i \times \Delta WED^{+}_{j,t}$		0.076		0.181**
		(0.051)		(0.075)
$Post_t \times Treat_i \times \Delta WED^{-}_{j,t}$		0.083		-0.057
		(0.071)		(0.065)
Observations:	26330	25036	15270	14698
Year-Fixed Effects	✓	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓	✓
Performance Controls	✓	✓	✓	✓
Size Controls	✓	✓	✓	✓
Share Stocks	✓	✓	✓	✓

Note: Table 4 shows the results from estimating equation (2) for executives with and without a non-compete contract.$Post_t \times Treat_i \times \Delta WED_{j,t}$ measures the differential effect of a change in the world export demand measure on the log of executive compensation following a state tax increase. All regressions are estimated using the stacked regression design with "clean" treatments and "clean" controls. The regressions include year-event-fixed effects as well as executive-firm-event fixed effects. $\Delta WED^{+}_{j,t}$ indicates positive, $\Delta WED^{-}_{j,t}$ negative export shocks. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To verify that the results in Table 4 are not driven by this, I also estimate a simple difference-in-difference model. Table 5 shows the results from the difference-in-difference design. Again, the effect of the tax increase varies for mobile and immobile executives. Following the state tax increase I find a positive and highly statistically significant effect of export shocks on executives without a non-compete contract. The effect for executives with a non-compete contract is reduced by half and is not statistically significant. In the simple difference-in-differences design the effect on compensation for executives without a non-compete contract is driven by a stronger pass-through of positive export shocks while negative export shocks are not passed-through.

Table 5: Diff-in-Diff: Mobile vs. Immobile Executives

	Non-Compete		No Non-Compete	
	(1)	(2)	(3)	(4)
$Post_t \times \Delta WED_{j,t}$	0.062		0.133***	
	(0.051)		(0.048)	
$Post_t \times \Delta WED^{+}_{j,t}$		0.061		0.210***
		(0.056)		(0.067)
$Post_t \times \Delta WED^{-}_{j,t}$		0.091		-0.095
		(0.101)		(0.071)
Observations:	3633	3400	5164	4833
Year-Fixed Effects	✓	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓	✓
Performance Controls	✓	✓	✓	✓
Size Controls	✓	✓	✓	✓
Share Stocks	✓	✓	✓	✓

Note: Table 5 shows the results from estimating equation (3) for executives with and without a non-compete contract. $Post_t \times \Delta WED_{j,t}$ measures the differential effect of a change in the world export demand measure on log of executive compensation following a state tax increase. $\Delta WED^{+}_{j,t}$ indicates positive, $\Delta WED^{-}_{j,t}$ negative export shocks. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Additional Results and Robustness Checks I also carry out additional robustness checks. Similar to the analysis carried out in Table A.5 I verify that following the state tax increases there is no differential effect of export shocks on other firm outcome variables for executive with and without non-compete contracts. Table A.8 shows that after an increase in the state tax rate

there is no differential effect of export shocks on the log of market capitalization or the log of sales. To further corroborate the results, I also use an alternative measure of outside options. I analyze the effect of state tax increases on the pass-through of export shocks for executives working in highly concentrated industries and executives working in low concentrated industries. I use the Herfindahl - Hirschman index to measure industry concentration.[22] Results are reported in Table A.9. In industries with higher industry concentration, industries in which there are less outside options available, there is a positive but statistically insignificant effect of export shocks on executive compensation relative to the control group. In industries with a low level of industry concentration there is a positive and statistically significant effect. Again, this effect is driven by an increase in the pass-through of positive export shocks.

6.2 Firm - Level Shocks

The results from analyzing the effect of the federal tax increase provide weak evidence for a negative effect of federal taxes on the pass-through of profit shocks to executive compensation. This negative effect is consistent with the "bargaining effort" channel outlined in section 2. Higher taxes reduce the incentive for executives to bargain over profits accruing to the firm. I test this channel by providing additional evidence on the effect of taxes on the pass-through of firm-level profit shocks. Firm-level profit shocks do not affect the value of the outside option of working for another firm. Thus, in the presence of a bargaining effect of higher taxes I should find a negative effect on the pass-through of such firm-level shocks for both an increase in the state tax rate as well as an increase in the federal tax rate.

Measuring Firm Performance Shocks To measure firm performance shocks I will follow Kline et al. (2019) and Van Reenen (1996) who measure changes in firm profitability caused through patent grants. I follow the approach by Kline et al. (2019) and measure shocks to performance as the change in market capitalization around the grant date of the patent. Since, firms typically apply for patents to protect new technologies or products from being adopted by their competitors a change in the value of patents can be regarded as an idiosyncratic shock

[22] A measure in the spirit of the Herfindahl-Hirschman index has also been used by Caldwell and Harmon (2019) to measure the availability of outside options to workers.

which only affects one firm.[23] To determine the size of the profit shock generated through the grant of a patent, I measure the nominal value of patents following Kogan et al. (2017). Kogan et al. (2017) estimate the value of patents by estimating the excess stock market return for the publicly listed firm on the grant date of the patent. I will use the percentage change in changes in market returns due to patenting as the measure of idiosyncratic demand shocks:

$$\Delta PAT_{f,t} = \frac{Market_{f,t} - Market_{f,t-1}}{Market_{f,t-1}}$$

Table A.11 validates that changes in the market value of patents also affect executive compensation as well as firm performance. A one percentage point change in the market value of patents increases executive compensation by 2.6 percent and sales by 1 percent. I match patents to the respective Compustat firms following the matching provided by Autor et al. (2020). Table A.10 shows descriptive statistics for the subsample of Compustat firms to which a patent could be matched. Table 6 shows the pass-through of firm performance shocks to executive compensation

