

CEO Personal Income Taxes and Real Earnings Management

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Abstract

Using variation in CEOs' combined federal and state marginal income tax rates, we find that higher personal income taxes are associated with increased real earnings management (REM), as executives adjust operating decisions to meet earnings targets and offset higher tax liabilities. These adjustments involve overproduction and cuts in discretionary spending. We also find an asymmetric effect: tax increases drive REM, whereas tax decreases have no significant impact. This asymmetric response is difficult to reconcile with conventional expected-utility models but is consistent with prospect theory, under which managers evaluate outcomes relative to a reference level of after-tax compensation and are more sensitive to losses than to gains. This study highlights personal taxes as an important determinant of real earnings management and shows how tax policy can shape executives' real operating decisions.

Keywords: Personal Income Tax; Executive Compensation; Earnings Management

1. Introduction

Fiscal policy, particularly taxation, is a critical instrument employed by governments to influence economic behaviour and decision-making. A significant body of research has explored the effects of corporate taxation on managerial decision-making in financial reporting, with contributions from scholars such as Mills (1998), Mills and Sansing (2000) and Powers, Robinson and Stomberg (2016). However, the influence of personal income taxes on managerial financial reporting decisions remains relatively underexplored. This study seeks to address this gap by examining the relationship between personal income taxes and real earnings management behaviour. Given the prominent role of CEOs as key decision-makers (Amore and Failla, 2018; Mazouz and Zhao, 2018), understanding how their personal tax burdens influence decisions to manipulate real activities is essential for a comprehensive view of fiscal policy impacts.

This research question is important for three key reasons. First, the tax implications for a CEO's personal wealth can be significant. For instance, in the case of Mr Lawrence J. Ellison, the CEO of Oracle, with reported compensation of US\$96.16M in 2012, the increase in California's state income tax rate from 10.3% to 13.3% for income exceeding US\$1M resulted in an additional tax liability of approximately US\$2.88M. Such substantial changes in personal tax obligations can have important liquidity implications and provide strong incentives for CEOs to adjust their financial and reporting decisions. Second, changes in personal income tax rates can be viewed as exogenous shocks that directly reduce CEOs' net-of-tax income, with firms typically making only modest short-run adjustments to compensation contracts. As a result, the burden of higher personal taxes falls primarily on CEOs, creating a direct and economically meaningful channel through which personal taxes shape managerial behaviour. Third, we pay particular attention to real earnings management (REM), which involves deliberate departures from normal operating practices, such as price discounts, overproduction, and cuts in discretionary expenditure (Roychowdhury, 2006). Because these actions directly distort firms' real operating and investment decisions and are associated with weaker future performance and lower subsequent stock returns, REM can have first-order adverse effects on firm value (e.g. Cheng, Lee and Shevlin, 2016; Cohen and Zarowin, 2010; Kothari, Mizik and Roychowdhury, 2016).

We argue that personal income taxes can materially influence senior managers' real earnings management decisions. Earnings reports reflect both firm performance and managerial effectiveness. They also have a direct impact on CEO compensation, personal wealth and career prospects. Changes in personal income tax rates may therefore alter CEOs' incentives to manipulate earnings, although the direction of this effect is theoretically ambiguous. The substitution view suggests that higher personal income taxes reduce after-tax compensation and marginal returns to effort, thereby lowering the incentives for managers to engage in earnings manipulation. When the benefits of misreporting diminish, managers may adopt a more passive stance and be less inclined to accept the costs and risks associated with manipulation. This perspective is supported by the broader optimal taxation literature, which finds that higher income taxation leads to reduced work effort and efficiency losses among high-income individuals (Hausman, 1985; Saez, Slemrod and Giertz, 2012). Under this view, higher taxes may lead to more accurate financial reporting, as managers no longer see strong personal gains from distorting earnings.

In contrast, the expropriation view posits that increased tax burdens heighten managers' liquidity needs and may encourage them to actively manipulate earnings to offset reduced after-tax income. Over recent decades, a large share of CEO pay has shifted toward performance-based forms, including equity and non-equity incentive pay. Empirical studies show that earnings manipulation is more likely when compensation is performance-linked (Carter, Lynch and Zechman, 2009; Healy, 1985), and that executives with high equity ownership are particularly motivated to inflate earnings in response to rising tax liabilities (Bennett, Coles and Wang, 2021; Cheng and Warfield, 2005; Goolsbee, 2000). Thus, higher personal income taxes could exacerbate agency conflicts by incentivizing executives to prioritize personal wealth preservation over truthful financial disclosure. Given these competing theoretical perspectives, the net effect of personal income taxes on real earnings management remains an empirical question.

From a behavioural perspective, the relation between CEOs' personal income taxes and real earnings management is also unlikely to be symmetric for tax increases and tax cuts. Prospect theory and reference-dependent models posit that individuals evaluate outcomes relative to a reference point and place greater weight on losses than on gains

of the same magnitude (Barberis, 2013; Kahneman and Tversky, 1979; Tversky and Kahneman, 1991). Behavioural agency research applies this logic to executives, suggesting that managers seek to avoid setbacks to key payoffs and exhibit loss-averse responses around important performance targets (Devers *et al.*, 2008; Pepper and Gore, 2015; Wiseman and Gomez-Mejia, 1998). In the reporting setting, earnings benchmarks such as meeting analysts' forecasts, avoiding losses, and exceeding prior-year earnings create sharp changes in the payoff schedule for top managers (Burgstahler and Dichev, 1997; Degeorge, Patel and Zeckhauser, 1999; Graham, Harvey and Rajgopal, 2005). Changes in personal income tax rates shift how a given level of reported performance translates into net-of-tax compensation around these points. A tax increase reduces expected take-home pay for any given pre-tax performance and, relative to an expected after-tax benchmark, moves the CEO into the loss domain. Because the prospect-theory value function is steeper for losses than for gains, loss-averse CEOs are more willing to undertake value-reducing REM to keep reported earnings and bonus-relevant metrics at or above the levels needed to restore their expected net-of-tax payoff. By contrast, a tax cut shifts outcomes into the gains domain, so maintaining existing REM already delivers higher after-tax income, while unwinding REM would lower expected after-tax pay and raise the risk of missing performance benchmarks. Accordingly, we expect tax increases to induce stronger upward REM, whereas tax cuts do not prompt a symmetric reduction in REM.

Using a panel of U.S. public firms from 1992 to 2019, we test these predictions by constructing a CEO-level personal tax measure based on the combined federal and state marginal income tax rate faced by top-bracket taxpayers. Our baseline results demonstrate a significant positive relationship between CEO personal income tax rates and real earnings management. Regression results show that higher personal income tax rates are associated with increased REM. Specifically, a one-standard-deviation increase in CEO personal tax rates corresponds to increases in REM by about 6-7% of their standard deviations. These findings suggest that as personal income tax burdens rise, CEOs are incentivized to engage more actively in earnings manipulation, adjusting their firms' real activities to meet earnings targets. Moreover, when we disaggregate REM into its components, our results indicate that CEOs may manipulate earnings by increasing production costs and reducing discretionary spending. The economic significance of these results underscores the role of personal tax considerations in

shaping managerial behaviour. Higher tax rates appear to drive CEOs to optimize reported earnings through real activities, reflecting their attempts to mitigate the impact of increased taxes on their personal financial outcomes.

Making causal inferences when analyzing the economic impact of tax changes poses significant challenges. To address these issues, we leverage variation in state corporate income taxes and employ a difference-in-differences (DID) approach. We identify significant tax changes, defined as increases or decreases in personal income tax rates of at least 100 basis points, following the framework of Giroud and Rauh (2019). The DID analysis reveals that managers in states experiencing personal income tax increases are more likely to engage in earnings management compared to those in states without such changes. Notably, we observe little to no change in real earnings manipulation following tax decreases, suggesting an asymmetric effect of tax changes on earnings management behaviour. In the following suspect firm analysis, we find that personal tax increases significantly intensify REM for these suspect firms, while tax cuts have no comparable effect, consistent with the prospect theory-based explanation. We then explore cross-sectional heterogeneity and show that the tax-REM relation is shaped by CEOs' financial exposure and governance constraints, and by longer-term orientations captured by linguistic background and gender.

Finally, we examine how tax-induced real earnings management feeds into executives' realized income. Using a two-step design that first isolates the component of REM explained by changes in CEOs' marginal income tax rates and then relates this tax-driven REM to subsequent pay, we find that higher tax-driven REM is followed by a significant increase in next-year cash incentives (bonuses and non-equity incentives). By contrast, we find no meaningful effect on option exercise proceeds or net equity sales. These results suggest that the benefits of tax-induced REM are primarily realized through threshold-based cash compensation rather than through equity cash-out.

Our research advances the understanding of how personal tax policy shapes earnings management, complementing prior work on taxation's influence on corporate activities such as capital structure (Graham, 2003) and executive trading (Goolsbee, 2000; Goldman and Ozel, 2023). Goldman and Ozel (2023) study a trading-based response and show that personal tax changes affect executives' insider trading profits in secondary equity markets. We instead focus on reporting-driven real activities and

demonstrate that personal income tax hikes lead CEOs to adjust production and discretionary spending in ways that raise reported earnings and affect compensation. Specifically, we show that higher personal income tax rates lead to strategic changes in real earnings management, such as increasing production and reducing discretionary spending, as a means to enhance reported earnings and protect CEOs' after-tax income. We further document that this response is asymmetric: tax increases generate a pronounced rise in real earnings management, whereas tax cuts do not lead to a comparable decline. This asymmetry is not consistent with the predictions of an expected utility framework and is more in line with prospect theory, which models managers as reference-dependent and loss-averse. The evidence therefore adds a distinct, reporting-driven operating channel to the literature on tax-induced distortions in managerial decision-making (e.g. Ales and Sleet, 2016; Diamond and Saez, 2011) and shows that the effects of tax increases and tax cuts on reporting-related decisions are not symmetric.

