UNIVERSITY OF CALIFORNIA
RIVERSIDE

Three Essays on CEO Compensation, Partisanship and Capital Structure

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Management

by

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June 2022

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Acknowledgments

I am grateful to my advisor, Dr. Jean Helwege, for her unwavering support, patience, and guidance throughout my time at the University of California Riverside. I would like to thank the finance faculty, especially my committee members, Dr. Richard Smith and Dr. Mike Dong, for their feedback and comments. Lastly, I extend a generous thanks to former and current fellow doctoral students Raymond Kim and Mohammad Zolghadr for being great friends and the administrative staff at A. Gary Andersen Graduate School of Management for all the help.

To mom and dad, Aljohra and Abdulaziz, this is for you.

ABSTRACT OF THE DISSERTATION

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by

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Doctor of Philosophy, Graduate Program in Management
University of California, Riverside, June 2022
Dr. Jean Helwege, Chairperson

This dissertation consists of three essays. In the first essay, I construct a CEO pay complexity index based on grant-level compensation data to test whether compensation complexity is consistent with optimal contracts or agency problems. Complexity may represent board effort to contract optimally or a means by which the CEO camouflage agency issues and rent extraction. I find evidence supporting the agency view by showing how complexity is negatively related to firm value, profitability, and CEO turnover performance sensitivity. I also examine the relationship between complexity and CEO investment behavior and find mixed results. Overall, the findings relate to shareholders' dissatisfaction with the increased complexity of CEO compensation.

The second essay studies how customer concentration affects the use of relative performance evaluation (RPE). Customer concentration increases the potential benefit of RPE in compensation contracts to ease the higher systematic risk CEOs face and provide proper incentives. However, such concentration may make RPE costly and less appealing because of the limited availability of peers or the possible disruption to major customers'

relationships. I find that the sensitivity of CEO compensation to systematic performance is higher for firms with significant customers (less RPE). Examining why these firms rely less on RPE, I show that the positive sensitivity of pay to systematic performance disappears once a firm has enough informative peers. Further evidence indicates that the lack of RPE is not related to other explanations such as the possibility of disruption to the relationship with significant customers, CEO power, industry strategic interactions, or less incentive pay for risky firms.

The third essay examines the relationship between CEOs' political leanings and the speed of adjustment to target leverage. While most CEOs' political views do not affect movement towards the target, we find that partisan Democrat CEOs of under-levered firms have significantly slower adjustment speeds. After the exogenous shock of the 2017 Tax Cut and Jobs Act (TCJA), these firms are even slower to make adjustments. We find that the post-TCJA inertia of partisan Democrats reflects a reduction in share repurchases, consistent with the Democratic Party views on the use of windfall corporate profits.

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[1] Co-authored with Jean Helwege and Raymond Kim

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Chapter 1

CEO Compensation Complexity: Optimal Contracts or Agency Problems?

1.1 Introduction

Large U.S. public firms issue multiple grants each year to CEOs under performance-based incentive plans. These grants show a great deal of heterogeneity and complexity in their design.[1] Specifically, grants vest over multiple years and depend on reaching one or more performance targets such as stock return, accounting performance, or any other measure boards deem appropriate. Also, performance against targets can be measured over a year or multiple years and evaluated on an absolute or relative to peers basis. Lastly, conditional

[1] C. Bettis et al. (2018a) find that the percentage of the largest 750 public firms that adopt performance-based incentive plans rose from 20% in 1998 to 70% in 2012, and that these plans have become complex over time.

upon achieving vesting requirements, a grant's payout comes in cash, stock, or stock options. While shareholders have been advocates for tying pay to performance, they recently expressed dissatisfaction with the complexity of performance-based plans and demand simplifying them to judge plan effectiveness in incentivizing CEOs. [2] In this paper, I propose two hypotheses that relate compensation complexity to managerial incentives.

One is the Optimal Contracts hypothesis, which conjectures that compensation complexity reflects efficient contracting by the board to establish incentives that align executive and shareholders' interests. Under this view, there are at least two reasons why an optimal contract is complex. First, the standard economic theory implies that the theoretical optimal contract is highly complex since it would be highly non-linear and contain many terms describing parties' obligations across different states of the world. According to Hölmstrom (1979) and Hölmstrom (1982), principles should use any signal with relevant information about the agents' actions and ensure the agent against exogenous performance shocks. Thus, the implication on the contract is to include multiple performance measures and rely on relative performance evaluation. Second, the contract can be optimally complex to mirror the broad scope (Gabaix and Landier (2006)) and nature of the CEO's job that involves tasks such as implementing various corporate strategies and fostering relations with investors and other stakeholders. Prior work suggests relying on equity-based pay, increasing CEO wealth sensitivity to firm value, and tying pay to long-term performance (e.g., M. C. Jensen and Meckling (1976), Morck, Shleifer, and R. W. Vishny (1988), McConnell and Servaes (1990)). Current performance-based incentive plans include many

[2] See for example `https://hbr.org/2017/07/decoding-ceo-pay`.

of these practices, thus, are consistent with the optimal contracting hypothesis that predicts complexity to improve CEO incentive alignment and positively relate to the firm outcomes.

The second hypothesis is the Agency Problems, which argues that complex pay arrangements are how CEOs camouflage agency issues and rent extraction. L. Bebchuk, J. Fried, and Walker (2002) argue that boards do not operate at arm's length when negotiating compensation. Instead, the executives, through managerial power, affect the compensation design. Executives prefer pay arrangements that make it easier to hide rent extraction to avoid shareholders' outrage over observable excessive pay (L. Bebchuk and J. Fried (2003)). An opaque incentive plan that investors cannot fully understand can be an ideal tool for CEOs to facilitate and disguise rent extraction and other agency problems. Previous studies show how incentive pay may alter manager behavior towards focusing on targeted performance goals and neglecting others and associate with undesired outcomes (e.g, Grinstein and Hribar (2004), Morse, V. Nanda, and Seru (2011), Bennett, J. C. Bettis, et al. (2017), Edmans, Goncalves-Pinto, et al. (2018)). Therefore, under the agency-based view, the complexity of performance-based plans will not improve managerial incentives and will negatively associate with firm outcomes.

The goal of managerial incentives is to motivate executives to make sound business decisions that enhance shareholder value. Thus, to assess whether complex compensation plans achieve this goal, I examine the relationship between pay complexity and firms' value, profitability, CEO turnover-performance sensitivity, and investment behavior. [3] I take

[3] A long list of prior work studies the relationship between incentives and firm' value (Morck, Shleifer, and R. W. Vishny (1988); McConnell and Servaes (1990); Mehran (1995)), profitability (Core and Larcker (2002); R. Kumar and Sopariwala (1992); Morse, V. Nanda, and Seru (2011)), CEOs' turnover (Gopalan, S. Huang, and Maharjan (2014); Jochem, Ladika, and Sautner (2018)), and acquisitions (Cai and Vijh (2007); Phan (2014); Edmans, Fang, and A. Huang (2017)).

advantage of the compensation disclosures mandated by the SEC in 2006 to construct a complexity index similar to A. M. Albuquerque et al. (2022) using the information from the "Grants of Plan-Based Awards Table" in proxy statements. The index captures the complexity of a plan by uniqally counting grants' payout form (short/long-term cash, stock, and stock options), vesting conditions (time or performance-based relative/absolute), unique performance measures (based on which vesting depends), and distinct periods over which the performance will be evaluated. I analyze CEO compensation complexity in the 750 largest U.S. firms by market capitalization from 2006 to 2018.

I find that compensation complexity is negatively and significantly related to firm value and profitability. Economically, a one standard deviation increase in complexity is associated with a decrease in next year's Tobin's Q (ROA) of around 3.4% (5%) relative to sample mean. As a partial explanation for these negative relations, I find CEOs with complex pay are less likely to be replaced following poor performance. These results hold after controlling for firm and CEO characteristics, year, and industry fixed effects. The findings also survive endogeneity concerns using two-stage least squares (2SLS), nearest-neighbor, and propensity score matching approaches. Overall, the results support the agency-based hypothesis that complex compensation is a symptom of agency issues.

In the last set of tests, I show that complexity is negatively (positively) related to the likelihood of announcing an M&A deal by firms with strong corporate governance (agency problems of free cash flow). Furthermore, analysis shows that the market views less-negatively deals made by CEOs with complex pay and firms with potential agency problems of free cash flow. Finally, I use proxy statement releases as an event to study the market reaction to changes in pay complexity and find no significant difference in abnormal returns between firms that decreased or increased their CEO pay complexity.

This paper contributes to the vast literature on executive compensation. Specifically, the study adds to the growing work exploring the increase in compensation complexity (C. Bettis et al. (2018b), Kevin J Murphy and Sandino (2019), Bennett, G. T. Garvey, et al. (2019)).[4]. I extend this line of research by showing that the complexity of performance-based plans is related to and a symptom of agency problems. The findings suggest that reliance on performance-based incentive plans and increasing disclosures may not necessarily help mitigate agency problems if shareholders and other interested parties cannot easily understand the complicated plans' information revealed through public disclosures. The findings also warrant scrutiny about the complexity of CEO compensation from boards, shareholders, and other stakeholders.

The rest of the paper is organized as follows: Section 2.2 provides a literature review and develops the hypotheses tested in this paper. Section 2.3 describes the data and the construction of the compensation complexity index used in the analysis. Section 1.4 includes the main empirical results. Section 2.5 addresses the endogeneity concerns. Section 2.6 provides additional analysis and robustness checks. Section 1.7 summarizes the findings and concludes.

[4]This paper is close to A. M. Albuquerque et al. (2022), who find that increases in complexity not explained by economic characteristics are associated with excess compensation, suggesting a desire to camouflage higher pay. However, only limited evidence shows that complexity is associated with lower future performance, implying higher pay to compensate CEOs for more pay-at-risk. My paper is different from theirs in several ways. First, I employ different econometric specifications and use several variables to capture firms' governance, executives' power, and potential agency problems. This step is crucial to separate the optimal contracting from the agency-based views. Second, I explicitly address the endogeneity concerns using the instrumental variable approach, nearest-neighbor, and propensity score matching techniques. Lastly, my paper also differs in that it explores the relationship between pay complexity and CEO turnover-performance sensitivity, CEO risk-taking in the setting of M&A, and the market reaction to changes in the CEO pay complexity around proxy statement releases.

1.2 Literature Review and Hypotheses Development

1.2.1 Compensation Complexity

The complexity of a compensation package can be manifested and observed in many dimensions. One dimension is the structure of the compensation. For example, grants under performance-based plans have varying features and exhibit heterogeneity in their design. The grants could vest over several years and could include multiple performance targets. Including multiple performance targets raise the issue of choosing the appropriate targets (e.g., stock price return, accounting performance, operational efficiency) and each target's weight when evaluating the overall performance, which does not follow a straightforward process by firms. Also, firms have to decide on the appropriate length of the evaluation period and the choice of evaluation method (absolute/relative to peers). Lastly, executives receive payouts in cash, stock, or stock option subject to fulfilling vesting requirements. All of these features increase the complexity of grants under performance-based incentive plans.

Compensation complexity is also observed in the language that conveys executive compensation information to shareholders in proxy statements. According to media and recent surveys, investors are dissatisfied with the clarity of communication in proxy statements. Larcker and Tayan (2015) documents this dissatisfaction among a group of prominent investors. Moreover, in 2019, the U.S. Council of Institutional Investors mentioned that "Performance-based compensation plans are a major source of today's complexity and confusion in executive pay" and demanded firms to dial-back the complexity of the plans.