Table 6: The Effect of Firm-Level Shocks on Compensation: State Tax Changes

	(1)	(2)	(3)
$Post_t \times Treat_i \times \Delta PAT_{f,t}$	0.022	0.022	0.022
	(0.034)	(0.034)	(0.034)
Observations:	49956	49956	49956
Year-Fixed Effects	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓
Performance Controls		✓	✓
Size Controls		✓	✓
Share Stocks			✓

Note: Table 6 shows the results from estimating equation (2). $Post_t \times Treat_i \times \Delta PAT_{f,t}$ measures the differential effect of a one percentage point change in the market value of patents granted on the log of executive compensation following a state tax increase. All regressions are estimated using the stacked regression design with "clean" treatments and "clean" controls. The regressions include year-event-fixed effects as well as executive-firm-event fixed effects. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at firm, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

following an increase in the state tax rate relative to the control group. I do not find any evidence

[23]The underlying assumption is that the nominal value of patents for firms in the same industry is not correlated.

that changes in the market value of patents affect executive compensation differently following an increase in the state tax rate. Figure A.6 shows that there is no pre-trend in the pass-through of patent shocks between treated and control states prior to the reform. I further verify these results by using the market change in patents as an instrument for the percentage change in sales similar to the analysis carried out in Table A.3. Table A.12 shows that a one percentage point caused by an increase in the market value of patents increases executive compensation by 0.1 percent more than in unaffected control states. One concern when measuring firm performance shocks with the change in the market value of patent applications is that the market value of patent applications could be affected by the tax reform itself. Akcigit et al. (2022) shows that the personal income tax rate affects the likelihood of inventors having highly-valued patents. To ensure that the results are not driven by changes in the market value of patents I only use patents which were applied for before the tax change. Since my sample spans the four years before and after the reform I only rely on patents which were applied for five years before the tax increase. Table A.13 shows that there is no decrease in the pass-through of patent shocks to executive compensation. The coefficient is positive but statistically insignificant.

7 Conclusion

This paper documents how taxes affect the pass-through of profitability shocks to executive's earnings. I outline that taxes can affect executive compensation through two channels in a Nash bargaining model. First, higher taxes can affect executive compensation by improving the value of the outside option an executive can earn in a jurisdiction not subject to the tax change. Second, higher taxes discourage executives from exerting effort to bargain over rents.

I analyze how a change in the federal tax rate as well as a change in the state tax rate affects the pass-through of profitability shocks outside of the executive's control to executive compensation. I measure profitability shocks outside of the executive's control as changes in world export demand. I find that federal taxes and state taxes affect the pass-through of such profitability shocks to executive compensation in different ways. Following a state tax increase, executive compensation becomes more responsive to export shocks. Following a federal tax increase I find that executive compensation responds less strongly to an increase in an industry-wide productivity

shock. I then proceed to test if the positive impact of taxes on the pass-through of productivity shocks following an increase in the state tax rate is stronger for executives with more accessible outside options. Executives who are not covered by a non-compete contract experience a larger change in the pass-through of profitability shocks after a tax increase compared to executives who are covered by a non-compete contract. This difference is not driven by any differential response of these executives to changes in tax rates. The analysis of the federal tax increase suggests that taxes discourage executives from bargaining over profits. To test the bargaining channel, I analyze how state taxes affect the sensitivity of executive compensation to firm-level shocks, measured as changes in the market value of patents. Such firm-level shocks leave the value of the outside option unchanged. Thus, if higher taxes reduce the executives incentive to bargain over profits I should observe a negative effect on the pass-through of such shocks after a state tax increase and a federal tax increase alike. Following a federal and a state tax increase, there is no differential pass-through of firm-level productivity shocks to executive compensation. Hence, there is limited evidence that higher taxes discourage executives from engaging in bargaining over profits. Taxes do not appear to be an appropriate instrument to deter rent-seeking by executives. Instead, taxesespecially when localcan amplify the benefits executives gain from profit shocks beyond their control.

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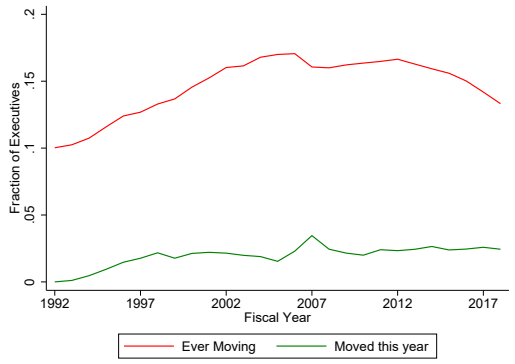
A Appendix