This study also contributes to the literature on executive compensation and earnings management (e.g. Bergstresser and Philippon, 2006; Cheng and Warfield, 2005; Zang, 2012) by bringing personal income taxes into the incentive framework. Prior research shows that contracts placing greater weight on performance-sensitive pay, particularly equity-based incentives, are associated with stronger incentives to manage reported earnings. We build on this work by examining how CEOs' personal income tax rates shape real earnings management, and by tracing how tax-induced changes in reported performance are reflected in different components of pay. We find that increases in real earnings management following tax hikes are reflected mainly in subsequent non-equity incentive compensation, with little evidence that tax-induced increases in REM translate into higher realized equity- or option-based compensation. Our study shows that tax considerations directly affect earnings management as a means to align after-tax compensation with performance expectations. Taken together, these results provide a deeper understanding of how personal taxation interacts with governance and compensation to shape earnings management.

2. Theory and hypothesis development

2.1 Executive compensation and earnings management

A large body of theoretical and empirical work in corporate finance and accounting shows that executive compensation is a first-order driver of incentives to manage earnings. Agency theory and optimal contracting models predict that when pay is closely tied to short-term accounting outcomes or the stock price, managers capture more of the upside from higher reported performance but bear only part of the downside if manipulation is detected, which creates strong incentives to shift value over time or extract rents through misreporting (Jensen and Meckling, 1976; Holmstrom, 1979). In line with this mechanism, early studies on earnings-based bonus plans find that features such as bonus thresholds, caps and floors give managers incentives to shift earnings between periods so that reported performance falls in the bonus-paying range (Carter, Lynch and Zechman, 2009; Guidry, Leone and Rock, 1999; Healy, 1985; Holthausen *et al.*, 1995). Subsequent research shows that tying managerial wealth more closely to stock-price performance further increases the propensity to manage earnings. Cheng and Warfield (2005) find that managers with higher equity incentives from stock-based pay and share ownership are more likely to manage earnings to meet or beat analysts' forecasts and to sell shares after favourable earnings news. Bergstresser and Philippon (2006) show that firms whose CEOs have pay that is more sensitive to the stock price exhibit larger abnormal accruals and a higher incidence of suspect earnings that just meet salient benchmarks. Burns and Kedia (2006) document that the sensitivity of the CEO's option portfolio to the stock price is positively related to the likelihood of financial misreporting. Collectively, these studies support a simple agency-based mechanism: performance-sensitive compensation raises the private benefits from inflating earnings relative to the expected costs of detection, so earnings management, including through costly real actions, can be viewed as a rational, although value-destroying, response to the contract design.

2.2 Taxation on executive compensation

In the United States, most executive compensation is subject to ordinary income taxation. This includes salaries, bonuses and restricted stock units (RSUs), which are taxed when they vest. Stock options, both non-qualified and incentive stock options,

are taxed at the time of exercise or when the stock acquired through them is eventually sold. Additionally, performance-based and deferred compensation are generally treated as ordinary income as well (Scholes *et al.*, 2016). The Tax Cuts and Jobs Act of 2017 significantly tightened the long-standing \$1 million deduction cap on executive compensation under Section 162(m) of the Internal Revenue Code (IRC §162(m)) by eliminating the exception for performance-based pay and expanding the group of covered executives. Although there are exceptions for performance-based pay, these tax regulations highlight the broad application of ordinary income taxation to executive compensation in the U.S. and emphasize the importance of understanding how income tax affects executive decision-making.

Taxation is an external factor that acts as a significant shock to corporate executives, and it is crucial to recognise that the consequences of these tax changes are primarily borne by the executives themselves. Prior research indicates that changes in personal tax rates do not typically trigger substantial renegotiations of executive compensation contracts. Frydman and Molloy (2011), for example, analyzed a sample of top executives from 50 large firms between 1946 and 2005, finding minimal adjustments in executive pay in response to changes in federal tax rates on labour income. Other studies similarly report that fluctuations in income tax rates have limited effects on CEO compensation (Goolsbee, 2000; Hall and Liebman, 2000; Rose and Wolfram, 2002). Without significant renegotiation of compensation packages, personal income taxes exert a direct and substantial impact on executives' wealth. These taxes influence CEOs' financial incentives and, consequently, their decision-making behaviour, underscoring the importance of examining the broader effects of personal tax policies on corporate governance and performance.

2.3 Substitution vs expropriation

Competing views on managerial preferences imply two contrasting effects of personal income tax on earnings management. The substitution view posits that when personal income tax rates increase, managers become more passive because their after-tax compensation becomes less responsive to firm performance and stock price movements (Agarwal *et al.*, 2021; Atkinson and Stiglitz, 2015; Gaertner, 2014). Higher personal income taxes reduce the share of firm-generated surplus that accrues to managers, weakening their incentives to exert effort in general and to undertake costly

misappropriation or manipulation activities in particular (Arnemann *et al.*, 2025). In our context, if higher personal taxes reduce the marginal after-tax gains from improving firm value, managers may have less incentive to engage in earnings manipulation and may instead be more willing to report underlying performance accurately (Dichev *et al.*, 2013; Jackson and Pitman, 2001).

In contrast, the expropriation view suggests that higher personal income taxes can spur rather than dampen manipulation. When tax rates rise, especially for top-bracket executives whose compensation has grown rapidly over recent decades, managers experience a large increase in their personal tax liabilities and face heightened liquidity needs to meet tax obligations (Mishel and Sabadish, 2013). To offset this loss in after-tax income, executives may actively engage in earnings management to protect or enhance their private benefits and to conceal opportunistic behaviour from outside stakeholders. A higher tax burden can induce managers to manipulate earnings to preserve their financial position, even at the expense of firm value (Cohen, Dey and Lys, 2008; Lin, Radhakrishnan and Su, 2006; Roychowdhury, 2006; Zang, 2012).

Which of these views dominates is an empirical question that depends on the contracting and governance environment. When compensation is highly performance-linked and monitoring is weak, executives have strong incentives to protect their private wealth and may respond to tax hikes by intensifying value-reducing actions that transfer resources from outside investors to themselves, consistent with the expropriation view. These arguments suggest that, where contracts strongly tie wealth to firm performance and monitoring is imperfect, personal tax hikes may strengthen managers' incentives to exploit less transparent channels, such as REM, to preserve their net-of-tax pay.

By contrast, the substitution view is more likely to prevail in environments with strong investor protection and effective governance, which raise the expected costs of opportunistic reporting and thereby reduce the marginal benefit of managing earnings when taxes increase. Leuz, Nanda and Wysocki (2003) show that earnings management is substantially lower in countries with stronger legal protection of outside investors, consistent with governance mechanisms that limit insiders' ability to extract private benefits and conceal firm performance.

2.4 Prospect theory and CEO tax responses

In a standard agency model with expected-utility (EUT) preferences and smooth adjustment costs, tax shocks should generate broadly symmetric behavioural responses to favourable versus unfavourable shocks. Specifically, if a higher personal tax rate strengthens the incentive to manage earnings, a correspondingly lower tax rate should weaken it to a similar extent. However, a large body of evidence suggests that the EUT framework does not adequately capture how individuals actually evaluate risky prospects (e.g. Barberis, 2013; Kahneman and Tversky, 1979; Machina, 1987), which calls into question its suitability for modelling the link between CEOs' personal tax exposure and real earnings management (REM).

In response to the limitations of EUT, descriptive models have been developed to better reflect behaviour under risk. One of the most influential is prospect theory, and its cumulative extension, which departs from EUT by assuming that outcomes are evaluated as gains or losses relative to a reference point and that losses loom larger than gains (Barberis, 2013; Kahneman and Tversky, 1979; Tversky and Kahneman, 1991). Prospect-theoretic models predict a characteristic pattern of risk attitudes: individuals tend to be risk-averse over high-probability gains but risk-seeking over high-probability losses.

A rise in the marginal personal income tax rate reduces the CEO's expected take-home pay for any given level of firm performance. Relative to the benchmark of an expected level of after-tax compensation, a personal tax increase places the executive in the loss domain. Because the prospect-theory value function is steeper in the loss domain than in the gain domain (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991), the disutility from a given drop in after-tax income is larger than the utility from an equivalent increase. Faced with a potential after-tax shortfall, a loss-averse CEO may therefore be willing to undertake value-reducing actions (such as REM) to keep reported earnings and bonus-relevant metrics at or above the levels needed to restore their expected net-of-tax payoff (Graham, Harvey and Rajgopal, 2006).

By contrast, a decrease in the personal income tax rate raises the CEO's expected after-tax pay for a given level of firm performance, moving the outcome into the gains domain. Keeping the existing level of REM already delivers an increase in after-tax

income relative to the reference point. Scaling back REM would require the CEO to accept a higher risk of missing performance benchmarks and a lower expected after-tax income in exchange for relatively small utility gains (e.g. slightly lower future distortion costs, and reduced regulatory and reputational risk). For a loss-averse CEO, this trade-off is unlikely to be attractive. Accordingly, we expect tax rate increases to trigger stronger upward REM, whereas tax cuts do not induce CEOs to symmetrically unwind their use of REM. We therefore predict an asymmetric effect of CEO personal income tax changes on real earnings management: increases in personal tax rates are associated with stronger upward REM, whereas tax cuts have a much weaker offsetting effect.

3. Data and methodology

3.1 Data and sample selection

We construct our sample by integrating data from several sources. We begin with executives in the ExecuComp database over the period 1992-2019. Following Armstrong *et al.* (2019), we obtain federal and state personal income tax rates from the NBER TAXSIM files and determine executives' office locations annually using firms' 10-K filings from EDGAR. Firm-level accounting data are from Compustat, stock returns from CRSP, and institutional ownership from the Thomson Reuters 13F database.

Consistent with prior studies, we exclude financial firms (SIC 6000-6999), firms located or incorporated outside the U.S., and firm-year observations with missing or negative assets or sales. We also remove penny stocks, defined as firm-years with stock prices below \$1. To construct state-level controls, we use gross state product from the U.S. Bureau of Economic Analysis, union membership rates from Unionstats, unemployment rates from the U.S. Bureau of Labor Statistics, and presidential election results from MIT Election Data and Science Lab. Our final sample consists of 24,212 firm-year observations.