Even firms themselves are acknowledging shareholders' concerns. For example, in 2016, Goldman Sachs' CEO compensation package received only two-thirds of shareholders' support. Investors stated that the long-term incentive plan (LTIP) introduced in 2015 was overly complex and lacked relative evaluation. Subsequently, the board agreed to remove LTIP and link equity awards to performance relative to the industry. [5]

In 2006, the SEC introduced new regulations that required firms to increase pay-for-performance disclosures. A primary goal of the rules was to provide more complete information about executive compensation. Indeed, the regulations assisted in shedding more light on pay practices across firms and over time. For example, C. Bettis et al. (2018b) document that 70% of the largest U.S. firms used performance-based equity in 2012 and that performance-based grants have become more complex. A. M. Albuquerque et al. (2022) construct a complexity index and show that the average compensation contract complexity monotonically increases during the study period. Kevin J Murphy and Sandino (2019) find evidence of compensation layering, the practice of firms layering new equity incentive plans over existing ones, which increases the complexity of the CEO compensation. Lastly, Bennett, G. T. Garvey, et al. (2019) document a negative relation between stock price informativeness and pay complexity. Yet, with all this body of work, it is still unclear whether compensation complexity is consistent with boards' efforts to optimally contract or managerial power and agency issues.

[5] See more about this example in Appendix A. As another example, Nabors industries approved a transaction in 2018 in which the CEO voluntarily forfeited an award of shares with a grant date fair value of about $4 million, in exchange for an award of restricted shares with a grant date fair value of $1,500. This occurred after 60% of shareholders voted against the 2018 compensation program and demanded simplifying it.

1.2.2 Optimal Contracts and Agency Problems

Compensation literature proposes two main views to rationalize how boards set executive compensation contracts. One is optimal contracting, where boards set up compensation plans that align CEO interests with shareholders and incentivize executives to maximize value. Theoretical models of optimal contracts and empirical research that examined executive compensation have proposed several pay practices that would assist in achieving the above objectives (e.g., M. C. Jensen and Meckling (1976), Hölmstrom (1982), M. Jensen (1986); Morck, Shleifer, and R. W. Vishny (1988), McConnell and Servaes (1990)). These propositions include more equity-based pay, increasing CEO wealth sensitivity to the firm value, focusing on long-term value creation by tying pay to long-term performance, and relying on measures indicative of value-maximization by the CEO.

Performance-based incentive plans include several of the above propositions. Edmans, Gabaix, and Jenter (2017) document that firms have been replacing time-vesting equity grants with more performance-based grants. Also, equity represents a significant proportion of total CEO compensation for firms in the S&P 1,500. [6] This trend is also evident in Figure 1.1. De Angelis and Grinstein (2015) study the pay-for-performance terms in CEO contracts for the S&P 500 firms and document significant variation in the type of performance measures used in these contracts. They also find that firms choose meaningful measures of performance consistent with optimal contracting. According to the above discussion, the complexity of compensation plans should indicate boards' efforts to enhance

[6] According to advisory firm ISS, performance-based equity and cash made up 58% of total pay for S&P500 CEOs in 2018.

managerial incentives and appropriately align manager interests with that of shareholders. I write this central prediction as follows:

Hypothesis 1a: *Compensation complexity is positively related to firm's value, profitability, CEO turnover-performance sensitivity, and CEO's investment behavior.*

Compensation contracts can also be viewed through the lens of managerial power, under which boards do not operate at arm's length when negotiating compensation. Instead, controlling executives influence the contract design. A CEO cannot be too powerful, however, as shareholders outrage over observable excessive pay would impose reputational costs to the firm and the CEO. [7] The outrage functions as a constraint to rent extraction and would lead CEOs to prefer pay arrangements that enable camouflaging rent extraction as optimal contracting (L. Bebchuk, J. Fried, and Walker (2002) and L. Bebchuk and J. Fried (2003)). A controlling CEO may use her power to land herself a compensation plan that shareholders cannot fully understand, facilitating and hiding rent extraction and other agency problems.

Performance-based plans may be inefficient if a complex plan alters CEO behavior to focus on targeted performance goals and neglect others. Indeed, the literature shows how incentives relate to executive power, short-termism, and opportunistic behavior. Morse, V. Nanda, and Seru (2011) show how powerful CEOs may rig their incentive pay by placing more weight on better-performing measures. Also, Burns and Kedia (2006) find CEOs more likely to misreport and restate financial statements when their stock options have high sensitivity to the firm stock price. Bennett, J. C. Bettis, et al. (2017) provide evidence

[7]For example, shareholders of Bed, Bath Beyond Inc. in 2014 voted down the CEO compensation plan. However, say-on-pay voting is non-binding and the CEO received that compensation. In 2015, the firm increased equity grants, and shareholders again voted the plan down. Under pressure from these disapprovals, the company decreased the compensation by 20.9% from 2014 to 2017.

of management of reported accounting performance to achieve compensation contingent on reaching performance targets. Edmans, Fang, and A. Huang (2017) show how equity grant vesting leads CEOs to take myopic actions such as mergers with low long-term returns. Lastly, Grinstein and Hribar (2004) find CEOs with more power to have more bounces resulting from acquisitions. Based on the above discussion, the agency-based view predicts that the complexity of performance-based plans is a symptom of agency issues and signals boards' poor contracting with managers. Moreover, the prediction is stronger when the CEO has power over the board. I state these predictions as follows:

Hypothesis 1b: *Compensation complexity is negatively associated with firm's value, profitability, CEO turnover-performance sensitivity, and CEO's investment behavior, especially for firms managed by powerful CEOs.*

1.3 Data

1.3.1 Variables Construction

The main data comes from ISS Incentive Lab and spans 2006-2018. Incentive Lab coverage begins from 1998 and includes the largest 750 U.S. firms by market capitalization. After a firm enters the 750 list, Incentive Lab backward-forward fills information for that firm. Thus, the ISS Incentive Lab comprises all S&P500, the majority of the S&P midcap 400, and a proportion of the S&P smallcap 600. Incentive Lab extracts detailed information on executive compensation and incentives awards from proxy statements (DEF 14A, 10-K, etc.).

I use the information from the "Grants of Plan-Based Awards Table" to construct the compensation complexity index. First, I divide grants into four types (short-term-cash, long-term-cash, restricted stock, and stock options) and give a point to each when awarded in a given year. Then, each unique grants receive a point for having a time-vesting condition or relative/absolute performance-evaluation conditions. Lastly, for each grant, I record the actual number of unique performance measures based on which the grant would vest and the number of unique periods over which the performance will be evaluated. [8] Summing all the points above gives the compensation complexity index for each CEO-firm-year. [9]

I collect CEO information, such as compensation, tenure, and age from ExecuComp. The financial and stock price information comes from Compustat and CRSP. I merge these data sets with Incentive Lab data and exclude financial firms to reach the full sample of 9,205 firm-year observations for 1,122 unique firms. For the M&A analysis, I collect deal information from Thomson Reuters′ SDC platinum. I follow the M&A literature and require deals to satisfy the following criteria. The announcement data is between 2007 and 2017, where a U.S. public firm acquires 50% or more ownership in public or private target with deal value greater than $1 million. [10] Lastly, acquirer financial and stock price data is available. The final M&A subsample includes, after merging and data requirements, 327 deals made by 243 distinct firms.

Previous work typically infers managerial power from CEO and firm characteristics. For example, Morck, Shleifer, and R. W. Vishny (1988) define a CEO as powerful when

[8] For example, a grant that vests conditionally upon stock price appreciation over the next three years would have 3 unique periods.

[9] It is worth noting that this type of indexing is not new in the literature (e.g, the G-index by Gompers, Ishii, and Metrick (2003) and the entrenchment index of L. Bebchuk, Cohen, and Ferrell (2009)).

[10] I drop deals without disclosed deal value, labeled as spin-offs, recaps, self-tenders, exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest

no other person holds the title of Chairman or President. M. Jensen (1993) and Lucian Arye Bebchuk and J. M. Fried (2003) argue that CEOs control the information conveyed to the board because CEOs dictate board's meeting agenda. They also argue that this control is especially stronger when the CEOs are the chairmen of the boards. [11] Managerial power also manifests when corporate governance is weak. Shleifer and R. Vishny (1986) show that monitoring by large shareholders can serve as an effective governs mechanism. Bertrand and Mullainathan (2001a) find that CEO pay for luck is reduced when a firm adds a blockholder to its board. Thus, I use CEO duality, ownership, and ownership stakes of blockholders to proxy for CEO power and firm governance.

Table 1.1 presents sample summary statistics for grants, CEO, and firms characteristics. From table 1.1, we observe a considerable variation in the distribution of the compensation complexity index, indicating the heterogeneity in grants under performance-based plans. Also, the table shows that a given CEO contract involves an average of 3 grants, 5 unique performance measures (based on which vesting depends), and 3 periods (over which performance measures in the grant will be evaluated). Finally, around 37% of CEOs' contracts in the sample involve both absolute and relative performance measures.

1.3.2 Univariate Comparison

I start the analysis by separating firms in the sample into quartiles based on yearly rank of the complexity index. The main interest here is to observe whether the characteristics of firms with high CEO pay complexity differ from those with low CEO pay complexity. Table 1.3 shows that not all firm characteristics change monotonically with complexity.

[11] Also see Adams, Almeida, and Ferreira (2005), Lucian A. Bebchuk, Cremers, and Peyer (2011).

Thus, the univariate comparison is merely a starting point in the analysis and is insufficient to describe the relationship between compensation complexity and firm characteristics.

Table 1.3 shows larger firms to have more complex contracts, reflecting the broader operational scope that CEOs face at these firms. Concerning valuation and profitability, firms in the highest complexity quantile seem to have significantly lower valuation but higher profitability. Moreover, the comparison shows that stock returns and sales growth monotonically decrease with complexity, with a significant difference in returns and sales growth for firms in the lowest/highest complexity quantiles. CEOs in top complexity quantile appear to spend less on R&D and generate higher free cash flows. Table 1.3 also shows that firms with the highest CEO contract complexity have significantly lower ownership of blockholders and a higher percentage of CEOs with the chairman title. Lastly, the table does not provide evidence supporting a difference between firms in the low/high complexity quantiles for the proportion of firms considered manipulators (Beneish, Lee, and Nichols (2013)).

1.4 Empirical Results

1.4.1 Compensation Complexity, Firm's Value, and Profitability

I assess whether compensation complexity incentivizes executives to act as value-maximizers by first investigating how complexity relates to firm value. Specifically, I estimate the following OLS model:

$$\textbf{Tobin's Q}_{i,t} = \alpha + \beta_1 \textbf{Complexity}_{i,t-1} + \beta_2 \textbf{X}_{i,t-1} + \gamma_t + \gamma_s + \varepsilon_{i,t} \tag{1.1}$$

where *Tobin's Q* is the proxy for firm value and is defined as (Book value of total assets + Market value of equity – Book value of equity)/ Book value of total asset. X is a vector of control variables showing in the literature to significantly affect value. Control variables include return on assets (ROA), market capitalization, R&D scaled by sales, sales growth, 12-month compound stock returns, CEO total compensation, CEO stock ownership, duality, and Blockholder ownership. I use lag values for all controls to better capture the direction of the relationship between complexity and Tobin's Q. Furthermore, γ_t and γ_s represent time and industry fixed effects, respectively. The inclusion of these fixed effects is to control for macroeconomic shocks and unobserved time-invariant industry characteristics. I cluster standard errors at the firm level and winsorize the dependent and control variables at the 1st and 99th percentiles to mitigate outliers' potential effects.

Table 1.3 shows the estimation results. From column (1), the estimated coefficient on complexity is significant and negative, indicating that pay complexity is negatively related to next period valuation. When I include controls in specification of column (2), the coefficient on complexity continue be significant and negative at the 5% significance level. Economically, a one standard deviation increase in pay complexity is associated with about 0.07 decline in next year's Tobin's Q, a 3.4% decrease relative to Q's sample average of 2.03. This result is robust to controlling for firm, CEO, and governance observable characteristics and holds across all specifications. The coefficients on controls are overall consistent with those reported in the literature.