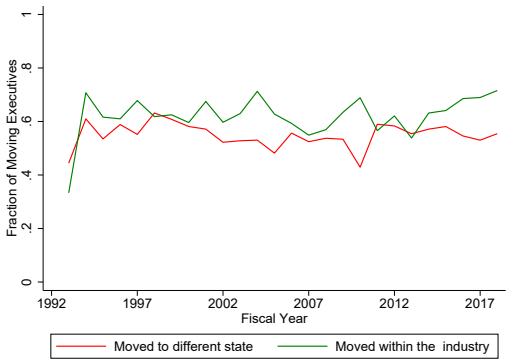
A.1 Additional Figures

Figure A.1: Mobility of Executives

Fraction of Executives moving

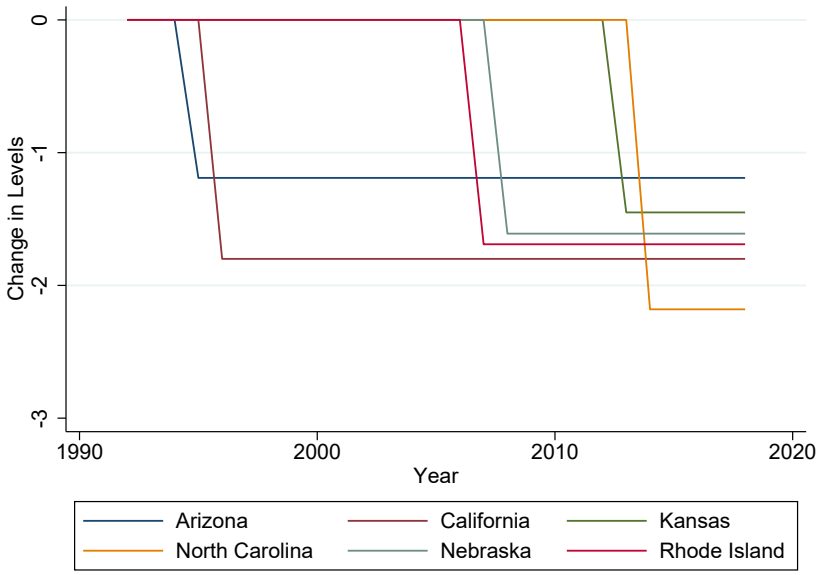


Fraction moving to different states and within industry



Note: Figure A.1 presents mobility patterns of executives. Subfigure A.5a presents the fraction of executives which ever moved and the fraction executives moving in a certain year. Subfigure A.5b shows the fraction of executives who moved to a different state and the fraction of executives who moved within the same 2-digit industry. A move is defined as an executive switching from one listed company to another.

Figure A.2: State Tax Decreases



Note: Figure A.2 presents the states which experience a tax decrease as well as the magnitude of the tax decrease. We only consider states which did not experience any increase or decrease in the four years prior to the tax decreases and no increase four years after the tax decrease.

Figure A.3: Example: Non-Compete Provision

PARTIES:

Eric Dean Sprunk ("EMPLOYEE")

and

NIKE, Inc., divisions, subsidiaries
and affiliates. ("NIKE"):

RECITALS:

A. This Covenant Not to Compete and Non-Disclosure Agreement is executed upon initial employment or upon the EMPLOYEE's advancement with NIKE and is a condition of such employment or advancement.

B. Over the course of EMPLOYEE's employment with NIKE, EMPLOYEE will be or has been exposed to and/or is in a position to develop confidential information peculiar to NIKE's business and not generally known to the public as defined below ("Protected Information"). It is anticipated that EMPLOYEE will continue to be exposed to Protected Information of greater sensitivity as EMPLOYEE advances in the company.

C. The nature of NIKE's business is highly competitive and disclosure of any Protected Information would result in severe damage to NIKE and be difficult to measure.

D. NIKE makes use of its Protected Information throughout the world. Protected Information of NIKE can be used to NIKE's detriment anywhere in the world.

AGREEMENT:

In consideration of the foregoing, and the terms and conditions set forth below, the parties agree as follows:

1. **Covenant Not to Compete**.

(a) **Competition Restriction**. During EMPLOYEE's employment by NIKE, under the terms of any employment contract or otherwise, and for one year thereafter, (the "Restriction Period"), EMPLOYEE will not directly or indirectly, own, manage, control, or participate in the ownership,

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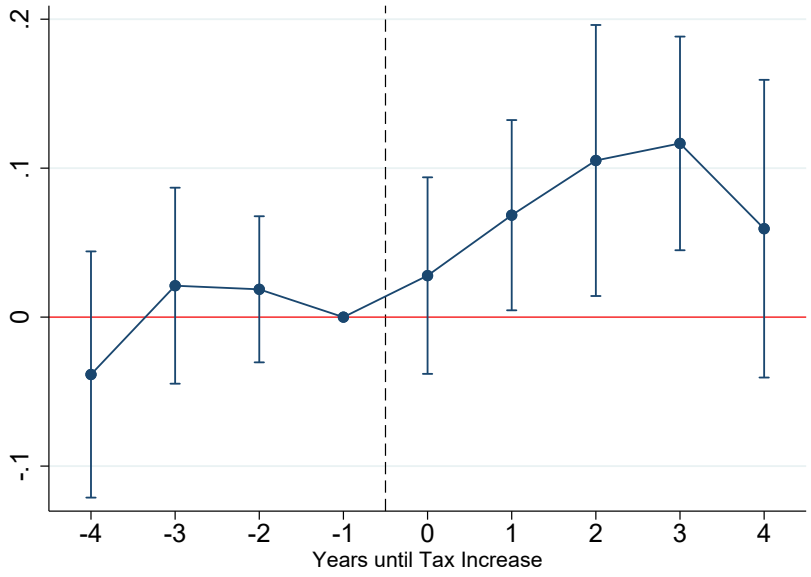
management or control of, or be employed by, consult for, or be connected in any manner with, any business engaged anywhere in the world in the athletic footwear, athletic apparel or sports equipment and accessories business, or any other business which directly competes with NIKE or any of its parent, subsidiaries or affiliated corporations ("Competitor"). ***By way of illustration only***, examples of NIKE competitors include, but are not limited to: Adidas, FILA, Reebok, Puma, Champion, Oakley, DKNY, Converse, Asics, Saucony, New Balance, Ralph Lauren/Polo Sport, B.U.M, FUBU, The Gap, Tommy Hilfiger, Umbro, Northface, Venator (Foot lockers), Sports Authority, Columbia Sportswear, Wilson, Mizuno, Callaway Golf and Titleist. This provision is subject to NIKE's option to waive all or any portion of the Restriction Period as more specifically provided below.