3.2 CEO personal income tax measure

Following Armstrong *et al.* (2019), we define managerial income taxes (*CEO_MTR*) as the combined marginal tax rate on personal income for individuals in the highest federal and state tax brackets. The rate is calculated assuming a married couple with \$150,000 in deductible property tax and accounting for the deductibility of state income taxes where applicable. Personal income tax rates are sourced from the NBER TAXSIM.¹

Managerial income taxes vary across both time and states during the sample period from 1992 to 2019, with around 60% of the total variation coming from time-series changes and the remainder from cross-sectional differences.² Table 1 reports average *CEO_MTR* by year alongside the top federal rate and shows that our measure captures the effects of the main federal tax reforms over this period (the 1993 Omnibus Budget Reconciliation Act, the Jobs and Growth Tax Relief Reconciliation Act of 2003, the 2012 American Taxpayer Relief Act and the 2017 Tax Cuts and Jobs Act). Figure B.1 in Appendix B plots the average *CEO_MTR* by state and illustrates the cross-sectional dispersion in personal tax rates. The interquartile range of *CEO_MTR* is around 2-4 percentage points each year, indicating economically meaningful cross-state dispersion.

Table 1. *CEO Personal income tax rates by year*

Year	Manager_Tax (combined Top Federal + Top State)						Top Federal Tax Only	
	N	Mean	Median	SD	25th	75th		
1992	32	0.363	0.366	0.024	0.350	0.381	0.310	OBRA
1993	435	0.444	0.445	0.022	0.426	0.456	0.396	
1994	611	0.443	0.445	0.022	0.426	0.456	0.396	
1995	655	0.443	0.445	0.022	0.426	0.454	0.396	
1996	687	0.441	0.445	0.019	0.426	0.451	0.396	
1997	710	0.441	0.445	0.019	0.426	0.451	0.396	
1998	750	0.441	0.445	0.019	0.426	0.451	0.396	
1999	772	0.442	0.445	0.020	0.426	0.456	0.396	
2000	786	0.442	0.445	0.020	0.426	0.457	0.396	
2001	804	0.437	0.440	0.020	0.421	0.452	0.391	
2002	854	0.432	0.435	0.020	0.416	0.447	0.386	JGTRRA
2003	876	0.397	0.401	0.021	0.380	0.413	0.350	
2004	895	0.397	0.400	0.022	0.381	0.416	0.350	
2005	849	0.398	0.400	0.024	0.381	0.416	0.350	
2006	878	0.393	0.396	0.023	0.377	0.409	0.350	
2007	1,077	0.394	0.396	0.024	0.377	0.410	0.350	
2008	1,050	0.390	0.393	0.024	0.373	0.405	0.350	
2009	1,070	0.392	0.393	0.025	0.373	0.412	0.350	

2010	1,089	0.388	0.389	0.025	0.370	0.408	0.350	
2011	1,080	0.389	0.389	0.024	0.374	0.408	0.350	
2012	1,066	0.391	0.389	0.028	0.378	0.403	0.350	ATRA
2013	1,062	0.446	0.443	0.027	0.428	0.456	0.396	
2014	1,068	0.446	0.443	0.027	0.428	0.462	0.396	
2015	1,058	0.444	0.442	0.027	0.428	0.454	0.396	
2016	1,070	0.444	0.443	0.027	0.428	0.454	0.396	
2017	998	0.444	0.441	0.027	0.427	0.454	0.396	TCJA
2018	1,000	0.428	0.421	0.041	0.402	0.440	0.370	
2019	930	0.427	0.420	0.041	0.402	0.440	0.370	
Total	24,212	0.421	0.421	0.024	0.404	0.435		

Note: This table presents descriptive statistics for yearly average *CEO_MTR* value. The sample covers data for 50 U.S. states plus DC from 1992 to 2019.

3.3 Empirical design

To test the relationship between CEO personal income tax rates and real earnings management, we estimate the following panel regression:

$$REM_{i,t} = \alpha + \beta CEO_MTR_{i,t} + \gamma Control_{i,t} + f_i + \tau_t + \varepsilon_{i,t} \quad (1)$$

where i indexes the firm, and t denotes the year. $REM_{i,t}$ denotes each of our real earnings management measures, and $CEO_MTR_{i,t}$ is the combined marginal personal income tax rate faced by the CEO. We derive our measures of real earnings management based on the approach used in previous studies (Cheng, Lee and Shevlin, 2016; Huang, Roychowdhury and Sletten, 2020). Specifically, we employ three individual metrics, abnormal cash flow from operations (REM_CFO), abnormal production costs (REM_PROD), and abnormal discretionary expenses (REM_DISX), and three aggregate metrics ($REM1$, $REM2$ and $REM3$).³ The construction of the REM proxies is described in Appendix A.

The vector $Control_{i,t}$ includes time-varying characteristics at the CEO, firm and state levels. Consistent with prior work (Ali and Zhang, 2015; Black *et al.*, 2017; Cheng, Lee and Shevlin, 2016; Cohen *et al.*, 2020; Ham *et al.*, 2017; Heathcote, Storesletten and Violante, 2017; Huang, Roychowdhury and Sletten, 2020; Ljungqvist, Zhang and Zuo, 2017; Ramalingegowda, Utke and Yu, 2021), we control for CEO equity incentives, age, gender, tenure and cash-based compensation, as well as firm size, market-to-book ratio, leverage, profitability, cash holdings, sales growth, institutional ownership, stock

returns and accrual-based earnings management. To capture state-level tax, economic and political conditions, we additionally include tax progressivity, corporate income tax rate, gross state product, union membership, state unemployment rate and political leaning for the firm's headquarters state. All variables are defined in Appendix A. We include firm fixed effects, f_i , and year fixed effects, τ_t , to absorb unobserved heterogeneity across firms and over time. Standard errors are clustered by executive and year.

Table 2 reports descriptive statistics for the variables used in the baseline regressions. All variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The REM proxies have means close to zero, consistent with their interpretation as abnormal components. CEOs in our sample face an average marginal personal income tax rate of about 42% and exhibit incentive, age and tenure profiles similar to those documented in related studies. Sample firms are large, moderately leveraged and profitable, with high institutional ownership, and the state-level variables display variation comparable to prior studies (Ali and Zhang, 2015; Armstrong *et al.*, 2019; Cohen *et al.*, 2020; Ham *et al.*, 2017).

Table 2. Descriptive statistics

	N	Mean	Median	SD	25th	75th
REM Measures						
<i>REM_CFO</i>	24,212	-0.095	-0.069	0.157	-0.154	-0.004
<i>REM_PROD</i>	23,928	-0.057	-0.048	0.219	-0.168	0.049
<i>REM_DISX</i>	24,212	0.098	0.071	0.265	-0.017	0.224
<i>REMI</i>	23,928	0.041	0.033	0.412	-0.136	0.241
<i>REM2</i>	24,212	0.003	0.011	0.260	-0.100	0.130
<i>REM3</i>	23,928	-0.054	-0.025	0.443	-0.249	0.162
CEO Characteristics						
<i>CEO_MTR</i>	24,212	0.421	0.425	0.035	0.397	0.445
<i>CEO_Vega</i>	24,212	3.466	3.790	1.917	2.367	4.902
<i>CEO_Age</i>	24,212	4.019	4.025	0.127	3.932	4.111
<i>CEO_Gender</i>	24,212	0.029	0.000	0.169	0.000	0.000
<i>CEO_Tenure</i>	24,212	1.669	1.792	0.930	1.099	2.398
<i>CEO_CashPay</i>	24,212	6.774	6.775	0.614	6.397	7.097
Firm Characteristics						
<i>Size</i>	24,212	7.408	7.300	1.605	6.232	8.460
<i>MTBV</i>	24,212	3.045	2.170	4.682	1.355	3.645
<i>Leverage</i>	24,212	0.345	0.153	0.708	0.019	0.393
<i>ROA</i>	24,212	0.044	0.052	0.129	0.022	0.089

<i>Surplus_Cash</i>	24,212	0.091	0.077	0.099	0.035	0.135
<i>SG</i>	24,212	0.117	0.073	0.329	-0.001	0.173
<i>Inst_Own</i>	24,212	0.730	0.767	0.214	0.599	0.892
<i>Return</i>	24,212	0.173	0.112	0.525	-0.114	0.349
<i>AEM</i>	24,212	0.074	0.051	0.078	0.022	0.099

State Characteristics						
<i>Tau</i>	24,212	0.081	0.089	0.036	0.072	0.103
<i>Corporate_Tax</i>	24,212	0.405	0.421	0.050	0.398	0.438
<i>Log(GSP)</i>	24,212	13.101	13.087	0.960	12.476	13.884
<i>Union_Mem</i>	24,212	13.280	14.700	6.077	6.900	17.100
<i>Unemploy</i>	24,212	5.911	5.392	2.064	4.483	6.892
<i>VotDemo%</i>	24,212	50.666	51.090	8.201	44.440	57.270

Note: This table presents the descriptive statistics for all the variables used in the primary analysis. Sample data were taken from a variety of datasets, including Compustat, ExecuComp and various datasets provided by governments and relevant non-profit organizations for the period between 1992 and 2019. Financial firms were excluded from the sample (SIC 6000-6999), as were penny stocks (firms with stock prices under \$1) and non-U.S. firms. The sample included all 50 U.S. states, plus DC as a separate area, for a total of 24,212 observations. All variables were winsorized at the 1st and 99th percentile values. All variables are defined in Appendix A.