Next, I further examine the negative relation for firms in which corporate governance is weak or managerial power is expected to be present. I interact the complexity index with proxies for executive power, namely duality and CEO stock ownership. Specifications in columns (3) and (4) show the results for these interactions. Estimates on both interaction terms are positive but insignificant. I next look at firms with large Blockholders, a better-governed set of firms and less prone to agency issues. Thus, I sort firms each year into quintiles based on Blockholder ownership stakes. In column (5), I interact the complexity index with indicators for Low/High Blockholder ownership. Column (5) shows that the negative relation between pay complexity and Tobin's Q only exists for firms with weak governance (low Blockholder ownership). The association between complexity and Tobin's Q turns positive and significant when complexity interacts with high Blockholder ownership.

I then test whether the negative relation between complexity and Tobin's Q carries to firm profitability. Specifically, I regress Return On Assets (ROA) on complexity and a vector of controls variables, year, and industry fixed effects. Table 1.4 presents the regression results. I find complementary results to the valuation analysis, as the coefficients on complexity in all specifications are negative and significant. The coefficient estimate from the specification in column (2) indicates that a one-standard-deviation increase in complexity is associated with about a .22% decline in next year's ROA, or a 5% decrease relative to the sample average of 4.4%. Lastly, compensation complexity is not associated with lower profitability for firms with potentially powerful CEOs or weak governance, as the estimates on the interaction terms are insignificant.

Collectively, the results from tables 1.3 and 1.4 show that CEO compensation complexity is negatively related to firm value and profitability. Furthermore, the negative relationship with firm value exists exclusively among poor-governed firms. These results hint at possible agency problems and lend initial support to the agency-based hypothesis.

1.4.2 CEO Turnover-Performance Sensitivity

The previous section documents negative relation between compensation complexity and firm value and profitability. Under the optimal contracting hypothesis, the likelihood of CEO turnover should relate positively to poor performance. On the other hand, the agency-based hypothesis predicts that it is unlikely that a powerful CEO would be replaced after a poor firm performance. [12] I examine these predictions by testing whether CEO turnover is related to pay complexity, controlling for past performance. I follow prior work on CEO turnover (e.g., Jenter and Kanaan (2015a) and Kaplan and Minton (2012)) and estimate the following probit model:

$$\begin{aligned}\mathbf{Turnover}_{i,t} = \alpha + \beta_1 \mathbf{Performance}_{i,t-1} + \beta_2 \mathbf{Complexity}_{i,t-1} + \\ \beta_3 (\mathbf{Performance}_{i,t-1} \times \mathbf{Complexity}_{i,t-1}) + \beta_2 \mathbf{X}_{i,t-1} + \gamma_t + \gamma_s + \varepsilon_{i,t}\end{aligned} \tag{1.2}$$

where Turnover is an indicator that equals one if a CEO changes in year t, zero otherwise. I measure performance with four measures: Stock return, which is the compound stock return for last the 12 months of the fiscal year, Industry_adj._Stock return, which is the difference between the firm stock return and the median return for firms in the same

[12] J. R. Graham, H. Kim, and Leary (2020) find that CEO power weakens the performance-turnover relation.

Fama-French 48 industry group, ROA, and Sales growth. I identify 818 cases of turnover where the CEO title in ExecuComp changes from one person to another in a given year. The coefficient of interest in Eq. (2.1) is β_3, which can answer whether CEOs with complex compensation are more or less likely to experience turnover when the previous period's performance is poor.

Table 1.5 shows the results from the probit regressions. Estimates in column (1) show the probability of CEO turnover to be negatively related to stock return and CEO ownership while positively related to stock volatility, CEO tenure, and age consistent with prior studies. More importantly, column (1) shows the coefficient on the interaction term between complexity and stock return to be positive and significant at the 10% level. This result indicates that CEOs with complex pay are less likely to be replaced after a poor stock performance. Results using different performance measures in columns (2), (3), and (4) draw a similar conclusion. Overall, the finding that turnover is less performance-sensitive for CEOs with complex pay is consistent with the agency-based hypothesis. The negative association between compensation complexity and CEO turnover performance sensitivity partially explains the negative relations found between complexity and firm value and profitability.

1.5 Addressing Endogeneity Concerns

The evidence from the previous section supports the agency-based hypothesis, as compensation complexity is negatively associated with firm value, profitability, and CEO turnover performance sensitivity. Although tests at an earlier section use lagged independent variables, control for observable firm and CEO characteristics, year and industry fixed effects, and cluster standard errors by firm, possible endogeneity concerns may hinder the interpretation of the results. I address such problems in this section.

1.5.1 Instrumental Variable Approach

Poor performing firms may try to attract new CEOs or motivate incumbents by offering complex compensation contracts with various performance-based incentives. [13] However, I used lagged values for all independent variables in earlier specifications to rule out such reverse-causality concerns. Omitted variables are another source of endogeneity. For instance, an entrenched CEO with excellent negotiation skills, bargaining power, or overconfidence could convince the board to offer her a contract with many performance-contingent awards that provide large sums upon vesting. While there are proxies to control for entrenchment or power, there is no clean way to control for CEO negotiation skills or bargaining power. [14] Finally, simultaneity is also a possible concern, as improvements in a firm value would likely be associated with increased business segments and foreign operations, entailing more managerial effort that boards prompt through performance-based incentives.

I address the endogeneity concerns using an instrumental variables (IV) approach. I instrument with two instruments: the median compensation complexity of firms in the same industry and size quartile and the tenure of the firm's compensation consultant. Relevance and exclusion conditions imply that the instruments must correlate with pay complex-

[13] In unreported analysis, CEOs in the lowest tenure quantile have significantly higher complexity (15.5) than those in the highest quantile (14). Although small magnitude, the significant difference is consistent with the idea of new CEOs receiving more complex contracts.

[14] I control for overconfidence using the percentage of options to total pay as a proxy and find results to hold.

ity and affect the variable of interest only through its effect on the instrumented variable. Therefore, I focus the following discussion on the situation where the variable of interest is Tobin's Q. Still, the same logic applies when using the other variables of interest. [15]

The identification assumption for the first instrument is that the median compensation complexity of peers is exogenous to unobserved firm characteristics and that the median influences Tobin's Q only through CEO pay complexity. Compensation practices within an industry are generally homogeneous due to benchmarking practices, peer effect, and specialized compensation consultants (Bizjak, Lemmon, and Naveen (2008a), Kalpathy, V. K. Nanda, and Zhao (2019), Denis, Jochem, and Rajamani (2019)). Therefore, the instrument should be relevant and satisfy the exclusion restriction because there is no apparent reason why the median compensation complexity of other CEOs in the industry would directly affect the firm Tobin's Q. I expect Indu_med_Complexity to impact the CEO pay complexity and, consequently, Tobin's Q. I define industries by Fama French 48 industry groups, use total assets to proxy for size, and exclude the vocal firm from calculating the median to avoid any mechanical relation.

The second instrument, the tenure of the firm compensation consultant, can relate to compensation complexity in the following way. A long-standing relationship with a consultant could signal board satisfaction with the consultant's work. Such satisfaction stems from compensation practices that align CEO interests with the shareholders. Thus, I expect compensation consultants with longer tenures to design more elaborate compensation plans over time. However, the positive relationship between the complexity of pay and the consultant tenure does not necessarily have to be in line with efficient contracting. For

[15] Both instruments are invalid when for M&A analysis, thus I do not report such tests for brevity.

example, Kevin J Murphy and Sandino (2019) find a positive relationship between the use of consultants and the complexity of pay. If consultants design complex contracts to justify their use, then longer-tenured consultants may have increased the complexity of the contracts to secure repeated business with firms.

While unobserved CEO, board, or consultant characteristics could affect keeping or replacing the consultant, it is unclear why the tenure, not the consultant choice, would be related to firm value. For example, two firms could have long-serving consultants, but the CEO captures the consultant in one firm, while the board retained the consultant based on positive views about their work in the other. In both cases, the consultant is likely to design complex contracts for different purposes. Thus, I expect the instrument to satisfy the relevance criterion and exclusion restriction.

Table 1.6 presents the results from the IV estimations. The results from the first stage in column (1) show a positive and highly significant coefficient on Indu_med_Complexity and to a lesser extent on CC_tenure. The p-value (0.00) from the Anderson-Rubin weak instrument test suggests that the instruments are not weak, and the F-statistic (43.9) of the first-stage is greater than the Stock and Yogo (2005) critical value of (19.9), indicating that that weak identification is not a problem. Additionally, from the second stage result in column (2), I find that the Sargan-Hansen test fails to reject the null hypothesis of joint validity of the two instruments as shown by the reported test's p-value (.22).

In the second stage, I regress firm value on the fitted values of compensation complexity. The estimates in column (2) confirm prior findings and show a negative and significant complexity coefficient, with larger magnitudes than those obtained earlier. Specifically, a one-standard-deviation increase in pay complexity would lead to an astounding 1.6 decrease in Tobin's Q. [16] The magnitude of the reduction is considerable. Thus, to better understand this result, I analyze the annual changes in the complexity index. I find the mean, 25th, and 75th percentiles of yearly changes in the complexity to be .55, -1, and 3, respectively, implying slow annual changes in complexity. Therefore, increases in pay complexity take a long time to occur for a firm, and the effect of such increases on value is slowly realized.

Next, I re-run the IV regression when the variable of interest in the second stage is ROA or CEO turnover. I instrument complexity with the median compensation complexity and report the results in table 1.7. [17] Columns (1) and (3) show a positive and significant coefficient on the instrument in both first-stage regressions. Also, the Anderson-Rubin p-values and the very high F-statistics indicate a strong instrument. Second stage estimates in columns (2) and (4) show that compensation complexity is negatively and significantly associated with profitability and CEO turnover-performance sensitivity. Overall, IV analysis supports the notion that complexity is a sign of agency problems and not a product of efficient contracting.

1.5.2 Propensity Score Matching

In addition to the IV approach, I employ the nearest-neighbor and propensity score matching techniques to test the robustness of the results. Specifically, I designate firms in the highest complexity quaintle (table 1.3) as the treatment group and firms in the lowest quaintle

[16] In unreported result, Q decrease by 1.3 when I add additional controls in the IV regression.
[17] CC_tenure is not a valid instrument in the first stage regression.

as the control group. Then, I match between the two groups along a set of relevant and observable characteristics that include firm market capitalization, lagged Tobin's Q, CEO tenure, duality, total compensation, the number of Blockholders, fiscal year, and Fama French 48 industry groups. I match each observation in the treatment group with one in the control group.

Table 1.8 shows the results from the matching. In Panel A of Table 1.8, the nearest match is determined using a weighted function of the covariates. [18] In Panels B and C, the nearest match is determined using the propensity scores estimated from probit and logistic treatment models, respectively. I find a negative and significant effect of CEO compensation complexity on Tobin's Q in all specifications, consistent with baseline and IV-regression results. I also find a negative and significant effect on ROA in two matching specifications, with estimates even larger in economic magnitude than the previous analysis.

1.6 Further Analysis and Robustness

1.6.1 Mergers and Acquisitions Activities

In this section, I examine how compensation complexity is related to CEO investment behavior and tests if the behavior is in line with what shareholders desire. M&As represent an ideal ground for examining the alignment of CEO interests and incentives with shareholders. Acquisitions represent major resource allocation decisions that executives have the discretion in making, and prior work shows how acquisitions can be very destructive to the wealth of acquiring firm shareholders (Moeller, Schlingemann, and R. M. Stulz (2005)) and

[18] I use the Mahalanobis distance, in which the weights are based on the inverse of the covariates' variance-covariance matrix.

motivated by empire-building behavior (M. Jensen (1986)). To test the relation between compensation complexity and managerial investment behavior, I estimate the following probit model:

$$\mathbf{M\&A}_{i,t} = \alpha + \beta_1 \mathbf{Complexity}_{i,t-1} + \beta_2 \mathbf{X}_{i,t-1} + \gamma_t + \gamma_s + \varepsilon_{i,t} \tag{1.3}$$

where M&A is an indicator equals one if the firm announces an acquisition during the year, zero otherwise. I follow the literature and include a vector of controls such as size, leverage, Tobin's Q, ROA, free cash flow. I measure the complexity index and control variables a year before the announcement. Additionally, I control for year and industry fixed effects and cluster standard errors at the firm level in all specifications.