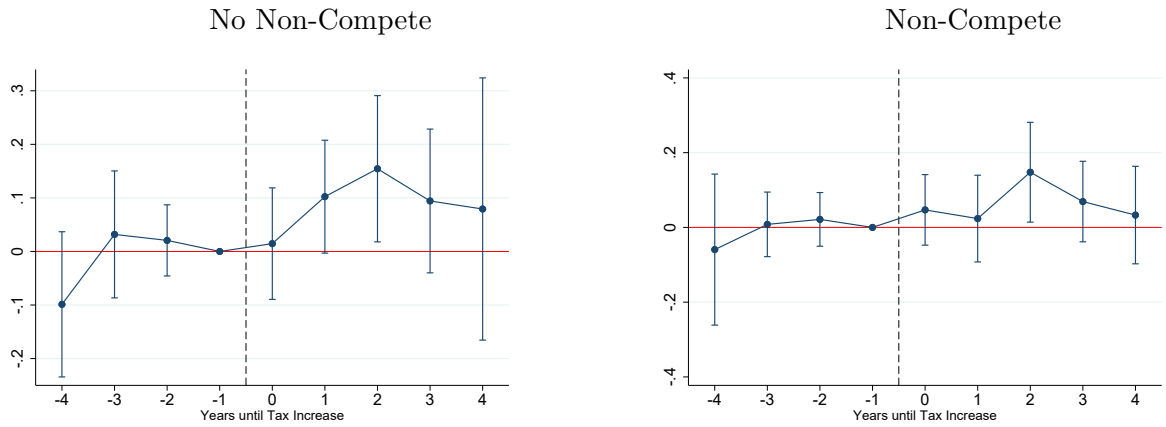
Note: Figure A.3 shows an excerpt of a non-compete agreement for Nike from https://www.sec.gov/Archives/edgar/data/320187/000119312510161874/dex1023.htm.

Figure A.4: Robustness Checks: State Tax Changes



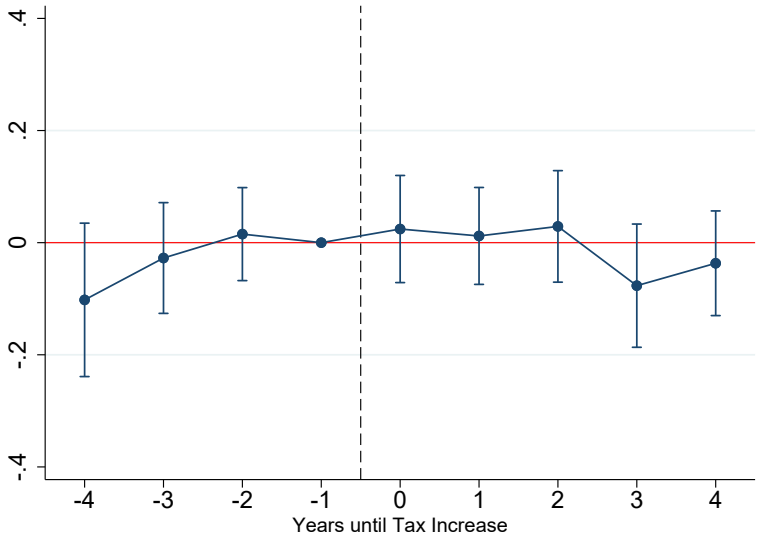
Note: Figure A.4 presents results from an event study regression. The dependent variable is the log of executive compensation. The Figure shows the year-specific coefficients on a dummy which takes the value one if the tax change exceeds 1 percentage points interacted with world export demand for the subsample of states experiencing a tax change. Event time -1 is the year before the reform. The coefficient one year prior to the reform is normalized to zero. Standard errors are clustered at the four digit industry level the vertical bars depict 95% confidence intervals.

Figure A.5: Dynamic Effects: Mobile vs. Immobile Executives



Note: Figure A.5 presents results from an event study regression. The dependent variable is the log of executive compensation. The Figure shows the year-specific coefficients on a dummy which takes the value one if the tax change exceeds 1 percentage points interacted with world export demand. All event studies are made using the stacked regression. Event time -1 is the year before the reform. The coefficient one year prior to the reform is normalized to zero. Figure (a) shows the results for executives without a non-compete contract. Figure (b) shows the results for executives with a non-compete contract. Standard errors are clustered at the four digit industry, state and event level the vertical bars depict 95% confidence intervals.

Figure A.6: Dynamic Effects: Patent Grants



Note: Figure A.6 presents results from an event study regression. The dependent variable is the log of executive compensation. The Figure shows the year-specific coefficients on a dummy which takes the value one if the tax change exceeds 1 percentage points interacted with the change in the market value of granted patents. Event time -1 is the year before the reform. The coefficient one year prior to the reform is normalized to zero. All figures are made using the stacked event study design with clean controls. Standard errors are clustered at the firm, state and event level the vertical bars depict 95% confidence intervals.

A.2 Additional Tables

Table A.1: Summary Statistics: State-Level

	All		Treated		Not Treated	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Firm Variables						
Sales, (mil)	5058.82	19281.02	4250.55	16176.86	5465.75	20656.33
Assets, (mil)	6109.43	20258.72	5541.53	19155.37	6395.27	20786.27
Market Cap, (mil)	8068.63	29670.16	9279.09	33283.41	7459.14	27653.17
Return on Assets	0.06	0.83	0.04	0.38	0.07	0.99
Executive Variables						
Compensation, (thous)	2423.32	4658.21	2623.96	6068.99	2322.49	3750.14
Stock Comp., (thous)	696.36	2511.50	740.44	3606.16	674.25	1716.70
Bonus, (thous)	155.68	797.45	141.32	1103.95	162.90	585.52
Salary, (thous)	409.98	257.35	400.55	244.40	414.72	263.49
Tenure	10.35	10.05	10.06	9.62	10.54	10.33
Non-Compete	0.59	0.49	0.42	0.49	0.68	0.47
Identifying Variation						
WED, (100mil)	202.84	223.96	240.64	216.61	183.84	225.19
State Tax	5.96	4.17	10.60	2.35	3.63	2.66
Observations	64108		21446		42662	

Note: Table A.1 presents the descriptive statistics for the sample used for the state-level analysis of changes in world export demand. The sample includes executives working in industries for which world export demands are not missing. Compensation is the value of compensation awarded to the executive in the respective year scaled in 1,000 USD. Assets and Sales are the values of firm assets and firm sales reported in Compustat. The variable Return on Assets is the ratio of earnings before interest over assets and multiplied with 100. Stock Comp. is the fair value of Stock Compensation the executive receives. Bonus and Salary the bonus and salary the executive receives. Tenure measures the years the executive has been working for the firm. Non-Compete is an indicator which takes on the value one if the executive ever had a non-compete contract with the current employer. State Tax is the marginal tax rate on an additional 1,000 USD of income for a married individual filing jointly and earning 1.5 million USD from NBER TaxSim. WED measures World Export Demand. Treated executives are executives living in a "clean" treatment state. Untreated executives are executives living in a "clean" control state.