4. Empirical findings

4.1 CEO personal income tax on earnings management

Table 3 presents regression results examining the effect of CEO personal income tax rates on real earnings management. Columns (1)-(3) report estimates for the three aggregate REM proxies (*REM1*, *REM2* and *REM3*), and columns (4)-(6) report estimates for the individual REM metrics (*REM_CFO*, *REM_PROD* and *REM_DISX*). Across all specifications, the coefficient on *CEO_MTR* is positive and statistically significant at the 1% level, indicating that higher CEO personal income tax rates are associated with greater real earnings management.^{4,5,6} The magnitudes are economically meaningful. A one-standard-deviation increase in *CEO_MTR* is associated with increases in *REM1*, *REM2* and *REM3* of approximately 0.023, 0.015 and 0.031 units, corresponding to about 6-7% of their respective standard deviations, implying that personal tax considerations can lead CEOs to make sizeable adjustments to firms' reporting-driven real activities.

When we decompose real earnings management into its three components, we obtain a more detailed picture of how CEOs adjust reporting-driven real activities in response to higher personal taxes. The coefficient on *CEO_MTR* for *REM_CFO* suggests that CEOs use sales-boosting actions that temporarily inflate revenues at the expense of

contemporaneous cash flows, for example through price discounts or more generous credit terms. The positive association with *REM_PROD* indicates greater overproduction: firms expand output relative to demand, spreading fixed costs over a larger volume to improve reported margins, but at the cost of higher inventory and production costs. Finally, the strong response of *REM_DISX* shows that CEOs also cut discretionary expenditure, such as advertising, R&D and other non-essential spending, to reduce current-period expenses and lift reported earnings. Taken together, these patterns imply that higher personal tax rates lead CEOs to rely on a set of real activities to manage reported performance, rather than on a single adjustment margin. Overall, the evidence in Table 3 supports our main hypothesis that higher CEO personal income tax rates are associated with more intensive real earnings management.

Table 3. CEO Personal Income Taxes and Real Earnings Management

Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>	(4) <i>REM_CFO</i>	(5) <i>REM_PROD</i>	(6) <i>REM_DISX</i>
<i>CEO_MTR</i>	0.660*** (3.310)	0.442*** (3.405)	0.877*** (4.252)	0.241*** (2.775)	0.462*** (4.244)	0.306** (2.171)
<i>Size</i>	0.065*** (12.473)	0.029*** (7.927)	0.035*** (6.393)	-0.028*** (-12.803)	0.007** (2.563)	0.056*** (15.055)
<i>MTBV</i>	-0.001*** (-2.701)	-0.001*** (-2.775)	-0.002*** (-3.284)	-0.001** (-2.355)	-0.001*** (-3.004)	-0.001*** (-3.439)
<i>Leverage</i>	-0.005* (-1.870)	-0.009*** (-4.568)	-0.010*** (-3.571)	-0.005*** (-3.137)	-0.001 (-0.363)	-0.005** (-2.521)
<i>ROA</i>	-0.072** (-2.548)	0.068*** (3.144)	-0.112*** (-2.600)	-0.041 (-1.342)	-0.174*** (-5.462)	0.076*** (2.858)
<i>Surplus_Cash</i>	-0.471*** (-11.280)	-0.956*** (-27.586)	-1.198*** (-24.438)	-0.733*** (-35.302)	-0.242*** (-10.956)	-0.279*** (-8.651)
<i>SG</i>	-0.078*** (-7.744)	-0.124*** (-12.303)	-0.121*** (-10.206)	-0.046*** (-8.167)	0.002 (0.433)	-0.106*** (-11.086)
<i>Inst_Own</i>	-0.006 (-0.426)	-0.007 (-0.730)	-0.019 (-1.275)	-0.015** (-2.405)	-0.014* (-1.938)	0.006 (0.624)
<i>Return</i>	-0.008** (-2.055)	-0.014*** (-4.900)	-0.019*** (-4.756)	-0.011*** (-6.258)	-0.005*** (-2.726)	0.003 (0.995)
<i>AEM</i>	-0.129*** (-3.746)	-0.109*** (-3.306)	-0.191*** (-4.920)	-0.069*** (-3.088)	-0.090*** (-5.834)	-0.125*** (-4.159)
<i>CEO_Vega</i>	0.001 (0.626)	0.001 (0.968)	0.001 (0.473)	-0.000 (-0.097)	-0.000 (-0.129)	0.001 (1.183)
<i>CEO_Age</i>	0.038* (1.900)	0.056*** (4.034)	0.058*** (2.768)	0.024*** (2.769)	0.011 (1.019)	0.064*** (4.523)
<i>CEO_Gender</i>	-0.015 (-1.080)	-0.006 (-0.718)	-0.008 (-0.544)	0.006 (1.184)	-0.001 (-0.121)	-0.016 (-1.611)
<i>CEO_Tenure</i>	-0.004* (-1.716)	-0.005*** (-3.548)	-0.006*** (-2.601)	-0.003*** (-2.704)	-0.001 (-1.013)	-0.007*** (-4.566)
<i>CEO_CashPay</i>	-0.005 (-1.240)	-0.003 (-0.855)	-0.006 (-1.373)	-0.000 (-0.190)	-0.005** (-2.125)	0.002 (0.610)
<i>Tau</i>	-0.035 (-0.582)	-0.052 (-1.254)	-0.117* (-1.862)	-0.094*** (-3.354)	-0.075** (-2.264)	0.021 (0.494)
<i>Corporate_Tax</i>	0.053 (0.469)	-0.162** (-2.101)	-0.098 (-0.828)	-0.162*** (-2.971)	0.068 (1.060)	-0.055 (-0.718)
<i>Log(GSP)</i>	-0.013 (-1.269)	-0.014* (-1.901)	-0.009 (-0.805)	0.003 (0.728)	0.005 (0.826)	-0.019*** (-2.576)

<i>Union_Mem</i>	-0.005*** (-4.955)	-0.002** (-2.401)	-0.003*** (-3.355)	0.002*** (3.777)	-0.002*** (-3.413)	-0.003*** (-4.185)
<i>Unemploy</i>	-0.002 (-1.167)	0.001 (0.592)	0.003 (1.316)	0.005*** (5.773)	0.002 (1.638)	-0.005*** (-3.875)
<i>VotDemo%</i>	0.003*** (4.619)	0.001** (2.344)	0.002*** (3.891)	-0.000 (-1.171)	0.001*** (4.560)	0.002*** (5.211)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.800	0.752	0.811	0.710	0.796	0.761
Obs.	23,925	24,212	23,925	24,212	23,925	24,212

Note: This table reports the relationship between REM and CEO personal tax. Columns (1)-(3) present results for the three aggregate REM proxies (*REM1*, *REM2* and *REM3*). Columns (4)-(6) show the results for the three individual REM metrics (*REM_CFO*, *REM_PROD* and *REM_DISX*). *REM1* is constructed from abnormal cash flow from operations (*REM_CFO*) and abnormal production costs (*REM_PROD*), *REM2* from abnormal production costs (*REM_PROD*) and abnormal discretionary expenses (*REM_DISX*), and *REM3* from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. The independent variable is the CEOs' marginal personal income tax rate (*CEO_MTR*). Financial firms were excluded from the sample (SIC 6000-6999), as were penny stocks (firms with stock prices under \$1) and non-U.S. firms. The sample covers 50 U.S. states, plus DC, for the period 1992 to 2019, for a total of 24,212 observations. All variables are defined in Appendix A. All specifications include both firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** are used to denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

4.2 Difference-in-differences analysis using tax variations

To further support our baseline results, we conduct a difference-in-differences (DID) analysis using staggered state-level personal income tax changes as plausibly exogenous shocks to CEO personal tax rates. The staggered timing of these state-level tax changes allows us to identify valid control firms that serve as counterfactual benchmarks for the evolution of real earnings management in the absence of tax adjustments. This approach helps address potential endogeneity concerns, such as unobserved factors influencing both tax rates and earnings management decisions, thereby lending a more causal interpretation to our findings.⁷

Following Giroud and Rauh (2019), we focus on major tax changes that result in at least a 100 basis point increase or decrease in personal income tax rates. We use a five-year window around these tax events, spanning two years before and two years after the tax change, to avoid potential issues of treatment reversals (e.g. tax increases in New York in 2009 followed by reductions in 2012, or tax hikes in Oregon in 2008 followed by cuts in 2011). We examine tax increases and decreases separately to isolate their distinct effects on real earnings management. Specifically, we estimate the following regression model:

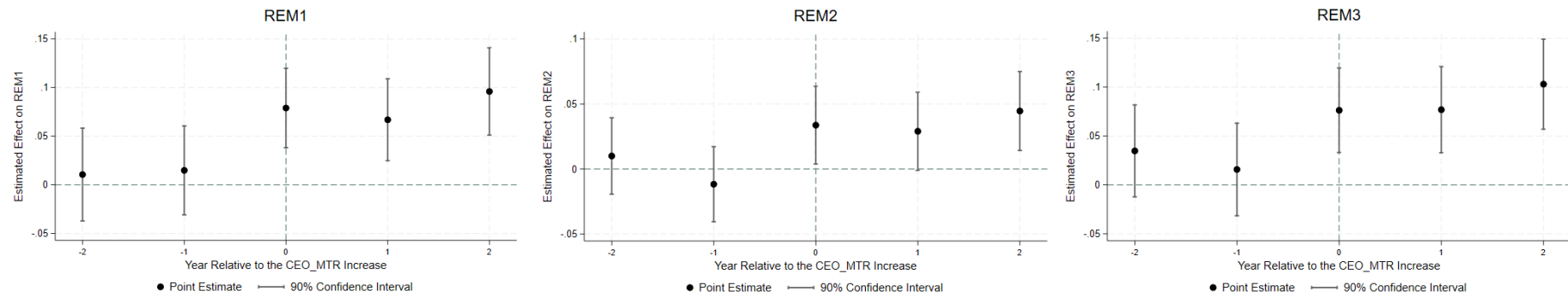
$$REM_{i,t} = \mu_0 + \theta Treatment(Inc/Dec)_{i,t} + \gamma Control_{i,t} + f_i + \tau_t + \varepsilon_{it} \quad (2)$$

where $REM_{i,t}$ denotes each of our three aggregate measures of real earnings management and $Treatment(Inc/Dec)_{i,t}$ is a dummy variable equal to one in the post-event period for CEOs whose companies are headquartered in states that experienced a significant increase (or decrease) in personal income tax and zero otherwise. The vector $Control_{i,t}$ includes the same time-varying firm-, CEO- and state-level controls as in Equation (1). We include firm fixed effects f_i and year fixed effects τ_t and use robust standard errors clustered by executive and year. Additionally, we follow Bertrand and Mullainathan (2003) and employ a dynamic treatment model to trace the timing and persistence of CEOs' real earnings management responses to tax changes. Specifically, we re-estimate Equation (2) using a set of four dummy variables that capture different time periods relative to the tax change: (1) one year before, (2) the year of, (3) one year after, and (4) two years after the tax rate adjustment.