Table 1.9 shows the estimation results. The complexity coefficients in all specifications are negative but statistically insignificant. Managers at poor-governed firms or firms with agency problems of free cash flow are potentially more likely to engage in self-serving acquisitions. Thus, to further analyze CEO investment behavior, I interact complexity with indicators for Low/High Blockholder ownership or Free Cash Flow. Column (2) shows a negative and significant estimate on the interaction between complexity and high Blockholder ownership, suggesting that well-governed CEOs with complex pay are less likely to engage in acquisitions. Furthermore, column (3) shows a positive and significant coefficient on the interaction of complexity and high free cash flow, implying that the propensity to engage in deals is higher for CEOs with complex pay and are at firms with possible agency problems of free cash flow.

Next, I examine whether these acquisitions enhance or destroy shareholder wealth. I run cross-sectional regressions of announcement cumulative abnormal return (CARs) over the event window (-1,1) and use the Fama-French three-factor model and daily stock returns in the window (-241,-41) to estimate the model parameters and CARs. Table 1.10 shows the regression results. The complexity coefficients in all specifications are negative but only statistically significant in the last specification. The result from column (3) implies that a one standard deviation increase in the compensation complexity index is associated with -0.606% reduction in CARs, or a loss of around $108 million per announcement. [19] The positive coefficient on the interaction between complexity and high free cash flow suggests that complexity seems to be associated with less negative market reaction to deals made by CEOs with complex pay and are at firms with agency issues of free cash flow.

Taken together, the results from tables 1.9 and 1.10 indicate that complexity is negatively (positively) related to firm's likelihood of announcing an M&A for firms with strong corporate governance (agency problems of free cash flow). Also, complexity is negatively associated with announcement CARs. The market seems to view less-negatively deals made by CEOs with complex pay and potential agency problems of cash flow. I conclude that these results do not favor one view over another and support the optimal and agency-based views.

1.6.2 Stock Market Reaction to Proxy Statement Releases

Since I construct the complexity index using information from proxy statements, proxy releases represent an interesting setting to test the relation between changes to complexity

[19] Calculated as 7.58 * -.0008 = -.606%.

and abnormal stock returns. I treat proxy release date as the event and calculate the CARs around each event using the market model. To account for the possible differences between the filing date and the date the proxy was distributed to the public, I use windows that are -10 (-15) to +10 (+15) days around the event date. Finally, I group firms into two groups based on CEO pay complexity changes in the event year relative to the prior year.

Table 1.11 panel A shows the mean comparisons for firms that decreased (increased) complexity in the event year relative to the previous year, as well as firms in the bottom (top) complexity change quartiles. The mean abnormal returns of firms that decreased/increased complexity or bottom/top change quartiles are insignificantly different. In Panel B of table 1.11, I show the result of regressing CARs on complexity, firm size, and market-to-book changes. Panel B provides a similar conclusion, as the estimates on changes in complexity are insignificant. It is worth noting that proxy statements include more than executive compensation information. Thus, it is not easy to disentangle the market reaction to changes in pay complexity from the response to other corporate events.

1.6.3 Additional Control Variables

I supplement the previous analysis in tables 1.3 and 1.6 by adding additional controls. I deferred the inclusion of such variables to the robustness section due to having many observations with missing values for some of the additional controls. [20] I include CEO age as a proxy for managerial entrenchment and risk-aversion (M. A. Serfling (2014)). I also

[20] Outside directorships, which I need to calculate the busy boards variable, is not available for all firms in the sample; thus, including this variable reduces the sample size from 9,205 to 5,229 observations.

control for firm age and the strength of board monitoring (busy boards) as in Fich and Shivdasani (2006). [21]

I re-estimate the OLS and IV regressions that relate compensation complexity to firm Tobin's Q and find the inclusion of CEO age, firm age, and the percentage of busy directors to matter but does not affect the main result. [22] Furthermore, I continue to find the interaction of complexity with Blockholder ownership to be consistent with the earlier analysis. Overall, the main result is robust to controlling for managerial risk-aversion and board governance and monitoring environment.

1.7 Conclusion

The complexity of performance-based plans has recently received public attention. Investors are dissatisfied with such complexity and demand clarity and simplicity to better understand how plans relate to CEO performance. In this paper, I propose two hypotheses that relate compensation complexity to managerial incentives. The first hypothesis postulates that complexity is consistent with optimal contracting since plans rely on several pay practices suggested by the literature to align CEO interests with shareholders. On the other hand, the agency-based view conjectures that complexity is a symptom of agency problems, as complex incentive plans can allow powerful CEOs to camouflage agency issues and rent extraction. The results lend support to the agency-based view.

I document negative associations between compensation complexity and firm value and profitability. The negative relationship with value exists only among firms with weak

[21] Busy directors can relate to CEO pay complexity through weaker governance practices (see Core, Holthausen, and Larcker (1999) and Field, Lowry, and Mkrtchyan (2013)).

[22] Results are reported in Appendix C.

corporate governance. As predicted by the agency-based view and a partial explanation for the negative associations with firm outcomes, I find CEOs with complex pay are less likely to be replaced following poor performance. These results remain robust after addressing endogeneity concerns using IV estimations and propensity score matching techniques. In analyzing CEO investment behavior, I find limited and mixed evidence that supports the optimal and agency-based views. Lastly, event study around proxy statement releases and the associated changes in pay complexity does not reveal a significant difference in abnormal returns between firms that decreased or increased their CEO pay complexity.

Overall, the evidence in this paper relates to the opinion of shareholders and investors who expressed dissatisfaction with the increased complexity of CEO compensation. The findings here provide three main takeaways. First, increasing pay-for-performance disclosures may not necessarily offer shareholders complete and valuable information about executive compensation. Second, reliance on performance-based incentive plans may not be sufficient for shareholders to mitigate agency problems if the plans are not easily understood and evaluated through revealed public disclosures. Lastly, future work can extend the paper's findings by examining how complexity relates to managerial risk-taking, disclosure behavior, and other firm outcomes.

Figure 1.1: Grant Type as % of Total Grants Over Time.

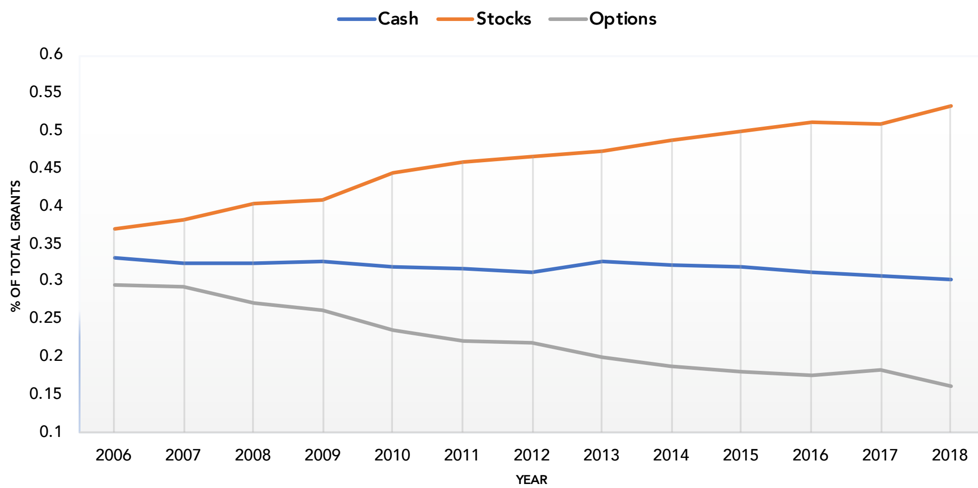

Figure 1.2: Compensation Complexity Over Time.

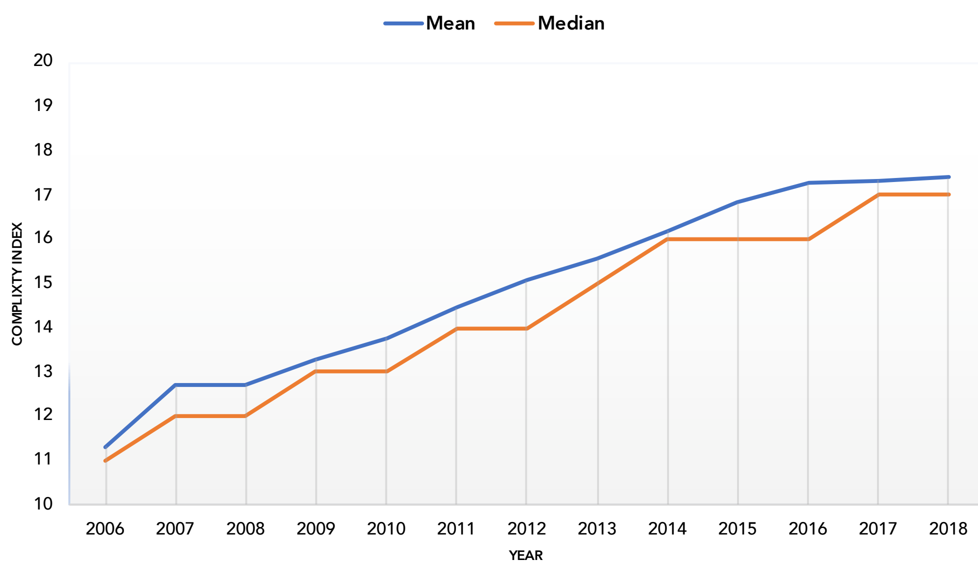

Table 1.1: This table presents summary statistics for grants, CEO, and firm characteristics. Variables are defined in the Appendix. The sample includes 1,208 distinct firms between 2006-2018.

	N	Mean	P25	P50	P75	Std. Dev.
Grants and CEO characteristics						
Complexity	9,205	15.26	10.00	14.00	19.00	7.27
Number of grants	9,205	3.25	2.00	3.00	4.00	1.33
Number of performance measures	9,205	5.21	3.00	5.00	7.00	3.66
Number of time periods	9,205	3.11	2.00	3.00	4.00	2.26
Fraction of grants with Abs/Rel %	9,205	0.38	0.00	0.00	1.00	0.48
Total compensation	9,205	8,518,891	4,022,080	6,835,747	10,842,551	6,670,012
CEO ownership %	8,943	1.76	0.21	0.56	1.39	3.59
Age	8,165	56	52	56	60	7
Tenure	8,166	6	3	5	9	5
Firm characteristics						
Market Cap (mil$)	9,205	13,762	2,157	4,633	11,955	27,814
R&D to sales	9,180	0.062	0.000	0.002	0.056	0.167
Capex to total assets	9,199	0.049	0.018	0.035	0.062	0.048
Leverage	9,173	0.227	0.104	0.219	0.329	0.162
Free cash flow	9,178	0.107	0.064	0.119	0.190	0.234
Sales growth	8,772	0.084	0.002	0.058	0.131	0.158
Tobin's Q	9,205	2.029	1.168	1.589	2.352	1.360
ROA	9,205	0.044	0.021	0.053	0.092	0.099
Stock return (%)	9,200	13.805	-11.400	10.500	32.800	42.299
Stock return volatility	9,035	9.636	6.100	8.400	11.700	4.985
Firm age	9,205	32	16	26	50	20
Blockholder ownership (%)	8,901	33.431	17.500	26.400	37.700	32.660
Number of Blockholder	8,901	3	2	3	4	2

Table 1.2: This table presents univariate comparison of firm characteristics by complexity quintiles. Each year, firms are ranked into quintiles based on the *complexity index*. Then, the mean of each variables was calculated within each quintile. The t-test is for the difference in means between the lowest and highest complexity groups.