Table A.2: Summary Statistics: Federal-Level

	All		Before Reform		After Reform	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Firm Variables						
Sales, (mil)	6102.01	19797.85	5648.15	20007.52	6511.17	19598.38
Assets, (mil)	8323.96	25023.37	6969.95	21370.25	9544.34	27853.37
Market Cap, (mil)	10662.50	35847.90	7871.48	26805.01	13164.45	42187.31
Return on Assets	0.07	0.17	0.07	0.18	0.07	0.17
Executive Variables						
Compensation, (thous)	2769.24	4279.60	2478.12	4445.29	3030.92	4107.53
Stock Comp., (thous)	1124.81	3051.78	880.02	3431.17	1345.52	2644.49
Bonus, (thous)	78.75	368.74	87.12	371.39	71.20	366.17
Salary, (thous)	480.45	284.53	451.53	272.76	506.52	292.31
Tenure	14.75	10.55	12.87	10.24	18.09	10.26
Non-Compete	0.62	0.49	0.62	0.49	0.62	0.49
Identifying Variation						
WED, (100mil)	235.53	245.37	250.68	267.86	221.88	222.29
Observations	41224		19546		21678	

Note: Table A.2 presents the descriptive statistics for the sample used for the federal-level analysis of changes in world export demand. The sample includes executives working in industries for which world export demand is not missing. Compensation is the value of compensation awarded to the executive in the respective year scaled in 1,000 USD. Assets and Sales are the values of firm assets and firm sales reported in Compustat. The variable Return on Assets is the ratio of earnings before interest over assets and multiplied with 100. Stock Comp. is the fair value of Stock Compensation the executive receives. Bonus and Salary the bonus and salary the executive receives. Tenure measures the years the executive has been working for the firm. Non-Compete is an indicator which takes on the value one if the executive ever had a non-compete contract with the current employer. WED measures World Export Demand. Before Reform presents descriptive statistics for the year 2008 until 2011. After Reform presents descriptive statistics for the years 2012 until 2017.

Table A.3: IV Regression: State Tax Changes

	(1)	(2)	(3)
$Post_t \times Treat_i \times \Delta SAL_{f,t}$	0.023**	0.023**	0.023**
	(0.012)	(0.012)	(0.011)
F - Stats:	3.66	33.71	31.33
Observations:	90958	90824	89344
Year-Fixed Effects	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓
Performance Controls		✓	✓
Size Controls		✓	✓
Share Stocks			✓

Note: Table A.3 shows the results from estimating equation (2). $Post_t \times Treat_i \times \Delta SAL_{f,t}$ measures the differential effect of a one percentage point change in sales instrumented by the percentage increase in export shocks on the log of executive compensation following a state tax increase. All regressions are estimated using the stacked regression design with "clean" treatments and "clean" controls. The regressions include year-event-fixed effects as well as executive-firm-event fixed effects. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: IV Regression: Federal Tax Changes

	(1)	(2)	(3)
$Post_t \times \Delta SAL_{f,t}$	-0.006	-0.009*	-0.008
	(0.006)	(0.005)	(0.005)
F - Stats:	3.36	71.38	58.22
Observations:	28903	28857	28857
Year-Fixed Effects	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓
Performance Controls		✓	✓
Size Controls		✓	✓
Share Stocks			✓

Note: Table A.4 shows the results from estimating equation (3). $Post_t \times \Delta SAL_{f,t}$ measures the differential effect of a one percentage point increase in sales instrumented by a one percentage point increase in world export demand on the log of executive compensation following the federal tax increase. The regressions include year-fixed effects as well as executive-firm fixed effects. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Robustness Checks: Export Shocks

	Log Sales	Log Market Cap
Panel A: Triple Diff-in-Diff		
$Post_t \times Treat_i \times \Delta WED_{j,t}$	-0.004	-0.005
	(0.014)	(0.027)
Observations:	89226	87996
Panel B: Within - State		
$Post_t \times Treat_i \times \Delta WED_{j,t}$	-0.016	0.012
	(0.013)	(0.028)
Observations:	18787	18542
Year-Fixed Effects	✓	✓
Exec-Firm Fixed Effects	✓	✓
Performance Controls	✓	✓
Size Controls	✓	✓
Share Stocks	✓	✓

Note: Table A.5 shows the results from estimating the effect of export shocks on the log of sales and the log of market capitalization. Panel A presents the results from estimating the triple difference-in-differences design. Panel B shows the results from estimating the difference-in-differences design. $Post_t \times Treat_i \times \Delta WED_{j,t}$ and $Post_t \times \Delta WED_{j,t}$ measure the differential effect of a change in the world export demand measure on the outcome variables following a state tax increase. The regressions in Panel A are estimated using the stacked regression design with "clean" treatments and "clean controls". The regressions include year-event-fixed effects as well as executive-firm-event fixed effects or year-fixed effect and executive-firm effects respectively. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry, state and event level in Panel A and on 4-digit industry level in Panel B. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Difference-in-Differences: State Tax Changes