We assess the parallel-trends assumption by examining the timing of REM changes relative to the tax change year and plotting the estimated coefficients with 90% confidence intervals (Figure 1, Panels A-B), separately for tax increases and tax decreases. The coefficients for the pre-change years are not statistically different from zero, indicating no differential pre-trends between treated and control firms and thereby supporting the parallel-trends assumption.

Table 4 presents the results for tax increases and decreases separately. Columns (1), (3) and (5) in Panel A show that the coefficient on $Treatment(Inc)$ is positive and statistically significant across all three measures of real earnings management.^{8,9} These findings are consistent with our baseline results that higher personal income tax rates are associated with increased real earnings management. By contrast, in Panel B we do not find statistically significant coefficients for major tax cuts, suggesting that reductions in CEO personal tax rates do not lead to a corresponding decline in real earnings management. Collectively, these results indicate that executives respond asymmetrically to tax rate changes, consistent with the notion that loss aversion strengthens their incentives to engage in real earnings management following an increase in personal income tax rates.

Panel A. Tax rate increases



Panel B. Tax rate decreases

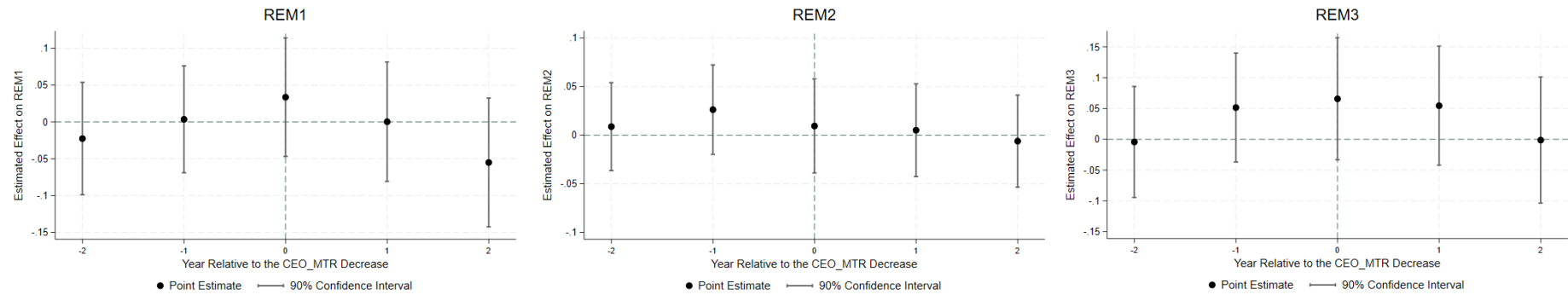


Figure 1. Dynamics of real earnings management around major personal income tax rate changes

Note: This figure plots the coefficient estimates of β_m from the following DID model:

$$REM_{it} = \alpha + \sum_{m=-2}^2 \beta_m \text{Treatment(Inc/Dec)}_{it}^m + f_i + \tau_t + \varepsilon_{it}$$

where REM_{it} is one of the three aggregate REM measures (REM1, REM2 and REM3). REM1 is constructed from abnormal cash flow from operations and abnormal production costs, REM2 from abnormal production costs and abnormal discretionary expenses, and REM3 from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. $\text{Treatment(Inc/Dec)}_{it}^m$ is a dummy variable equal to one if it is the m^{th} year relative to a major personal income tax rate change in the states where the CEOs' firms are headquartered, and 0 otherwise. η_i and γ_t denote firm and year fixed effects, respectively. The sample is restricted to the window $[-3, +2]$ around each tax change, and the year $m=-3$ is omitted and serves as the reference category. Standard errors are clustered by executive and year. Panel A reports results for tax-rate increases, and Panel B reports results for tax-rate decreases. Within each panel, REM1-REM3 are alternative proxies for real earnings management defined in Appendix A. The x-axis shows event time m , the y-axis shows the estimated effect on the corresponding REM measure. The dots in the figures represent the estimated coefficients β_m , and the vertical bars denote their corresponding 90% confidence intervals.

Table 4. DID analysis of major state tax changes

<i>Panel A. Major state tax changes (Increases)</i>						
Variables	(1) <i>REM1</i>	(2) <i>REM1</i>	(3) <i>REM2</i>	(4) <i>REM2</i>	(5) <i>REM3</i>	(6) <i>REM3</i>
<i>Treatment(Inc)</i>	0.028*** (3.877)		0.019*** (3.680)		0.030*** (4.010)	
<i>Treatment(Inc)</i> ⁻¹		0.012 (1.061)		-0.007 (-0.927)		0.002 (0.148)
<i>Treatment(Inc)</i> ⁰		0.029*** (2.673)		0.006 (0.776)		0.018 (1.550)
<i>Treatment(Inc)</i> ⁺¹		0.032*** (2.833)		0.017** (2.071)		0.028** (2.383)
<i>Treatment(Inc)</i> ⁺²		0.052*** (4.489)		0.022*** (2.733)		0.047*** (3.812)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.826	0.826	0.774	0.774	0.827	0.828
Obs.	7,391	7,391	7,465	7,465	7,391	7,391
<i>Panel B. Major state tax changes (Decreases)</i>						
Variables	(1) <i>REM1</i>	(2) <i>REM1</i>	(3) <i>REM2</i>	(4) <i>REM2</i>	(5) <i>REM3</i>	(6) <i>REM3</i>
<i>Treatment(Dec)</i>	0.005 (0.459)		0.005 (0.759)		0.013 (1.123)	
<i>Treatment(Dec)</i> ⁻¹		-0.016 (-1.191)		-0.010 (-1.141)		-0.015 (-1.079)
<i>Treatment(Dec)</i> ⁰		0.003 (0.269)		-0.011 (-1.273)		-0.008 (-0.577)
<i>Treatment(Dec)</i> ⁺¹		0.005 (0.361)		-0.004 (-0.364)		0.008 (0.518)
<i>Treatment(Dec)</i> ⁺²		-0.004 (-0.260)		0.000 (0.026)		0.000 (0.013)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.833	0.833	0.783	0.783	0.836	0.836
Obs.	5,802	5,802	5,868	5,868	5,802	5,802

Note: This table shows the results of DID analysis for the relationships between REM and state-level large tax shocks, and the periods before and after such tax shocks. The Treatment group (*Treatment*) comprises companies headquartered in states where a tax increase (decrease) of at least 1% occurred within a single year. Our control sample (*Treat*=0) comprises companies headquartered in states with no changes in individual income tax rates from 1992 to 2019. The treatment variables reflect a five-year window [-2, +2] around every large tax shock (increase or decrease) in a given state. Panel A (Panel B) shows the relationship between the three aggregate proxies and these large tax shock increases (decreases). The dependent variables are *REM1* (Column (1)-(2)), *REM2* (Column (3)-(4)) and *REM3* (Column (5)-(6)). *REM1* is constructed from abnormal cash flow from operations and abnormal production costs, *REM2* from abnormal production costs and abnormal discretionary expenses, and *REM3* from all three components. *Treatment(Inc/Dec)* is a dummy variable equal to one in the post-event period if the headquartered state is subject to a tax increase (decrease) of more than 100 basis points in a year, and zero otherwise. *Treatment(Inc/Dec)*⁰ is a dummy variable equal to one in the fiscal year of a tax increase (decrease) of more than 100 basis points in the state where the firm is headquartered, and zero otherwise. *Treatment(Inc/Dec)*⁻¹ is a dummy variable equal to one in the first year before a tax increase (decrease) of more than 100 basis points in the state where the firm is headquartered, and zero otherwise. *Treatment(Inc/Dec)*⁺¹ (*Treatment(Inc/Dec)*⁺²) is a dummy variable equal to one in the first (second) year after a tax increase (decrease) of more than 100 basis points in the state where the firm is

headquartered, and zero otherwise. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** are used to denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

4.3 Suspect firm analysis

To shed further light on how CEOs use REM around key performance benchmarks and on the asymmetric response to tax changes, we adopt a suspect-firm design. This approach serves two related purposes. First, it allows us to test whether CEOs respond to higher personal tax rates by using real earnings management to achieve earnings targets when their firms are close to meeting analysts' forecasts, avoiding losses, or just beating prior-year earnings. Second, it provides a sharper test of the prospect-theoretic prediction that the asymmetric response of REM to tax changes should be strongest around such thresholds.

Following Cohen, Dey and Lys (2008), we classify “suspect” firms as those that (i) just meet or slightly beat analysts' EPS forecasts, (ii) just avoid a loss, or (iii) just exceed prior-year earnings, and we interact the tax-shock indicators with this Suspect dummy. The results in Table 8 show a clear asymmetry. Across all REM measures, the *Treatment (Inc) × Suspect* interaction is positive and statistically significant, whereas the *Treatment (Dec) × Suspect* interaction is small and statistically indistinguishable from zero. In other words, when firms are close to all three earnings thresholds, higher personal taxes are associated with additional REM, but tax cuts do not induce a corresponding reduction.