Variable	**Lowest Complexity**	**2**	**3**	**4**	**Highest Complexity**	**T-test (L-H)**
Complexity Index	6.323	11.424	14.508	17.913	26.036	-150.00
Market Cap (mil$)	9,690.31	10,197.49	12,648.94	14,904.24	19,231.93	-15.73
Tobin's Q	2.360	2.147	1.938	1.894	1.833	11.67
ROA	0.040	0.045	0.046	0.048	0.042	-2.34
Stock return (%)	15.49	13.67	13.68	13.42	12.41	2.12
Sales growth	0.127	0.095	0.085	0.074	0.076	9.06
CEO ownership (%)	3.21	2.03	1.38	1.26	1.19	15.13
R&D to sales	0.082	0.068	0.059	0.055	0.060	3.72
Capx to assets	0.051	0.046	0.047	0.051	0.052	-0.77
FCF to assets	0.067	0.091	0.110	0.121	0.133	-7.79
Blockholder ownership ownership (%)	34.94	35.46	33.95	31.40	32.86	2.07
CEO Duality (0/1)	0.38	0.40	0.44	0.48	0.47	-6.01
Manipulator (0/1)	0.10	0.09	0.08	0.07	0.09	0.62

Table 1.3: This table shows the result from estimating equation 1.1. The depended variable is *Tobin's Q*. Low/High Blockholder ownership are indicators for firms in the lowest/highest yearly quintiles based on total Blockholders ownership, respectively. All independent variables are lagged by one year. See Appendix for the full description of variables. Regressions include industry (Fama French 48 industry groups) and year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Complexity	-.0206***	-.0096**	-.0126**	-.0077*	-.009**
	(.0043)	(.0036)	(.0047)	(.0038)	(.0039)
ROA		3.0587***	3.0585***	3.0505***	3.0663***
		(.4699)	(.4694)	(.4698)	(.4671)
Market capitalization		.2357***	.2357***	.2385***	.2468***
		(.024)	(.024)	(.0243)	(.025)
R&D to sales		2.6562***	2.6533***	2.6615***	2.66***
		(.2833)	(.2836)	(.2835)	(.2828)
Sales growth		1.3903***	1.3881***	1.3888***	1.3802***
		(.2429)	(.2423)	(.2439)	(.2408)
Stock return		.0101***	.0101***	.0101***	.0101***
		(.0014)	(.0014)	(.0014)	(.0014)
Log (CEO ownership)		.0633***	.0647***	.0281	.0625***
		(.0165)	(.0166)	(.0311)	(.0166)
Blockholder ownership		-.0001	-.0001	-.0001	-.0004
		(.0005)	(.0005)	(.0005)	(.0004)
Duality		-.0543	-.1546	-.0505	-.0485
		(.0437)	(.0938)	(.0439)	(.0434)
Log (total compensation)		-.2317***	-.2309***	-.2357***	-.2369***
		(.0428)	(.0427)	(.0425)	(.0424)
Duality × Complexity			.0067		
			(.0048)		
Log (CEO ownership) × Complexity				.0025	
				(.0016)	
Low Blockholder ownership × Complexity					-.0125**
					(.0043)
Low Blockholder ownership					.1100
					(.0909)
High Blockholder ownership × Complexity					.0107*
					(.0059)
High Blockholder ownership					-.1273
					(.0978)
Observations	9,205	8,188	8,188	8,188	8,188
Adjusted R^2	.244	.468	.469	.469	.471
Year FE	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓

Table 1.4: This table shows the result from relating compensation complexity to firm Profitability. The depended variable is Return On Assets (*ROA*). Low/High Blockholder ownership are indicators for firms in the lowest/highest yearly quintiles based on total Blockholders ownership, respectively. All independent variables are lagged by one year. See Appendix for the full description of variables. Regressions include industry (Fama French 48 industry groups) and year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Complexity	.0003	-.0003***	-.0004***	-.0003**	-.0003**
	(.0002)	(.0001)	(.0001)	(.0001)	(.0001)
ROA		.4699***	.4699***	.4697***	.4678***
		(.0386)	(.0386)	(.0386)	(.0384)
Market capitalization		.015***	.015***	.0151***	.0147***
		(.0015)	(.0015)	(.0015)	(.0014)
R&D to sales		-.1276***	-.1277***	-.1275***	-.1279***
		(.013)	(.0131)	(.0131)	(.0132)
Capital expenditure to total assets		-.0256	-.0256	-.0257	-.0242
		(.0401)	(.0403)	(.04)	(.0395)
Stock return		.0005***	.0005***	.0005***	.0005***
		(.0001)	(.0001)	(.0001)	(.0001)
Sales growth		.0299**	.0299**	.0299**	.0302**
		(.013)	(.013)	(.013)	(.013)
Duality		-.0011	-.0017	-.001	-.0013
		(.0021)	(.0036)	(.0021)	(.0021)
Log (total compensation)		-.0093***	-.0092***	-.0094***	-.0092***
		(.0021)	(.0021)	(.002)	(.002)
Log (CEO ownership)		.0003	.0003	-.0008	.0002
		(.0007)	(.0007)	(.0012)	(.0007)
Duality × Complexity			.00004		
			(.0002)		
Log (CEO ownership) × Complexity				.0001	
				(.0001)	
Low Blockholder ownership × Complexity					.00002
					(.0002)
Low Blockholder ownership					-.003
					(.0054)
High Blockholder ownership × Complexity					-.0003
					(.0003)
High Blockholder ownership					-.0042
					(.0048)
Observations	9,205	8,494	8,494	8,494	8,494
Adjusted R^2	.077	.465	.465	.465	.466
Year FE	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓

Table 1.5: This table shows the result from estimating equation 2.1. The dependent variable is Turnover, an indicator that equals 1 if the CEO change that year, zero otherwise. There are 818 turnovers in the sample. Stock return is the compound returns for last 12 months of fiscal period; Industry_adj_Stock return is the difference between the firm's Stock return and the median return for all firms in the same Fama-French 48 industry group; ROA is the return on assets; Sales growth is the the average sales growth for the previous three years. All independent variables are lagged by one year. See Appendix for the full description of variables. Regressions include industry (Fama French 48 industry groups) and year fixed effects. Standard errors are clustered at the firm level and reported in parentheses; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**
Stock return × Complexity	.0134*			
	(.0072)			
Stock return	-.6628***			
	(.1303)			
Industry_adj_Stock return × Complexity		.0145*		
		(.0087)		
Industry_adj_Stock return		-.6743***		
		(.1478)		
ROA × Complexity			.0523*	
			(.0269)	
ROA			-1.3013***	
			(.4356)	
Sales growth × Complexity				.0351*
				(.0209)
Sales growth				-1.0548***
				(.374)
Complexity	.002	.0034	.0006	.0008
	(.003)	(.003)	(.0032)	(.0033)
Total volatility	.0175***	.0176***	.0144***	.0171***
	(.0054)	(.0052)	(.0054)	(.0051)
Log CEO ownership	-.0374**	-.036**	-.0354**	-.0304*
	(.0165)	(.0164)	(.0165)	(.0168)
Duality	.0423	.0382	.0345	.0441
	(.0436)	(.0435)	(.0434)	(.0437)
Tenure	.0227***	.0225***	.023***	.0224***
	(.0077)	(.0077)	(.0077)	(.0079)
Age64	.4872***	.4871***	.4822***	.4697***
	(.0677)	(.0676)	(.0667)	(.0679)
Observations	7,827	7,827	7,827	7,695
Prob $>\chi^2$	0.00	0.00	0.00	0.00
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓

Table 1.6: This table reports instrumental variable regression estimation results. The endogenous variable is Compensation Complexity, the dependent variable in column (1). The first instrument is *Ind_Median_Complexity* , the median complexity index value of firms in the same industry and size quartile. Industry is defined based on Fama French 48 groups, and size is based on total assets. I exclude the vocal firm from the calculation of the median. The second instrument is *CC_tenure*, the number of years in which the compensation consultant was working with the firm. The depended variable in the second-stage is *Tobin's Q*. All independent variables are lagged by one year. See Appendix for the full description of variables. Regressions include industry (Fama French 48 industry groups) and year fixed effects. Standard errors are clustered at the firm level and reported in parentheses; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively

	(1) First-stage	(2) Second-stage
	Complexity	**Tobin's Q**
Ind_Median_Complexity	.5515***	
	(0.06)	
CC_tenure	.0769*	
	(0.04)	
Complexity		-.2213***
		(0.07)
ROA	-2.107	1.854***
	(1.38)	(0.62)
Market Cap	0.239	.3442***
	(0.15)	(0.08)
R&D to sales	-.1363	2.396***
	(0.66)	(0.58)
Sales growth	-3.34**	.579***
	(0.68)	(0.28)
Stock return	-.0003	.01***
	(0.00)	(0.00)
Log (CEO ownership)	-.1338***	-.013
	(0.04)	(0.02)
Blockholder ownership	.002	.0007
	(0.02)	(0.00)
Duality	.0365	-.0207
	(0.26)	(0.07)
Observations	7,539	7,539
Anderson-Rubin (weak instrument test) p-value	0.00	
First-stage F-statstic (weak identification test)	43.6	
Sargan-Hansen (p-value)		0.22
Year FE	✓	✓
Industry FE	✓	✓
Clustered SE	✓	✓

Table 1.7: This table reports instrumental variable regression estimation results. The endogenous variable is Compensation Complexity, the dependent variable in columns (1) and (3). The instrument is *Ind_Median_Complexity* , the median complexity index value of firms in the same industry and size quartile. columns (1) and (2) present the first and second-stage IV estimation for relation between complexity and ROA, respectively. columns (3) and (4) present the first and second-stage IV estimation for the CEO Turnover-Performance Sensitivity analysis. To preserve space, I only present coefficients on the instrumental variable in the first stage and coefficients on the predicted Complexity in the second stage. Control variables in columns (1-2) are the same as in table 1.4, while controls in columns (3-4) are the same as in table 1.5. See Appendix for the full description of variables. Regressions include industry (Fama French 48 industry groups) and year fixed effects. Standard errors are clustered at the firm level and reported in parentheses; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively

	(1)	**(2)**	**(3)**	**(4)**
	First-stage	**Second-stage**	**First-stage**	**Second-stage**
	Complexity	**ROA**	**Complexity**	**Turnover**
Ind_Median_Complexity	0.561***			
	(0.055)			
Complexity		-0.006***		
		(0.001)		
Stock return × Ind_Median_Complexity			0.803***	
			(0.064)	
Stock return × Complexity				0.005**
				(0.002)
Observations	8,765	8,765	7,794	7,794
Anderson-Rubin (weak IV test) p-value	0.00		0.03	
First-stage F-statistic	105.5		103.0	
Kleibergen-Paap (p-value)		0.00		0.00
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓

Table 1.8: This table reports propensity score matching estimation results The treatment group includes firms in the highest complexity quaintle from table 1.3, while the control group includes firms in the lowest complexity quaintle. Firms in the treatment and control are match based on market capitalization, one-year lagged Tobin's Q, CEO' tenure, duality, total compensation, number of Blockholder owners, fiscal year, and Fama French 48 industry groups. Each observation in the treatment group is matched with one observation in the control group. Column (1) shows the estimated average treatment effect (ATE) on Tobin's Q, while column (2) shows the estimated average treatment on ROA. Abadie–Imbens standard errors are reported; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively

Measure:	**(1) Tobin's Q**	**(2) ROA**
Panel A. Nearest-Neighbor Matching		
ATE	-.1389***	-.0073**
Std. Err.	.0342	.0035
z-Statistic	-4.06	-2.06
N	3,097	3,097
Panel B. Propensity-Score Matching (probit)		
ATE	-.0988**	-.0057
Std. Err.	.0499	.0042
z-Statistic	-1.98	-1.37
N	3,097	3,097
Panel C. Propensity-Score Matching (logit)		
ATE	-.0985***	-.0083*
Std. Err.	.0434	.0043
z-Statistic	-2.27	-1.91
N	3,097	3,097

Table 1.9: The table presents the result from estimating equation 2.2. The sample includes 327 M&A deals announced over the period 2007-2017. The dependent variable is *M&A*, and indicator equals to 1 if the firm announces an acquisition, 0 otherwise. Low/High Blockholder ownership (FCF) are indicators for firms in the lowest/highest yearly quintiles based on total Blockholders ownership(Free Cash Flow), respectively. All independent variables are lagged by one year. See Appendix for the full description of variables. Regressions include industry (Fama French 48 industries) and year fixed effects. Standard errors are clustered at the firm level and reported in parentheses; * ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**
Complexity	-.0026	.0024	-.0067
	(.0039)	(.0046)	(.0052)
Market Cap	.0576***	.0587***	.0533**
	(.0218)	(.0227)	(.0221)
Leverage	-.4273**	-.4274**	-.4104**
	(.2033)	(.2042)	(.2035)
Free Cash flow	.512*	.5122*	.2763
	(.2678)	(.2688)	(.2805)
ROA	.2974	.2752	.4427
	(.55)	(.5528)	(.5745)
Tobin's Q	-.065**	-.0656**	-.0718***
	(.0274)	(.0277)	(.0278)
Low Blockholder ownership × Complexity		-.0108	
		(.0095)	
Low Blockholder ownership		.0606	
		(.1556)	
High Blockholder ownership × Complexity		-.0238**	
		(.0118)	
High Blockholder ownership		.1809	
		(.1637)	
Low FCF × Complexity			-.0019
			(.0116)
Low FCF			.0089
			(.1817)
High FCF × Complexity			.0136*
			(.0082)
High FCF			-.0705
			(.1432)
Observations	7,751	7,751	7,751
Prob $>\chi^2$	0.000	0.000	0.000
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
Clustered SE	✓	✓	✓

Table 1.10: This table reports the cross-sectional estimation of M&As announcement CARs. The dependent variable is the stock cumulative abnormal return over the window (-1, 1), using the Fama-French three factor model. The independent variables include the lagged complexity index and controls. Diversify is an indicator equals to 1 if acquirer and the target belong to different industries, zero otherwise. See Appendix for the full description of variables. Regressions includes industry (Fama French 48 industry groups) and year fixed effects. Standard errors are clustered at the firm level and reported in parentheses; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**
Complexity	-.0002	-.0002	-.0008***
	(.0002)	(.0003)	(.0002)
Market Cap	.0012	.0009	.0018
	(.0023)	(.0026)	(.0025)
Leverage	.0275	.0266	.0322
	(.0222)	(.0241)	(.02)
Net working capital	-.0195	-.0172	-.0203
	(.0324)	(.0323)	(.0323)
Free Cash flow	.0442	.0445	.0811
	(.0376)	(.0378)	(.0495)
Diversify	.0022	.0026	.0013
	(.0074)	(.0076)	(.0077)
Tobin's Q	.0052*	.0054*	.0059**
	(.0028)	(.003)	(.0028)
Low Blockholder ownership × Complexity		-.0005	
		(.0004)	
Low Blockholder ownership		.0058	
		(.009)	
High Blockholder ownership × Complexity		.0004	
		(.0019)	
High Blockholder ownership		-.0096	
		(.0156)	
Low FCF × Complexity			.0007
			(.0009)
Low FCF			.0033
			(.0179)
High FCF × Complexity			.0012**
			(.0005)
High FCF			-.0299**
			(.012)
Observations	327	327	327
Adjusted R^2	.068	.071	.086
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
Clustered SE	✓	✓	✓

Table 1.11: This table presents the result for the event study that examines the relation between stock market abnormal returns and the release of proxy statements. The event date is the proxy statement release date, and the event windows are -10(-15) to 10(15) days around the event. Panel A shows mean comparison for firms that decrease (increased) complexity in the event year relative to the previous year. Panel A also shows the mean comparison for firms in the bottom (top) complexity change quartiles. Panel B shows the regression analysis of event CARS. The dependent variable in In column (1) is CARs for event window (-10, 10), while CARs for event window (-15, 15) in column (2). Regressions include industry and year fixed effects. Standard errors are clustered at the firm level and reported in parentheses; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

Panel A: Mean comparisons

	Firms decreasing complexity		**Firms increasing complexity**		
Variable	N	Mean	N	Mean	MeanDiff
CAR(-10,10)	2,746	0.20%	5,074	0.20%	0
CAR(-15,15)	2,746	0.30%	5,074	0.40%	-0.001

	Bottom quartile Δ complexity		**Top quartile Δ complexity**		
Variable	N	Mean	N	Mean	MeanDiff
CAR(-10,10)	2,546	0.20%	2,028	0.30%	-0.001
CAR(-15,15)	2,546	0.30%	2,028	0.30%	0

Panel B: Regression analysis

	(1) **CAR(-10,10)**	**(2)** **CAR(-15,15)**
Δ Complexity	0.003	0.002
	(0.002)	(0.002)
Log(assets)	-.019**	-.014*
	(0.007)	(0.009)
Market-to-Book	-.08***	-.087***
	(0.014)	(0.014)
Observations	9,184	9.184
Adjusted R^2	0.027	0.028
Year FE	✓	✓
Industry FE	✓	✓
Clustered SE	✓	✓

Appendix A

An Example of a Complex Compensation Plan

Consider Goldman Sachs' CEO's compensation package for 2015 and 2016. In 2015, CEO's compensation consisted of salary, annual variable compensation (includes cash, Performance Share Units (PSU), Restricted Share Units (RSU)), and awards under the firm's Long-Term Performance Incentive Plan (LTIP). The payouts from PSU were tied to the annual firm's stock price, while RSU's payouts to stock price and annual return on equity. As to the awards under LTIP, the performance period is set to eight years, with the possibility of change to 3-years under the compensation committee's discretion. The calculations of LTIP awards' payouts are as follows. First, the compensation committee determines the initial awards notional value based on historical performance and macro environment. Second, throughout the performance period, the notional value increases/decreases by the annual return on equity, capped at 12%. Lastly, at the end of the performance period, the final balance of LTIP awards is adjusted by the average return on equity and change in book value per share over the entire performance period (as shown in table below).

Thresholds Applicable to Average "ROE"/BVPS Adjustment for 2016 LTIP Awards (Step 3)

Payout*	Average "ROE" Over Performance Period (Applies to 50% of Adjusted Notional Value at End of Performance Period)	Average Change in BVPS Over Performance Period (Applies to 50% of Adjusted Notional Value at End of Performance Period)
Zero	<5%	<2%
50%	5%	2%
100%	12%	7%
150%	≥15%	≥12%

In 2016, the CEO's compensation package received only two-thirds of shareholders' support at the annual meeting. Shareholders mentioned overlay complex compensation program and the lack of peers' relative performance evaluation as the main reasons behind the low support (Specifically, they opposed to the grant of LTIP awards on top of the annual variable compensation, overly complex calculations of LTIP awards' payoffs, and overlapping performance thresholds of LTIP and PSU awards.). As a response, in 2016 the firm's board met with the shareholders and agreed to remove the long-term incentive plan and link equity awards to CEO's performance relative to peers.

The following is an illustration of the compensation based complexity index for Tesla's CEO Elon Musk for the 2018 fiscal year. The table shows how the information from proxy statements (DEF 14A) with regard to the incentive terms were used to calculate the index.

		Score
Short-term Cash		0
Long-term Cash		0
Restricted Stocks		0
Stock Options		1
	Time condition	0
	Relative condition	0
	Absolute condition	1
	# of unique Rel Performance measures	0
	# of unique Abs Performance measures	3
	# of unique Time periods	12
	Complexity index =	**17**

Appendix B

Variable Definitions

Variable	**Definition**
Blockholders ownership (%)	The aggregate ownership percentage of all Blockholders; from Incentive Lab.
Busy directors (%)	The percentage of outside directors that hold three or more directorships; ISS - Directors Data.
Capex to assets	Capital expenditure/Total assets; from Compustat.
CC tenure	The number of years in which the compensation consultant was working with the firm.
CEO age	CEO age on year t; from ExecuComp.
CEO stock ownership (%)	CEO total ownership of firm stock; from Execucomp variable "shrown tot pct".
CEO's tenure	The number of years as CEO; calculated from ExecuComp).
CC_tenure	The number of years in which the compensation consultant was working with the firm.
Complexity	The complexity index constructed similar to Carter et al.(2015); from Incentive Lab.
Diversify	A dummy variable that takes the value of 1 if the acquirer and the target belong to different 2-digit SIC codes, 0 otherwise.
Duality	A dummy variable that takes the value of 1 if the CEO is also the Chairman, 0 other- wise; from Incentive Lab.
Firm age	The time since first appearance in Compustat.
Free cash flow to assets	Calculated as (Earnings before interest, taxes, depreciation, and amortization - income tax - interest - dividend payment)/ beginning of the year book value of assets; from Compustat.
Indu_med_Complexity	Median compensation complexity of firms in the same industry and size quartile. Same industry is defined by Fama French 48 groups and size by total assets.
Leverage	Long-term debt (book value)/ total assets; from Compustat.
Log (CEO stock ownership)	Log ((CEO stock ownership*100) +1).
Log (total compensation)	Log of CEO's toal compensation; from ExecuComp.
Log market cap	Log (market cap + 1).
M&A	A dummy variable that takes the value of 1 if the firm is an acquirer in the previous year, 0 otherwise.
Manipulator (1/0)	A dummy variable that equals 1 if the M-Score is greater than 1.78, zero otherwise. The M-Score is calculated from the model in Beneish et al. (2013).
Market Cap (In $ million)	Market value of equity; obtained as (fiscal year end-month share- outstanding * fiscal year end-month closing price); from CRSP.
Num. Blockholders	The number of Blockholders; from Incentive Lab.
R&D to sales	R&D expense/Sales; from Compustat. Any missing value of RD expenditure is replaced with zero.
ROA	Net income/Total assets; from Compustat.
Sales Growth (%)	The average sales growth for the previous three years; from Compustat.
Stock Return	Compound returns for last 12 months of fiscal period; from CRSP.
Tobin's Q	(Book value of total assets + Market value of equity – Book value of equity)/Book value of total assets; from Compustat.
Total Volatility	Total stock return volatility in the last 24 months of fiscal period; from CRSP.
Total compensation	CEO's compensation calculated as the sum of salary, bonus, non-equity incentives, option awards, stock awards, other compensation, deferred compensation (TDC1); from ExecuComp.
Turnover	A dummy variable that takes the value of 1 if there is change of CEO as shown in ExecuComp, 0 otherwise.