	(1)	(2)	(3)	(4)
$Post_t \times \Delta WED_{j,t}$	0.099***	0.083***	0.082***	
	(0.027)	(0.025)	(0.024)	
$Post_t \times \Delta WED^{+}_{j,t}$				0.111***
				(0.034)
$Post_t \times \Delta WED^{-}_{j,t}$				0.030
				(0.043)
Observations:	19145	19140	18798	17528
Year-Fixed Effects	✓	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓	✓
Performance Controls		✓	✓	✓
Size Controls		✓	✓	✓
Share Stocks			✓	✓

Note: Table A.6 shows the results from estimating equation 3 on the subsample of states which experienced a "clean" treatment. $Post_t \times \Delta WED_{j,t}$ measures the differential effect of $\Delta WED_{j,t}$ on log of executive compensation following a state tax increase. $\Delta WED^{+}_{j,t}$ indicates positive, $\Delta WED^{-}_{j,t}$ negative export shocks. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Summary Statistics: Non-Compete vs. No Non-Compete

	Non-Compete		No Non-Compete	
	Mean	Std.Dev.	Mean	Std.Dev.
Firm Variables				
Sales, (mil)	2955.54	7911.56	4060.98	12305.93
Assets, (mil)	3751.80	9796.25	5241.75	15425.30
Market Cap, (mil)	4390.18	11212.09	6492.53	21211.29
Return on Assets	0.06	0.83	0.05	0.34
Executive Variables				
Compensation, (thous)	2814.98	4253.92	2688.27	5857.50
Stock Compensation, (thous)	806.28	2134.43	751.89	2151.01
Bonus, (thous)	191.00	972.70	179.42	1320.53
Salary, (thous)	458.07	291.27	424.28	260.77
Tenure	9.72	9.38	9.60	10.02
Treated	0.24	0.43	0.48	0.50
Identifying Variation				
World Export Demand, (100mil)	206.42	233.21	210.95	219.44
State Tax	5.17	3.73	7.15	4.43
Observations	16507		11476	

Note: Table A.2 presents the descriptive statistics for the subsample of executives with available information on whether they have a non-compete contract. The sample consists only of executives in "clean" control and treatment states working in an industry with non-missing world export demand. Compensation is the value of compensation awarded to the executive in the respective year scaled in 1,000 USD. Assets and Sales are the values of firm assets and firm sales reported in Compustat. The variable Return on Assets is the ratio of earnings before interest over assets and multiplied with 100. Stock Comp. is the fair value of Stock Compensation the executive receives. Bonus and Salary the bonus and salary the executive receives. Tenure measures the years the executive has been working for the firm. State Tax is the marginal tax rate on an additional 1,000 USD of income for a married individual filing jointly and earning 1.5 million USD from NBER TaxSim. WED measures World Export Demand.

Table A.8: Robustness Checks: Non-Compete vs. No Non-Compete, Exports

	Non-Compete		No Non-Compete	
	Log Sale	Log Market Cap.	Log Sale	Log Market Cap.
Panel A: Triple Diff-in-Diff				
$Post_t \times Treat_i \times \Delta WED_{j,t}$	0.016	-0.024	-0.013	-0.043
	(0.022)	(0.040)	(0.022)	(0.042)
Observations:	26252	26034	15270	15141
Panel B: Within - State				
$Post_t \times \Delta WED_{j,t}$	0.012	0.002	-0.026	-0.020
	(0.018)	(0.039)	(0.016)	(0.039)
Observations:	3633	3584	5164	5137
Year-Fixed Effects	✓	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓	✓
Performance Controls	✓	✓	✓	✓
Size Controls	✓	✓	✓	✓
Share Stocks	✓	✓	✓	✓

Note: Table A.8 shows the results from estimating the effect of export shocks on the log of sales and the log of market capitalization for executives with and without a non-compete contract. Panel A presents the results from estimating equation (2). Panel B shows the results from estimating equation (3). $Post_t \times Treat_i \times \Delta WED_{j,t}$ measures the differential effect of a change in the world export demand measure on the log of executive compensation following a state tax increase. The regressions in Panel A are estimated using the stacked regression design with "clean" treatments and "clean controls". The regressions include year-event-fixed effects as well as executive-firm-event fixed effects or year-fixed effect and executive-firm effects respectively. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry, state and event level in Panel A and on 4-digit industry level in Panel B. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: High Concentration vs. Low Concentration: State Tax Changes

	High HHI		Low HHI	
	(1)	(2)	(3)	(4)
$Post_t \times Treat_i \times \Delta WED_{j,t}$	0.030		0.093**	
	(0.037)		(0.041)	
$Post_t \times Treat_i \times \Delta WED^{+}_{j,t}$		0.048		0.108**
		(0.058)		(0.051)
$Post_t \times Treat_i \times \Delta WED^{-}_{j,t}$		0.025		0.062
		(0.055)		(0.055)
Observations:	48721	44700	38729	38729
Year-Fixed Effects	✓	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓	✓
Performance Controls	✓	✓	✓	✓
Size Controls	✓	✓	✓	✓
Share Stocks	✓	✓	✓	✓

Note: Table A.9 shows the results from estimating equation (2) for executives with and without a non-compete contract. $Post_t \times Treat_i \times \Delta WED_{j,t}$ measures the differential effect of a change in the world export demand measure on the log of executive compensation following a state tax increase. All regressions are estimated using the stacked regression design with "clean" treatments and "clean" controls. The regressions include year-event-fixed effects as well as executive-firm-event fixed effects. $\Delta WED^{+}_{j,t}$ indicates positive, $\Delta WED^{-}_{j,t}$ negative export shocks. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at 4-digit industry, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.10: Summary Statistics: State-Level (Patent Sample)