This pattern is consistent with the prospect theory-based explanation developed above. Missing an earnings benchmark entails a discrete loss in expected after-tax compensation, whereas just meeting it preserves that payoff. Tax increases push CEOs into a loss domain in which avoiding such discrete losses becomes particularly salient, strengthening their willingness to use REM to stay above the thresholds. Tax cuts, by contrast, place CEOs further into the gains domain, where scaling back REM would lower expected after-tax income and increase the risk of missing those thresholds. Taken together, the suspect-firm evidence corroborates the prospect theory-based

explanation for the asymmetric tax-REM response documented in our difference-in-differences analysis.

Table 5 Suspect firm analysis

Panel A. Suspect firm (EPS just beat analysts' forecasts)

Panel A.1 Major state tax changes (Increases)			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>Treatment(Inc)</i>	0.021*** (2.618)	0.012** (2.101)	0.021** (2.562)
<i>Suspect</i>	-0.005 (-0.811)	0.000 (0.036)	-0.006 (-0.957)
<i>Treatment(Inc) × Suspect</i>	0.029** (2.136)	0.025*** (2.806)	0.033** (2.434)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.826	0.782	0.831
Obs.	7,281	7,353	7,281

Panel B.1 Major state tax changes (Decreases)			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>Treatment(Dec)</i>	0.001 (0.080)	0.004 (0.551)	0.009 (0.737)
<i>Suspect</i>	-0.007 (-1.039)	-0.000 (-0.070)	-0.007 (-0.996)
<i>Treatment(Dec) × Suspect</i>	0.010 (0.667)	-0.003 (-0.271)	0.001 (0.097)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.831	0.789	0.838
Obs.	5,707	5,771	5,707

Panel B. Suspect firm (Avoid losses)

Panel B.1 Major state tax changes (Increases)			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>Treatment(Inc)</i>	0.026*** (3.617)	0.018*** (3.486)	0.028*** (3.758)
<i>Suspect</i>	-0.006 (-0.463)	-0.002 (-0.276)	-0.001 (-0.047)
<i>Treatment(Inc) × Suspect</i>	0.092** (2.192)	0.046* (1.687)	0.090** (2.157)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.826	0.774	0.828
Obs.	7,391	7,465	7,391

Panel B.2 Major state tax changes (Decreases)

Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>Treatment(Dec)</i>	0.005 (0.452)	0.006 (0.780)	0.013 (1.144)
<i>Suspect</i>	0.008 (0.573)	-0.004 (-0.489)	0.006 (0.429)
<i>Treatment(Dec) × Suspect</i>	-0.003 (-0.073)	-0.004 (-0.163)	-0.013 (-0.312)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.833	0.783	0.836
Obs.	5,802	5,868	5,802

Panel C. Suspect firm (Earnings just beat prior year earnings)

Panel C.1 Major state tax changes (Increases)

Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>Treatment(Inc)</i>	0.024*** (3.302)	0.016*** (3.016)	0.026*** (3.378)
<i>Suspect</i>	-0.011 (-1.199)	-0.004 (-0.723)	-0.014 (-1.523)
<i>Treatment(Inc) × Suspect</i>	0.044* (1.869)	0.037** (2.357)	0.050** (2.179)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.826	0.774	0.828
Obs.	7,391	7,465	7,391

Panel C.2 Major state tax changes (Decreases)

Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>Treatment(Dec)</i>	0.004 (0.377)	0.005 (0.728)	0.012 (1.056)
<i>Suspect</i>	-0.010 (-1.008)	-0.001 (-0.253)	-0.010 (-1.024)
<i>Treatment(Dec) × Suspect</i>	0.011 (0.508)	0.002 (0.103)	0.008 (0.327)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.833	0.783	0.836
Obs.	5,802	5,868	5,802

Note: This table reports the results of the suspect-firm analysis, examining whether the impact of major state personal income tax changes on real earnings management is stronger when firms are close to key earnings thresholds. The dependent variables are the three aggregate REM measures (*REM1*, *REM2* and *REM3*). *REM1* is constructed from abnormal cash flow from operations and abnormal production costs, *REM2* from abnormal production costs and abnormal discretionary expenses, and *REM3* from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. *Treatment(Inc/Dec)* is a dummy variable equal to one in the post-event period if the headquartered state is subject to a tax increase (decrease) of more than 100 basis points in a year, and zero otherwise. Following Cohen, Dey and Lys (2008), *Suspect* equals one if the firm just meets or slightly beats the relevant benchmark and zero otherwise. Panel A defines *Suspect* based on just meeting or narrowly beating analysts' EPS forecasts, Panel B based on just avoiding a loss, and Panel C based on just exceeding prior-year earnings. The Treatment group (*Treatment*) comprises companies

headquartered in states where a tax increase (decrease) of at least 1% occurred within a single year. Our control sample (Treat=0) comprises companies headquartered in states with no changes in individual income tax rates from 1992 to 2019. The treatment variables reflect a five-year window [-2, +2] around every large tax shock (increase or decrease) in a given state. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by firm and year. The markers *, ** and *** denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

5. Cross-sectional analyses

In this section, we further investigate the relationship between personal income tax rates and real earnings management by examining cross-sectional variation in CEO and firm characteristics. This cross-sectional approach allows us to identify differential effects of tax rate changes on executives' earnings management behaviour, providing deeper insights into how tax policy interacts with corporate decision-making.

5.1 CEOs' intentions to engage in REM

As highlighted by Goldman and Ozel (2023), changes in income tax rates directly affect executives' personal tax liabilities and their need for liquidity to meet tax obligations, with important economic consequences for cash flows. Their estimates imply that a one-percentage-point increase in income tax rates raises an insider's tax liability by approximately \$34,272. Consequently, we hypothesize that executives may be incentivized to engage in real earnings management to address heightened tax liabilities and liquidity demands, with stronger effects for those facing heavier tax burdens and lower cash reserves.

To proxy CEOs' personal tax burden, we follow Yost (2018) and construct a percentage-based measure of the capital tax burden on equity-related income. For senior executives, capital income from equity holdings often represents a substantial share of overall economic income and tax liability, so higher values of this measure indicate stronger personal tax pressure and are expected to be associated with stronger incentives to use real earnings management to meet liquidity needs. We also construct a proxy for CEOs' cash reserves to capture cross-sectional differences in personal liquidity for our liquidity-based tests.

In Panel A of Table 6, the coefficient on *CEO_MTR* remains statistically significant. However, we find limited evidence of a direct effect of executives' capital tax burdens on real earnings management, potentially reflecting deductions, credits and tax planning strategies that mitigate the impact of capital taxes. More importantly, the interaction term *CEO_MTR* $\times$ *Tax_Burden* is consistently positive and significant across all three columns, indicating that the effect of changes in CEOs' personal income tax rates on REM is stronger when their personal tax burden is higher. Panel B of Table 6 extends the baseline to include CEO's personal cash reserves (*CEO_Cash_Reserve*) and its interaction with *CEO_MTR*. The interaction term *CEO_MTR* $\times$ *CEO_Cash_Reserve* is negative and statistically significant for all three REM measures, indicating that the positive association between *CEO_MTR* and REM is stronger for CEOs with relatively low personal cash reserves. Overall, Table 6 supports our conjecture that changes in CEOs' personal income tax rates raise their tax liabilities and tighten their liquidity, leading to stronger use of real earnings management.

Table 6. Cross-sectional analyses: CEOs' intentions to engage in REM

<i>Panel A. CEO Tax Burden</i>			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.566*** (2.823)	0.392*** (3.001)	0.782*** (3.785)
<i>Tax_Burden</i>	0.002* (1.663)	0.001 (1.476)	0.003* (1.908)
<i>CEO_MTR</i> $\times$ <i>Tax_Burden</i>	0.103*** (3.511)	0.033* (1.671)	0.068** (2.165)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.801	0.755	0.813
Obs.	23,486	23,765	23,486
<i>Panel B. CEO Cash Reserve</i>			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.372** (1.997)	0.329*** (2.689)	0.741*** (3.889)
<i>CEO_Cash_Reserve</i>	-0.001 (-1.246)	-0.001** (-2.166)	-0.003*** (-3.947)
<i>CEO_MTR</i> $\times$ <i>CEO_Cash_Reserve</i>	-0.060* (-1.742)	-0.048** (-1.996)	-0.095*** (-2.602)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.798	0.751	0.812

Obs.	23,663	23,946	23,663
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Note: This table reports the results of managerial intentions for REM, examining how the impact of managerial tax rates on REM varies with CEOs' personal tax burden and liquidity needs. The dependent variables are the three aggregate REM measures (*REM1*, *REM2* and *REM3*). *REM1* is constructed from abnormal cash flow from operations and abnormal production costs, *REM2* from abnormal production costs and abnormal discretionary expenses, and *REM3* from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. *CEO_MTR* denotes the CEOs' marginal personal income tax rate. Panel A uses the CEO's personal tax burden (*Tax_Burden*) on CEOs' equity-related income, proxied by tax liabilities on vested stock holdings. Panel B includes CEOs' cash reserve (*CEO_Cash_Reserve*), which proxies for CEOs' personal cash holdings and thus their available liquidity. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** are used to denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

5.2 Governance mechanisms and managerial opportunism

As documented in our analyses, managers increase real earnings management when their personal tax burden rises, suggesting that they adjust real operating decisions to protect their after-tax income. It is therefore important to assess whether corporate governance mitigates this response. From an agency-theoretic perspective (Jensen and Meckling, 1976; Fama and Jensen, 1983), higher personal income taxes widen the conflict of interest between managers and shareholders by strengthening managers' incentives to use real activities manipulation, while strong internal and external governance reduces these agency costs by improving oversight and aligning managerial behaviour with shareholder interests. Stewardship theory (Donaldson and Davis, 1991) further suggests that internal governance not only monitors but also fosters trust and shared objectives, encouraging managers to prioritize long-term firm performance over short-term tax-driven gains. For external governance, institutional logics theory (Thornton and Ocasio, 1999) highlights that institutional investors and market-level monitoring embody norms valuing transparency and legitimacy and exert coercive and normative pressures that discourage opportunistic manipulation. Firms embedded in stronger external governance environments are therefore more likely to adhere to credible reporting practices that constrain real earnings management, even when individual incentives are distorted by tax considerations.