Appendix C

Additional Tables

Additional Control Variables. This table shows the result from the re-estimation of the OLS and the second-stage IV regressions that relate compensation complexity to firm value. The depended variable is Tobin'Q. Column (1) shows that results form OLS estimation, and Columns (2) and (3) present the estimation from results for the IV regression. All regressions include industry and year fixed effects. Standard errors are clustered at the firm level and reported in parentheses; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**
	OLS	**First-stage**	**Second-stage**
	Tobin's Q	**Complexity**	**Tobin's Q**
Ind_Median_Complexity		.5232***	
		(0.071)	
Complexity	-.0083**		-.1796***
	(0.003)		(0.038)
ROA	5.566***	-1.5003	4.626***
	(1.137)	(2.087)	(.600)
Market Cap	.2078***	-.9853***	.1848***
	(0.031)	(0.214)	(0.047)
R&D to sales	3.6644***	2.2577	3.692***
	(0.435)	(2.762)	(0.823)
Sales growth	.596*	-2.7569***	0.0506
	(0.276)	(1.067)	(0.284)
Stock return	.0106***	-0.0004	0.0107***
	(0.001)	(0.003)	(0.000)
Log (CEO ownership)	.0576**	-.5443***	-0.0381
	(0.023)	(0.155)	(0.037)
Blockholder ownership	0.0006	-0.0085**	0.0007
	(0.001)	(0.004)	(0.001)
Duality	0.0233	-0.2430	0.0101
	(0.052)	(0.351)	(0.079)
Log (total compensation)	-.1821***	2.3225***	.2645***
	(0.049)	(0.245)	(0.117)
Firm's age	-.0072***	0.0185	-0.0035
	(0.002)	(0.012)	(0.003)
CEO's age	-.0079*	-0.0481*	-0.0155**
	(0.004)	(0.026)	(0.006)
Busy directors (%)	-.2919*	1.7465	0.131
	(0.148)	(1.331)	(0.299)
Observations	5,229	5,229	5,229
Anderson-Rubin (weak IV test) p-value		0.00	
First-Stage F-Statisic		53.8	
Kleibergen-Paap (p-value)			0.00
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
Clustered SE	✓	✓	✓

Additional Control Variables. This table shows the result from the re-estimation of the OLS regressions in table 1.3 that relates CEO Compensation Complexity to Firm's Value. The depended variable is Tobin'Q. All variables are defined as in table 1.3. See Appendix for the description of variables. All independent variables are lagged by one year. Regressions include industry and year fixed effects. standard errors are clustered at the firm level and reported in parentheses; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Complexity	-.0206***	-.0083**	-.01**	-.0049	-.0069*
	(.0044)	(.0031)	(.004)	(.0044)	(.0038)
ROA		5.566***	5.5604***	5.5763***	5.5818***
		(1.137)	(1.1351)	(1.1347)	(.8415)
Market capitalization		.2078***	.2078***	.2123***	.2195***
		(.0313)	(.0313)	(.0333)	(.0337)
R&D to sales		3.6644***	3.6635***	3.6884***	3.6767***
		(.4357)	(.4355)	(.4371)	(.7415)
Sales growth		.596*	.5963*	.5812*	.5875**
		(.2761)	(.2751)	(.2806)	(.2003)
Stock return		.0106***	.0106***	.0107***	.0106***
		(.0014)	(.0014)	(.0014)	(.0013)
Log (CEO ownership)		.0576**	.0585**	.0064	.0566**
		(.0238)	(.0239)	(.0437)	(.0185)
Blockholder ownership		.0006	.0006	.0006	.0004
		(.0006)	(.0006)	(.0006)	(.0004)
Duality		.0233	-.0338	.0289	.0294
		(.0523)	(.0904)	(.0526)	(.0464)
Log (total compensation)		-.1821***	-.1816***	-.1881***	-.1889***
		(.0497)	(.0495)	(.0506)	(.0494)
Firm's age		-.0072***	-.0072***	-.0073***	-.0071***
		(.0021)	(.0021)	(.0021)	(.0017)
CEO's age		-.0079*	-.0078*	-.0078*	-.0077*
		(.0038)	(.0038)	(.0038)	(.0037)
Busy directors (%)		-.2919*	-.2903*	-.3125*	-.2868
		(.1483)	(.1464)	(.157)	(.1684)
Duality × Complexity			.0037		
			(.0045)		
Log (CEO ownership) × Complexity				.0036	
				(.0024)	
Low Blockholder ownership × Complexity					-.011**
					(.0047)
Low Blockholder ownership					.0674
					(.0997)
High Blockholder ownership × Complexity					.0095
					(.0066)
High Blockholder ownership					-.1656
					(.1111)
Observations	9,205	5,229	5,229	5,229	.5,229
Adjusted R^2	.2449	.5048	.5049	.5058	.5074
Year FE	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓

Chapter 2

Do Firms with Major Customers Use More or Less Relative Performance Evaluation in CEO Compensation?

2.1 Introduction

Many U.S. firms deal with and derive a significant proportion of their sales from a few major customers.[1] Prior literature shows that the prominence of such customer concentration bears a substantial effect on various corporate aspects.[2] Recent work also sheds light on how

[1] According to Ellis, Fee, and Thomas (2012), 45% Of firm-years in their sample belonged to firms having at least one major customer.

[2] Dhaliwal et al. (2016) and Campello and Gao (2017) study the effect of customer concentration on financing costs, Kale and Shahrur (2007) and Banerjee, Dasgupta, and Y. Kim (2008) on capital structure

customer concentration impacts CEO compensation design. For example, C. Liu, Masulis, and Stanfield (2021) show that firms with major customers lower option-based pay due to the increased costs associated with the CEO's risk-taking incentives. Chen et al. (2022) find opposite results, which they interpret as evidence of boards' efforts to offset CEOs' risk-aversion and prevent managerial conservatism. In this paper, I examine how a firm's customer concentration affects implementing an important feature in CEO compensation, which is relative performance evaluation (RPE).

Agency theory suggests that boards should link CEO compensation to firms' performance relative to peers, which would improve risk-sharing among managers and owners and provide insurance to CEOs against uncontrollable performance shocks (Holmstrom (1982); Diamond and Verrecchia (1982); Holmstrom and Milgrom (1987) E. P. Lazear and Rosen (1981)). RPE insulates a manager's performance from systematic shocks by filtering common performance trends between the focal firm and its peers. Hence, theory predicts that the efficacy of RPE should be higher for firms that are more exposed to systematic risk and will depend on peer availability to filter out such risk. I conjecture that having concentrated customer bases would position firms to derive clear benefits from RPE and face costs associated with its implementation.

Concentrated customer bases can motivate firms to use RPE in CEO compensation to achieve at least two benefits. First, having a concentrated customer base is associated with higher systematic and idiosyncratic risks (A. Albuquerque, Papadakis, and Wysocki (2014); Dhaliwal et al. (2016)). The higher exposure to systematic risk implies

choices , J. Wang (2012) and Itzkowitz (2013) on financial decisions, Intintoli, M. Serfling, and Shaikh (2017) and Johnson, Karpoff, and Yi (2015) on CEO turnover and governance.

that firms would benefit more from RPE to alleviate unwanted risk on CEOs and provide informative signals about their abilities. Second, firms would find RPE especially beneficial since it offers tournament-like incentives that would induce desirable risk-taking actions by CEOs (E. P. Lazear and Rosen (1981); Hvide (2002); and Park and Vrettos (2015)). The logic is that the high idiosyncratic risk associated with customer concentration may alter the attitude of un-diversified managers, leading them to invest conservatively and forgo risky but positive-NPV projects appreciated by diversified shareholders.

Despite these benefits, the high costs of RPE implementation might constrain its use. One such cost is the limited availability of informative peers needed to capture and filter out common risks. Specifically, firms in important customer-supplier relations often find it necessary to invest in relationship-specific investments and produce unique products tailored to customers' needs (Titman (1984); Joskow 1988; Titman and Wessels (1988a)). The unique nature of these investments and the undiversified sources of revenue make these firms distinct in the product market, thus lowering the number of feasible and appropriate peers. The lack of suitable peers makes it cumbersome and impractical for boards to implement RPE. Moreover, RPE could still be costly and less beneficial even if boards were to identify relevant peers. The reason is that the limited number of peers implies that RPE's benchmark, peers' average performance, would be a noisy measure and less informative about common shocks.[3]

The second cost that may constrain RPE use is the possible disruption of customer ties due to CEO excessive risk-taking. Two related arguments underpin this conjecture.

[3]According to Holmstrom (1982), filtering of common shocks should increase with the number of available peers.

First, customers care about their supplier's investment policies and financial health as both are directly related to supply-chain stability and the value of current and future business relations (e.g., Maksimovic and Titman (1991); Hertzel et al. (2008); Cen et al. (2016); C. Liu, Masulis, and Stanfield (2021)). Second, maintaining long and robust relationships with large customers provides firms with other benefits apart from mere revenues through positive spillover effects (Cen et al. (2016)). Therefore, potential excessive risk-taking prompted by tournament-like incentives of RPE would increase firm-specific risk and financial distress costs and signal deterioration in firm's reliability, which may lead customers to scale down or terminate the business relationship. Such disruption would mean substantial losses for firms on their specific investments and missing out on benefits brought about by customer relations.

In sum, firms with concentrated customer bases can benefit from RPE to mitigate the higher systematic risk faced by their CEOs and provide incentives that encourage value-increasing actions. However, firms may find RPE costly and less appealing because of peers' limited availability or to avoid the possible disruption to their relations with customers. Thus, this paper examines firms' use of implicit and explicit RPE to understand whether its implementation costs would outweigh the benefits.

The empirical investigation relies on a panel of 41,083 firm-years spanning 1992 through 2019 to detect the implicit presence of RPE using a two-stage regression approach. In doing so, I follow the literature (Antle and A. Smith (1986); Jenter and Kanaan (2015b); Na (2020)) and regress firm performance on peer performance to decompose performance into two parts: firm-specific component and common component.[4] The firm-specific (com-

[4]Common component represents the part of firm's performance that is common or shared with peers.

mon) performance part is defined as the regression's residuals (predicted values). In the second stage, I estimate the sensitivity of compensation to each component. I next compare the sensitivity of pay to common performance between firms with and without major customers. Following this research design, I show that the sensitivity of CEO compensation to common or systematic performance is higher for firms that deal with significant customers (less use of RPE). In economic terms, for a firm with a sample mean sale to major customers, a one standard deviation increase in customer concentration results in 17% increase in the sensitivity of CEO compensation to common performance. This result is robust to controlling for firm characteristics, CEO and industry-year fixed effects. The finding also holds using an alternative RPE research design (A. Albuquerque (2009)) and different peer group definitions (49-Fama French industries and Hoberg and Phillips (2016) product market peers) to address concerns that misidentification of peer groups is driving the result.

Next, I dig deeper into why firms with major customers rely less on RPE. First, I examine whether firms link CEO compensation to common performance due to the lack of peers. The analysis shows that firms with concentrated customer bases have, on average, a significantly lower number of peers and are also less similar to peers in terms of product description. Consistent with the explanation, I find that firms with major customers fully filter out the effect of peer performance on CEO pay when many peers are available. Second, I investigate whether the possibility of disrupting customers' ties is behind the lack of RPE. To test this explanation, I examine situations where the likelihood of losing large customers is low. Unlike corporate customers, government customers are more stable and decrease firms' risk exposure (Banerjee, Dasgupta, and Y. Kim (2008); Goldman, So, and Rocholl (2012)). These characteristics should make firms less worried about losing the business of government customers. Inconsistent with the disruption explanation, firms do not reduce the sensitivity of CEO pay to peer performance when dealing with government customers. Furthermore, firms do not remove the effect of peer performance on CEO pay when customers face high switching costs. I also rule out other explanations for the lack of RPE, such as CEO power, industry strategic interactions, or the notion of less incentive pay for risky firms.

As the last step of the investigation, I take advantage of the expanded compensation disclosures mandated by the SEC in 2006 to validate the main findings by examining the explicit use of RPE for the 750 largest U.S. firms from 2006 to 2018. I show that firms with major customers are less likely to disclose the use of RPE linked to a customized group of peers and that firms that do so rely on relatively fewer explicit peers. Furthermore, I find that the concentration of corporate customers is positively and significantly associated with RPE that uses a market or industry index as a performance reference point. This result implies that firms with major corporate customers opt to benchmark CEO performance against a market-wide index rather than a custom peer group when explicitly using RPE. The result confirms and is consistent with the finding from implicit RPE tests, which indicated that peers' limited availability constraints firms' use of RPE.