	All		Treated		Not Treated	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Firm Variables						
Sales, (mil)	7052.62	23491.57	6297.68	19672.62	7383.39	24974.51
Assets, (mil)	16311.80	104795.16	14861.02	82539.62	16947.33	113168.95
Market Cap, (mil)	10030.85	32233.80	12205.02	39813.15	9074.01	28208.55
Return on Assets	0.07	0.25	0.04	0.41	0.08	0.13
Executive Variables						
Compensation, (thous)	2715.81	5071.19	3038.50	6624.36	2574.18	4204.66
Stock Comp., (thous)	791.15	6903.46	943.28	12141.26	724.64	2008.25
Bonus, (thous)	183.18	778.43	173.65	1054.35	187.35	620.09
Salary, (thous)	440.14	286.58	432.39	288.43	443.54	285.71
Tenure	10.53	10.14	10.12	9.67	10.73	10.36
Non-Compete	0.62	0.49	0.44	0.50	0.70	0.46
Identifying Variation						
Patent Value	580.55	3396.33	902.30	4117.07	439.68	3016.51
State Tax	5.73	4.15	10.57	2.36	3.61	2.75
Observations	92705		28228		64477	

Note: Table A.10 presents the descriptive statistics for the sample used for the state-level analysis of changes in the market value of patents. The sample includes executives working for firms which at some point in time recorded patenting activity. Compensation is the value of compensation awarded to the executive in the respective year scaled in 1,000 USD. Assets and Sales are the values of firm assets and firm sales reported in Compustat. The variable Return on Assets is the ratio of earnings before interest over assets and multiplied with 100. Stock Comp. is the fair value of Stock Compensation the executive receives. Bonus and Salary the bonus and salary the executive receives. Tenure measures the years the executive has been working for the firm. Non-Compete is an indicator which takes on the value one if the executive ever had a non-compete contract with the current employer. State Tax is the marginal tax rate on an additional 1,000 USD of income for a married individual filing jointly and earning 1.5 million USD from NBER TaxSim. Patent Value measures the market value of patents. Treated executives are executives living in a "clean" treatment state. Untreated executives are executives living in a "clean" control state.

Table A.11: Validity Check: Patent Shocks

	Compensation	Sales
$Post_t \times Treat_i \times \Delta PAT_{f,t}$	0.026***	0.010***
	(0.005)	(0.003)
Observations:	65710	65671
Year-Fixed Effects	✓	✓
Exec-Firm Fixed Effects	✓	✓
Performance Controls	✓	✓
Size Controls	✓	✓
Share Stocks	✓	✓

Note: Table A.11 shows the effects of a percentage change in the market value of granted patents on the log of executive compensation and sales. $Post_t \times Treat_i \times \Delta PAT_{f,t}$ measures the differential effect of a one percentage point change in the market value of patents granted following a state tax increase. All regressions include year-fixed effects and executive-firm fixed effects. Performance is measured as return on assets, firm size as logarithm of assets, and share stock denotes the share the executive receives in stock compensation. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: IV Regression: Patent Shocks and State Tax Changes

	(1)	(2)	(3)
$Post_t \times Treat_i \times \Delta SAL_{f,t}$	0.001	0.001	0.001
	(0.006)	(0.006)	(0.006)
F - Stats:	7.52	14.80	16.29
Observations:	47372	47372	46300
Year-Fixed Effects	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓
Performance Controls		✓	✓
Size Controls		✓	✓
Share Stocks			✓

Note: Table A.12 shows the results from estimating equation (2). $Post_t \times Treat_i \times \Delta SAL_{f,t}$ measures the differential effect of a one percentage point change in sales instrumented by the percentage change in the market value of patents granted on the log of executive compensation following a state tax increase. All regressions are estimated using the stacked regression design with "clean" treatments and "clean" controls. The regressions include year-event-fixed effects as well as executive-firm-event fixed effects. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at firm, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.13: Robustness Check: Patents filed before Tax Increase

	(1)	(2)	(3)
$Post_t \times Treat_i \times \Delta PAT_{f,t}$	0.049	0.049	0.049
	(0.032)	(0.032)	(0.032)
Observations:	34248	34248	34248
Year-Fixed Effects	✓	✓	✓
Exec-Firm Fixed Effects	✓	✓	✓
Performance Controls		✓	✓
Size Controls		✓	✓
Share Stocks			✓

Note: Table A.13 shows the results from estimating equation (2). $Post_t \times Treat_i \times \Delta PAT_{f,t}$ measures the differential effect of a one percentage point change in the market value of patents granted on the log of executive compensation following a state tax increase. I restrict this to patents applied for five years before being granted. All regressions are estimated using the stacked regression design with "clean" treatments and "clean controls". The regressions include year-event-fixed effects as well as executive-firm-event fixed effects. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at firm, state and event level. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.14: Robustness Checks: Patent Shocks

	Log Sales	Log Market Cap
Panel A: Triple Diff-in-Diff		
$Post_t \times Treat_i \times \Delta PAT_{f,t}$	-0.000	0.010
	(0.023)	(0.028)
Observations:	65671	65623
Panel B: Within - State		
$Post_t \times \Delta PAT_{f,t}$	0.001	0.009
	(0.018)	(0.021)
Observations:	17005	17027
Year-Fixed Effects	✓	✓
Exec-Firm Fixed Effects	✓	✓
Performance Controls	✓	✓
Size Controls	✓	✓
Share Stocks	✓	✓