Consistent with Coles, Daniel and Naveen (2014) and Huang, Roychowdhury and Sletten (2020), we use board co-option (Co-option) to measure internal governance and

institutional ownership (*Inst_Own*) to capture external governance. *Co-option*, defined as the proportion of the board comprised of directors appointed after the CEO took office, reflects how closely the board is tied to the CEO. A higher value of *Co-option* indicates weaker internal monitoring and lower internal governance quality. For external governance, we focus on institutional ownership because institutional investors, as sophisticated stakeholders, tend to discourage behaviour that undermines long-term value. Roychowdhury (2006) documents a negative relation between institutional ownership and real activities manipulation to avoid financial losses. Based on this literature and our setting, we predict that as CEOs face higher personal income tax rates, real earnings management will be more pronounced in firms with a greater proportion of co-opted directors, and that higher institutional ownership will dampen the sensitivity of real earnings management to CEOs' personal taxes.

In Panel A of Table 7, $CEO_MTR \times Co_option$ is positive and statistically significant across all REM measures, indicating that the tax-REM relation is stronger when boards are more co-opted and internal governance is weaker. In Panel B, the coefficients on $CEO_MTR \times Inst_Own$ are negative and significant, suggesting that stronger external monitoring dampens the sensitivity of real earnings management to CEOs' personal tax rates. These findings underscore the importance of robust governance mechanisms, both internal and external, in curbing opportunistic managerial behaviour in response to personal tax pressures.

Table 7. Cross-sectional analyses: corporate governance

<i>Panel A. Board Effectiveness</i>			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.950*** (4.293)	0.736*** (5.206)	1.391*** (6.222)
<i>Co-option</i>	0.042*** (3.660)	0.019** (2.372)	0.033*** (2.833)
$CEO_MTR \times Co_option$	1.068*** (2.864)	0.569** (2.336)	0.953** (2.568)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.822	0.772	0.832
Obs.	16,012	16,190	16,012
<i>Panel B. Institutional Ownership</i>			

Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.420** (2.116)	0.332*** (2.582)	0.711*** (3.481)
<i>Inst_Own</i>	-0.009 (-0.594)	-0.007 (-0.636)	-0.025 (-1.524)
<i>CEO_MTR</i> × <i>Inst_Own</i>	-1.774*** (-3.088)	-1.548*** (-3.886)	-2.711*** (-4.472)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.800	0.752	0.811
Obs.	23,925	24,212	23,925

Note: This table reports the results for the impact of managerial tax rate on REM conditioning on corporate governance. The dependent variables are the three aggregate REM measures (*REM1*, *REM2* and *REM3*). *REM1* is constructed from abnormal cash flow from operations and abnormal production costs, *REM2* from abnormal production costs and abnormal discretionary expenses, and *REM3* from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. *CEO_MTR* denotes the CEOs' marginal personal income tax rate. Panel A and Panel B show the relationship between REM and managerial tax rates with corporate governance attributes. Panel A shows results based on board effectiveness (*Co-option*), as the proportion of the board comprised of directors appointed after the CEO took office, while Panel B reports results based on institutional ownership (*Inst_Own*), which for each firm is defined as the percentage of current outstanding shares owned by institutions. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** are used to denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

5.3 CEO heterogeneity

5.3.1 CEO power

To further examine the mechanism, we analyze whether CEOs' decision-making power moderates the relation between personal income tax and real earnings management. Prior research shows that powerful CEOs are more able and willing to undertake bold or extreme policies, including financial reporting choices, whereas less powerful CEOs are more constrained and cautious (Adams, Almeida and Ferreira, 2005; Bernile, Bhagwat and Yonker, 2018; Sah and Stiglitz, 1986, 1991). Weak monitoring of powerful CEOs is associated with a higher likelihood of misstatements and lower financial reporting quality (Efendi, Srivastava and Swanson, 2007; Feng *et al.*, 2011; Lisic *et al.*, 2019), suggesting that CEO power can magnify opportunistic responses to personal incentives.

Following Han, Nanda and Silveri (2016) and Tang, Crossan and Rowe (2011), we capture CEO power along three dimensions: expert power (*CEO_Tenure*), ownership

power (*CEO_Own*) and structural power (*CEO_PaySlice*). Detailed variable definitions are provided in Appendix A.

Table 8 reports regressions that interact *CEO_MTR* with each of these three power measures. Across all specifications, the interaction terms are positive and statistically significant, indicating that the positive association between CEOs' personal tax rates and real earnings management is stronger when CEOs hold greater expert, ownership, or structural power. These results suggest that CEO power amplifies the extent to which personal tax incentives are translated into reporting-driven real activities.

Table 8. Cross-sectional analyses: CEO power

Panel A. Expert power			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.330* (1.781)	0.320*** (2.623)	0.734*** (3.810)
<i>CEO_Tenure</i>	-0.003 (-0.464)	-0.005 (-1.090)	-0.003 (-0.443)
<i>CEO_MTR</i> × <i>CEO_Tenure</i>	0.252*** (3.340)	0.151*** (2.989)	0.262*** (3.328)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.800	0.752	0.811
Obs.	23,925	24,212	23,925
Panel B. Ownership power			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.379** (2.056)	0.341*** (2.799)	0.759*** (3.948)
<i>CEO_Own</i>	-0.001 (-1.505)	-0.000 (-0.535)	-0.000 (-0.179)
<i>CEO_MTR</i> × <i>CEO_Own</i>	0.059*** (2.712)	0.030** (2.053)	0.043* (1.850)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.800	0.752	0.811
Obs.	23,925	24,212	23,925
Panel C. Structural power			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.624*** (3.133)	0.421*** (3.244)	0.838*** (4.071)
<i>CEO_PaySlice</i>	0.001 (0.394)	0.002 (1.378)	0.002 (0.709)
<i>CEO_MTR</i> × <i>CEO_PaySlice</i>	0.158**	0.087*	0.161**

	(2.096)	(1.665)	(1.969)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.800	0.752	0.811
Obs.	23,908	24,195	23,908

Note: This table reports the results of the impact of managerial tax rate on REM conditioning on CEOs' power. The dependent variables are the three aggregate REM measures (*REM1*, *REM2* and *REM3*). *REM1* is constructed from abnormal cash flow from operations and abnormal production costs, *REM2* from abnormal production costs and abnormal discretionary expenses, and *REM3* from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. *CEO_MTR* denotes the CEOs' marginal personal income tax rate. Panel A shows the relationship between REM and *CEO_MTR* with CEO tenure (*CEO_Tenure*). Panel B shows the relationship between REM and *CEO_MTR* with percentage of total shares owned by CEO (*CEO_Own*). Panel C shows the relationship between REM and *CEO_MTR* with CEO Pay Slice (*CEO_PaySlice*). CEO Pay Slice is the fraction of total compensation of the CEO in comparison with the total compensation received by the other highest-level executives of the company. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** are used to denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

5.3.2 CEO cultural background

We next examine whether CEOs' cultural background shapes the effect of personal tax incentives on real earnings management. A growing literature shows that linguistic structures related to future-time reference (FTR) are associated with intertemporal choices and the willingness to trade off future for current outcomes (Chen, 2013; Kim, Kim and Zhou, 2017). CEOs from weak-FTR linguistic backgrounds, whose languages grammatically link the present and the future, tend to adopt a more long-term orientation. In line with this view, we expect the positive association between CEOs' personal tax rates and real earnings management to be weaker for weak-FTR than for strong-FTR CEOs, because long-term oriented CEOs are less willing to sacrifice future reputation or firm performance to accommodate short-term tax-related pressures.

To capture individual-level cultural traits, we follow Brochet et al. (2019) and Pan, Siegel and Wang (2020) to classify CEOs according to FTR, based on linguistic ancestry inferred from surnames. We define *CEO_Weak_FTR* as an indicator equal to one for CEOs whose ancestral language has a weak FTR that grammatically links the present and the future and zero otherwise. The results in Table 9 show that *CEO_MTR* $\times$ *CEO_Weak_FTR* is negative and statistically significant, indicating that the positive association between *CEO_MTR* and REM is weaker for CEOs from weak-FTR

backgrounds than for those from strong-FTR backgrounds. This is consistent with our prediction and with prior evidence that speakers of weak-FTR languages are more long-term oriented (Chen, 2013; Kim, Kim and Zhou, 2017).

Table 9. Cross-sectional analyses: CEO cultural background

Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.779*** (3.872)	0.490*** (3.736)	0.943*** (4.520)
<i>CEO_Weak_FTR</i>	-0.000 (-0.047)	-0.001 (-0.322)	0.003 (0.493)
<i>CEO_MTR</i> × <i>CEO_Weak_FTR</i>	-0.426*** (-3.992)	-0.168** (-2.239)	-0.244** (-2.154)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.800	0.752	0.811
Obs.	23,925	24,212	23,925

Note: This table examines the impact of CEO personal tax rate on real earnings management conditional on CEOs' culture background, proxied by CEOs' linguistic background (*CEO_Weak_FTR*) using the Future-Time Reference (FTR) classification. It equals one for CEOs whose native languages grammatically associate the future with the present. The dependent variables are the three aggregate REM measures (*REM1*, *REM2* and *REM3*). *REM1* is constructed from abnormal cash flow from operations and abnormal production costs, *REM2* from abnormal production costs and abnormal discretionary expenses, and *REM3* from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. *CEO_MTR* denotes the CEOs' marginal personal income tax rate. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

5.3.3 CEO gender

Motivated by evidence that male and female chief executives differ in preferences and compensation structures (Adams and Funk, 2012; Huang and Kisgen, 2013), we examine whether the sensitivity of real earnings management to personal tax exposure varies by CEO gender. We re-estimate our baseline specification including an indicator variable, *CEO_Gender*, equal to one for female CEOs and zero otherwise, and its interaction with *CEO_MTR*. As reported in Table 10, *CEO_MTR* × *CEO_Gender* is negative and statistically significant across all three REM measures, implying that the positive relation between personal income tax exposure and REM is attenuated for

female-led firms. This moderating pattern is consistent with prior work suggesting that female executives exhibit more conservative marginal responses to financial incentives and place relatively greater weight on longer-horizon considerations (Adams and Funk, 2012; Baixauli-Soler, Belda-Ruiz and Sánchez-Marín, 2015; Gómez-Mejía et al., 2019). Taken together, our results show that female CEOs are less responsive to personal tax incentives in shaping real reporting choices. We note that the share of female CEOs in our sample is small, so these estimates should be interpreted with appropriate caution, but the evidence is in line with theory and prior empirical work on gender-linked differences in incentives and behaviour.

Table 10. Cross-sectional analyses: CEO gender

Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>CEO_MTR</i>	0.417** (2.205)	0.388*** (3.112)	0.827*** (4.223)
<i>CEO_Gender</i>	-0.020 (-1.391)	-0.007 (-0.725)	-0.009 (-0.587)
<i>CEO_MTR</i> × <i>CEO_Gender</i>	-1.052** (-2.302)	-0.891*** (-3.143)	-1.185** (-2.480)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.797	0.750	0.810
No. of Observations	23,925	24,212	23,925

Note: This table reports the results for real earnings management and managerial income tax rates conditional on CEO gender (*CEO_Gender*). *CEO_Gender* equals one for female CEOs and zero for male CEOs. The dependent variables are the three aggregate REM measures (*REM1*, *REM2* and *REM3*). *REM1* is constructed from abnormal cash flow from operations and abnormal production costs, *REM2* from abnormal production costs and abnormal discretionary expenses, and *REM3* from all three components. For ease of interpretation, all REM measures are defined such that higher values indicate higher reported earnings. *CEO_MTR* denotes the CEOs' marginal personal income tax rate. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

6. Income realization channels

We have shown that CEO personal income taxes are associated with changes in real earnings management. A natural next step is to ask how these changes in REM translate into executives' realized income. When firms manage earnings upward, share prices

may rise, but executives must still take additional actions, such as exercising options and selling shares, to convert price gains into cash. By contrast, meeting performance thresholds mechanically triggers higher bonus and non-equity incentive payouts. To identify the operative channel, we implement a two-step analysis. In the first step, we estimate our baseline REM specification and decompose REM into two components: the fitted component associated with changes in the executive's marginal income tax rate (tax-induced REM, REM_Hat) and the residual component (REM_Resid), which captures variation in REM unrelated to tax changes. In the second step, we relate next-period pay outcomes to both REM_Hat and REM_Resid using firm and year fixed effects and the same set of controls as in the main specification. We examine three compensation outcomes in year $t+1$: realized cash incentives, defined as the natural logarithm of one plus the sum of bonus and non-equity incentive payments; option exercise value realized, defined as the natural logarithm of one plus the total dollar proceeds from sales of shares acquired through stock option exercises; and net equity sales, defined as the net dollar value of the CEO's open-market trades in previously held firm shares, excluding option-related transactions, scaled by the stock's total dollar trading value in that year (Chen et al., 2022; Rice, 2024).

The results in Table 11 show that REM_Hat is positively and statistically significantly associated with realized cash incentives in the following year across all REM measures (Panel A). By contrast, coefficients for option exercise value realized and net equity sales (Panels B and C) are small and statistically insignificant, and REM_Resid is insignificant across all specifications. These findings indicate that the benefits of tax-induced REM are primarily realized through threshold-based cash compensation rather than through equity monetization. Bonus and non-equity incentive plans are typically annual and tied to discrete performance targets, so the payoff to REM arrives quickly in the form of next-period cash (Indjejikian et al., 2014; Graham, Harvey and Rajgopal, 2005; Matsunaga and Park, 2001). By contrast, turning higher reported earnings into equity cash-outs requires executives to time option exercises and share sales, which are constrained by vesting, blackout periods, trading plans, diversification, and separate tax considerations (Bettis, Coles and Lemmon, 2000; Huddart and Lang, 1996; Jagolinzer, 2009; Jin and Kothari, 2008; Ofek and Yermack, 2000). As a result, the equity-cash-out leg of the chain is slower, noisier, and much less mechanically tied to a given year's REM.

Table 11. Income realization channels

Panel A. Realized Cash Incentives t+1			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>REM_Hat</i>	3.607*** (3.606)	5.711*** (3.839)	2.715*** (3.607)
<i>REM_Resid</i>	0.026 (0.991)	0.042 (1.090)	0.023 (0.954)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.672	0.669	0.672
Obs.	22,671	22,945	22,671
Panel B. Option Exercise Value Realized t+1			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>REM_Hat</i>	8.612 (0.957)	13.685 (1.025)	6.510 (0.961)
<i>REM_Resid</i>	-0.524 (-1.286)	-0.978 (-1.613)	-0.625 (-1.611)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.416	0.413	0.416
Obs.	8,551	8,640	8,551
Panel C. Net Equity Sales Value Realized t+1			
Variables	(1) <i>REM1</i>	(2) <i>REM2</i>	(3) <i>REM3</i>
<i>REM_Hat</i>	1.892 (1.109)	3.037 (1.197)	1.423 (1.109)
<i>REM_Resid</i>	-0.038 (-0.476)	-0.153 (-1.316)	-0.033 (-0.433)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R ²	0.319	0.319	0.319
Obs.	8,487	8,576	8,487

Note: This table examines how tax-induced changes in real earnings management translate into CEOs' realized income. *REM_Hat* is the fitted component of REM from the baseline specification, and *REM_Resid* is the residual component. Panel A reports regressions of Realized Cash Incentives in year t+1 (the natural logarithm of one plus the sum of bonus and non-equity incentive payments) on *REM_Hat* and *REM_Resid*. Panel B uses Option Exercise Value Realized in year t+1 (the natural logarithm of one plus the total dollar proceeds from sales of shares acquired through stock option exercises) as the dependent variable. Panel C uses Net Equity Sales Value Realized in year t+1 (the net dollar value of the CEO's open-market trades in previously held firm shares, excluding option-related transactions, scaled by the stock's total dollar trading value in that year) as the dependent variable. We include the same set of baseline firm-, CEO- and state-level control variables as in the baseline specification. Detailed variable definitions are in Appendix A. All specifications include firm and year fixed effects. Standard errors are clustered by executive and year. The markers *, ** and *** denote statistical significance at the 10%, 5% and 1% levels (two-sided), respectively.

7. Conclusion

We examine whether changes in CEOs' personal income tax rates affect firms' use of real earnings management (REM). Exploiting variation in combined federal and state personal income tax rates, we document that higher CEO tax rates are associated with higher levels of REM, particularly revenue acceleration, increased production, and cuts in discretionary expenditures that boost current-period earnings. We also find an asymmetric response: tax increases lead to higher REM, whereas tax decreases have no statistically significant effect, indicating that CEOs react more strongly to adverse than to favourable tax shocks. Cross-sectional analyses show that the tax-REM relation is stronger when CEOs enjoy greater discretion and face weaker monitoring, and is mitigated when CEOs' cultural backgrounds are associated with a stronger long-term orientation. Overall, the evidence highlights CEOs' personal tax exposure as a systematic, time-varying individual-level factor that shapes managerial incentives and behaviour, and our study contributes to the literature by linking personal income taxation to REM, upper-echelon decision-making, and the real effects of financial reporting incentives.

Our results have several implications for boards, regulators and investors. For boards and compensation committees, the evidence suggests that external changes in CEOs' personal tax environment can intensify short-term earnings pressure and encourage real operating adjustments that boost reported earnings but may undermine long-term value, underscoring the need to design performance metrics and contracts that are robust to tax-induced shifts in incentives. For policymakers, the findings point to an unintended consequence of personal income tax reforms: beyond their fiscal and macroeconomic effects, changes in top marginal tax rates can spill over into firms' real activities and earnings quality through executives' behavioural responses. For investors and analysts, periods of rising personal tax rates for top executives may coincide with heightened reliance on real earnings management, calling for greater scrutiny of the sustainability and informational content of reported earnings when interpreting performance around tax changes.

Footnotes

¹ The NBER provides federal tax rates by state, and there are slight differences in these rates due to the deductibility of state income taxes.

² In untabulated analysis, 61% is the adjusted-R² from a regression of CEO_MTR on year fixed effects.

³ For ease of interpretation, all REM measures (*REM_CFO*, *REM_PROD*, *REM_DISX*, *REM1*, *REM2*, and *REM3*) are defined such that higher values indicate higher reported earnings.

⁴ In untabulated tests, we re-estimate the baseline model on firms with a single reported geographic segment in Compustat segment files (i.e. with limited scope for cross-state tax planning), and the results remain unchanged.

⁵ As a robustness check, we re-estimate the baseline model after excluding state-year observations in which an assumed executive income of USD 1.5 million does not fall into the top bracket (about 2.8% of the sample); the results are qualitatively unchanged.

⁶ To account for other components of state taxation, we incorporate state-level average property and sales tax rates (available from 2000) into our baseline regression. The estimated effect of the marginal income tax rate remains robust, suggesting that variations in these additional tax dimensions do not materially influence our main results.

⁷ As an additional endogeneity check, we estimate a 2SLS model that instruments *CEO_MTR* with state-level political shifts (presidential party flips, two-party vote margin and Senate/House majority flips). The 2SLS estimates remain positive and significant across our REM measures, consistent with the baseline and DID results.

⁸ In untabulated tests, we exclude state tax changes that coincide with major federal reforms. The results remain statistically significant and similar in magnitude.

⁹ In untabulated tests, we further examine the influence of concurrent labour-income policy changes, including state-level minimum-wage and unemployment-insurance (UI) replacement-rate adjustments (defined following Clemens and Strain, 2021, and

Ganong, Noel and Vavra, 2020). Our main results are robust to the inclusion of these concurrent policy changes.

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