Note: Table A.14 shows the results from estimating the effect of export shocks on the log of sales and the log of market capitalization. Panel A presents the results from estimating the triple difference-in-difference design. Panel B shows the results from estimating the simple difference-in-difference design. $Post_t \times Treat_i \times \Delta PAT_{f,t}$ and $Post_t \times \Delta PAT_{f,t}$ measure the differential effect of a change in the market value of patents granted on the outcome variables following a state tax increase. The regressions in Panel A are estimated using the stacked regression design with "clean" treatments and "clean controls". The regressions include year-event-fixed effects as well as executive-firm-event fixed effects or year-fixed effect and executive-firm effects respectively. Performance controls are return on assets and logarithm of assets. The share of stock measures the share of granted compensation the executive receives in the form of stocks. Standard errors are clustered at firm, state and event level in Panel A and on firm level in Panel B. Significance Levels are: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A.3 Alternative Identification Strategy

In the main analysis I focus on the effect of time-varying shocks before and after an increase in the state tax rate. However, many studies documenting the pass-through of profit shocks to executive compensation rely on one-time events. I verify the robustness of my results by analyzing whether the pass-through of one-time profit shocks also depends on the state tax rate. I analyze differential effects of a one-time change in the corporate tax burden caused by changes in bonus depreciation based on Ohrn (2023). Ohrn (2023) shows that executive compensation increases more in industries strongly affected by a corporate tax reduction through bonus depreciation. Bonus depreciation allows for accelerated deduction of assets from the corporate tax base, thus increasing firms after-tax profits.

I will exploit the enactment of bonus depreciation in the US as part of the Job Creation and Worker Assistance Act in 2002. The rate of bonus depreciation offered varied over time. In 2002 the rate of bonus depreciation amounted to 30%, it was increased to 50% in 2003 and 2004 but abolished from 2005 to 2007. In 2008 bonus depreciation was reinstated at a 50% rate. Bonus depreciation was available at the 50% rate until the end of of 2012, with an increase of the rate to 100% in 2011. I will employ the same identification strategy as Ohrn (2023) who compares the evolution of executive compensation in industries typically investing in longer-lived assets to executive compensation in industries typically investing in shorter-lived assets. The idea underlying this identification strategy is that industries which typically invest in longer-lived assets receive a higher reduction in present corporate tax rates than industries typically investing in shorter-lived assets. In addition to Ohrn (2023), I assess whether this differential effect is larger in states with higher tax rates than in states with lower tax rates. I define states as high tax states if the personal income tax rate in that state is higher than the median personal income tax rate of all states. I estimate the effect of bonus depreciation on executive compensation in the following manner:

$$ln(Y_{j,i,t}) = \beta_0 + \beta_1[BONUS_{j,t-1}] + \gamma X_{j,i,t} + \delta_t + \delta_{fi} + \epsilon_{j,i,t}$$

I control for the same variables as in the most restrictive specification. Table A.15 shows that bonus has stronger effects in states with an above-median personal income tax rate. In high tax

states the effect of bonus is highly statistically significant and 2.5 times larger than in states with a below-median state tax rate.

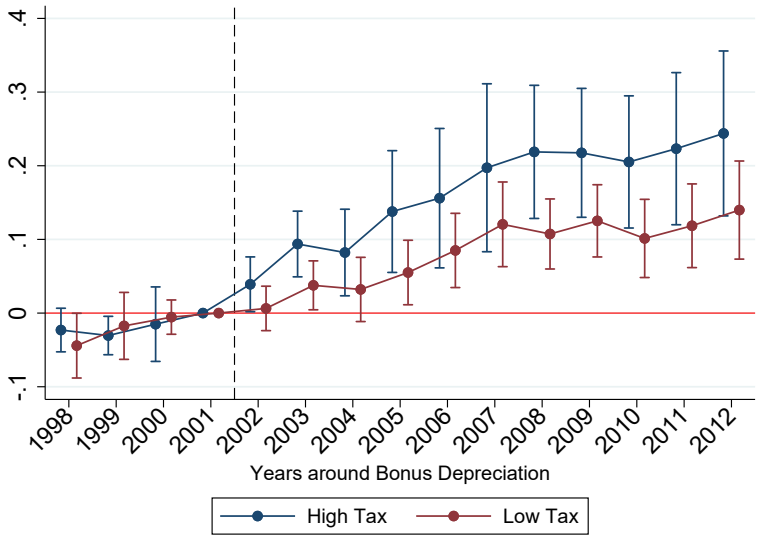
Table A.15: The Differential Effect of Bonus Depreciation

	High Tax	Low Tax
Bonus	0.066***	0.025
	(0.013)	(0.017)
Observations:	98657	100062
Executive x Firm FE	✓	✓
Year FE	✓	✓
Performance Controls	✓	✓
Size Controls	✓	✓
Share Stock	✓	✓

Note: Table A.15 presents the heterogeneous impact of bonus depreciation on executive compensation depending on the state tax rate. The column High Tax shows the effect of bonus depreciation in states with an above-median state tax rate, column Low Tax shows the effect of bonus depreciation in states with a below-median state tax rate. The dependent variable is the log of executive compensation. Standard errors are clustered at the 2-digit industry level.

I also analyze the dynamic effect of bonus depreciation using the year of first enactment as a starting point. Prior to the enactment of bonus depreciation, I do not find any evidence of differences in industry-trends for executives in high tax compared to low tax states. After the enactment of bonus depreciation I find that industries affected by bonus depreciation show stronger growth in executive compensation if their headquarters are located in states with an above median tax rate. Overall, these findings confirm that higher personal income taxes affect the pass-through of profit shocks to executive compensation.

Figure A.7: One-Time Event: Bonus Depreciation



Note: Figure A.7 presents the heterogeneous impact of bonus depreciation on executive compensation depending on the state tax rate. The line High Tax shows the effect of bonus depreciation in states with an above-median state tax rate, Low Tax shows the effect of bonus depreciation in states with a below-median state tax rate. The dependent variable is the log of executive compensation. The Figure shows the year-specific coefficients of bonus depreciation before and after enactment. The coefficient one year prior to the reform is normalized to zero. Standard errors are clustered at the 2-digit industry level, the vertical bars depict 95% confidence intervals.

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