Overall, this paper contributes to the literature on the role of customers as important stakeholders. Specifically, the results extend a recent line of research that examines how customer concentration relates to the firm's CEO compensation (C. Liu, Masulis, and

Stanfield (2021); Chen et al. (2022); A. Albuquerque, Papadakis, and Wysocki (2014)). I show that, in the presence of large customers, firms have fewer peers and are less similar to their peers in terms of product description. The uniqueness of these firms makes it cumbersome for their boards to identify peers exposed to shared shocks, leading to less use of RPE. The paper also contributes to the extensive executive compensation literature by proposing another explanation for the RPE puzzle. The evidence that the makeup of a firm's customer base is an important consideration for the board when deciding to adopt RPE in compensation contracts may partially explain why RPE is not as prominent in practice as theory predicts. This explanation for the lack of RPE adds to others in the literature, such as firms' desire to soften competition in oligopolistic industries (Aggarwal and Samwick (1999)), managers' ability to hedge market movements (Jenter (2004) and G. Garvey and Milbourn (2003)), relative wealth concerns (DeMarzo and Kaniel (2016)), outside opportunities (Oyer (2004) and Himmelberg and Hubbard (2000)), and talent-retention explanation (De Angelis and Grinstein (2020)).

The rest of the paper is organized as follows: Section 2.2 provides background and testable hypothesis. Section 2.3 describes the data and the construction of the variables used in the analysis. Section 2.4 includes the main empirical results. Section 2.5 provides robustness. Section 2.6 summarizes the findings and concludes.

2.2 Background and Hypothesis Development

2.2.1 Relative Performance Evaluation

Agency theory suggests that boards should tie the compensation of CEOs to firms' performance to align CEOs' interests with the shareholders'. Furthermore, CEOs' performance should be measured relative to a group of economically meaningful peers (Holmstrom (1982); Verrecchia (1982); Holmstrom and Milgrom (1987)) rather than viewed in absolute terms. Such a measurement is conducted to insulate CEO's performance from exogenous shocks by filtering out common performance trends between the focal firm and its peers (E. P. Lazear and Rosen (1981); Holmstrom (1982)). That is the idea behind RPE, which improves managers' and owners' risk-sharing and incentive alignment.

According to RPE theory, complete filtering of exogenous performance shocks that can be measured among peers is considered as a strong-form of RPE. Under the strong-form, boards base compensation and decide to retain or dismiss CEOs exclusively based on firms' performance that is entirely unrelated to peers. Past work provides mixed on whether strong-form holds for both compensation and turnover decisions, referred to in the literature as the RPE puzzle.[5] The type of RPE often tested in the literature is weak-form RPE, which does not predict complete filtering of peer performance, but only that some filtering is done by boards.[6] Specifically, under the weak-form, CEO compensation and turnover is positively related to firm performance while negatively related to peer performance.

[5] For work that test strong-form RPE in compensation, see for e.g., Antle and A. Smith (1986); Gibbons and Kevin J. Murphy (1990); Na (2020), and for turnover decisions see for e.g., Jenter and Kanaan (2015b).

[6] See for e.g., A. Albuquerque (2009), Albuquerque (2013); De Angelis and Grinstein (2020), Jayaraman et al. (2020).

In testing for the implicit presence of RPE in compensation contracts, researchers typically relate CEO's pay to the performance of an assumed group of peers. The literature has employed several definitions of peers, including peers comparable in size and from the same industry (A. Albuquerque, Papadakis, and Wysocki (2014)), in the same product market (Jayaraman et al. (2020)), and in the same life cycle stage (Drake and Martin (2019)). Thus, the implicit approach of testing for RPE assumes that the group of peers has been correctly identified. In 2006, the SEC introduced new regulations, among which rules requiring firms that use RPE in setting CEOs pay to disclose the performance measures, goals, resulting payouts, and the identity of the peer firms or market index used for relative evaluation. This rule provided researchers with a new explicit way for testing the presence of RPE and its related features in compensation contracts (see for e.g., Gong, L. Y. Li, and Shin (2011); J. C. Bettis et al. (2018); De Angelis and Grinstein (2020)).

2.2.2 Customer Concentration

According to Ellis, Fee, and Thomas (2012), 45% of all firm-year observations in Compustat in their sample period have at least one major customer. Such customer concentration makes the firms less diversified, increases their business risk, and makes the supplier-customer relationship significant to how various suppliers' corporate policies are shaped. For example, firms that deal with major customers often invest in relation-specific investments, such as R&D, SG&A, or asset specific-investments, and produce customized products for their customers (Titman (1984); Joskow 1988; and Titman and Wessels (1988a)). Dhaliwal et al. (2016) and Campello and Gao (2017) document the higher risk associated with customer concentration by showing its association with higher firms' costs of equity and debt financing. Cen et al. (2016) find that long-term relationships with major customers function as a certification for overall quality and solvency, leading firms to enjoy bank loans with favorable conditions. Customer concentration is also associated with firms' conservative corporate policies such as maintaining lower leverage (Kale and Shahrur (2007); Banerjee, Dasgupta, and Y. Kim (2008)), higher cash holdings (Itzkowitz (2013)), and paying less dividends (J. Wang (2012)).

A recent stream of work extends the above work and examines how customer concentration may impact CEOs' compensation policies. C. Liu, Masulis, and Stanfield (2021) argue that customer concentration can affect the optimal compensation since dealing with major customers increases the costs associated with the supplier's CEO's risk-taking incentives. Using industry-level import tariff cuts as exogenous shocks that decreased customers' switching costs, the authors show that firms with major customers lower option-based pay following tariff cuts. Chen et al. (2022) use a different empirical approach and reach the opposite conclusion finding customer concentration to be positively related to CEO risk-taking incentives. The authors interpret the results as evidence of boards' efforts to offset CEOs' risk-aversion and prevent excessive managerial conservatism at the expense of value maximization. Lastly, A. Albuquerque, Papadakis, and Wysocki (2014) find evidence supporting the notion that customer concentration is positively related to idiosyncratic risk, and consequently, negatively related to CEOs' equity-based incentive in compensation contracts.

2.2.3 Customer Concentration and RPE

RPE theory predicts that the efficacy of RPE is expected to be higher for firms that are more exposed to systematic risk. Furthermore, the usefulness of RPE will depend on the availability of a peer group that helps filter out such risk and that filtering is increasing in the number of available peers.

The existing literature indicates that concentration in firms' customer bases is associated with more specific investments in unique products and increased systematic and idiosyncratic risks. The higher systematic risk suggests that these firms could find RPE helpful to alleviate the higher risk faced by their CEOs. Furthermore, higher idiosyncratic risk indicates that RPE can be particularly beneficial for these firms. Specifically, RPE provides tournament-like incentives that would induce risk-taking actions by un-diversified CEOs that diversified shareholders appreciate. The intuition is that idiosyncratic risk is undesired by managers who have un-diversified wealth and human capital since such risk is hard to diversify (Amihud and Lev (1981) and C. W. Smith and R. Stulz (1985)). RPE decreases (increases) CEO's compensation sensitivity to common (firm's specific) performance by filtering common performance trends. Thus, RPE effectively rewards CEOs for taking idiosyncratic rather than systematic risk, as through increasing the former would CEOs be able to outperform peers.

Despite these benefits, in the presence of significant customers, the costs of implementing RPE may be sufficiently high to outweigh its benefits. The unique investments and the production of customers tailored products make firms unique in the product market, limiting the availability of informative peers to include as a benchmark. Jayaraman et al. (2020) argue that appropriate peer group would be firms producing similar products and thus facing common demand and supply shocks. Hence, products uniqueness of firms with major customers would make it cumbersome for boards to identify peers exposed to shared shocks. Besides, RPE may still be costly and less practical even if boards were to identify relevant peers. Since RPE relies on average peers performance as a benchmark for common performance, the limited number of peers means that the benchmark would be a noisy measure of and less informative about common shocks.[7]

The second cost that may limit firms' use of RPE is the possibility of disruption to the relationship with major customers due to excessive risk-taking by firms' CEOs. Two related arguments support this conjecture. First, major customers care about their suppliers' investment policies and financial health, since both are directly related to supply-chain stability and the value of supplier-customer business relations (e.g., Maksimovic and Titman (1991); Hertzel et al. (2008); Kale and Shahrur (2007); Cen et al. (2016); C. Liu, Masulis, and Stanfield (2021)). Anecdotally, firms recognize the importance of their relations with major stakeholders such as customers and cite such relations as a consideration when designing CEO compensation.[8] Second, solid and continued business relationships with major customers provide other benefits to firms apart from mere revenues through positive spillover effects on other aspects of the firms' operations (e.g., Cen et al. (2016)). Therefore, while tournament-like incentives of RPE may induce CEOs to engage in risky

[7]According to Holmstrom (1982), filtering should increase with the number of available peers. In the limit, systematic performance should be filtered entirely out from firm performance.

[8]For example, Huntington Ingalls Industries, a Shipbuilding manufacturer, states in its 2020 Proxy filing that "...We have also designed our compensation program to balance performance-based compensation over the short and long-term to incentivize decisions and actions that promote stockholder value and focus our executives on performance that benefits our stockholders and customers, while discouraging inappropriate risk-taking behaviors."

and value-added projects, the same incentives can increase suppliers' specific-risk and financial distress costs, leading to less stable and reliable customer relationships. The possible disruption to the business relations would translate into substantial losses for firms on their relationship-specific investments and missing out on the other benefits of customer relations. The above discussion and reasoning lead to the following **hypothesis:**

The level of RPE use in CEO compensation contracts is negatively associated with a firm's customer concentration.

2.3 Data and Variable Constructions

2.3.1 Measuring Customer Concentration

I collect data on sales to each major customer from the Compustat Segments database for the period between 1992 to 2019. Following the literature (e.g Banerjee, Dasgupta, and Y. Kim (2008); Patatoukas (2012); Campello and Gao (2017)), I construct several proxies for customer concentration. *Sale major customers*, represents the percentage of total firm sales captured by all customers that account for at least 10% of total sales. *HHi*, is the Herfindahl-Hirschman Index of sales determined as the sum of squares of sales percentage to each reported major customer. *Sale largest customer*, is the percentage of supplier sales the belongs to the single largest customer. *Corporate (Government) customer*, are indicators for the type of customers. I collect firms' financial and stock price information from Compustat and CRSP and CEO information from ExecuComp. The full sample includes 3,464 unique firms, of which 1,259 unique firms (representing 20% of observations) have at least one major customer during the sample period.

2.3.2 Measuring Peer Performance

For the main analysis, I construct peer groups similar to A. Albuquerque (2009) as follows using all firms in the CRSP-Compustat merged database. First, I create annual portfolios based on the two-digit (SIC) code. Second, within each industry portfolio, I sort firms into quartiles by their market value at the beginning of the fiscal year. Third, I match each vocal firm to a group of firms in the same industry and size quartile. Lastly, I define peer performance as the equal-weighted portfolio annual stock return of firms in the same industry and size quartile, excluding the focal firm. In the robustness test, I use different peer group definitions to verify that the choice of peer group does not drive the results.[9]

2.3.3 Descriptive Statistics

Tables 2.1 shows the sample summary statistics for firm and CEOs characteristics in panel A. Panel B of table 2.1 shows the descriptive statistics for the main explanatory variable. In the sample, panel B shows that around 24.3% firm-year observations involve a firm with one or more major customers, with Corporate (Government) customers representing roughly 20.1% (5.4%) firm-year observations. Panel C in table 2.1 reports statistics for the subsample of supplier-year observations with major customers. Of the full sample, 10,007 firm-year observations belong to firms with one or more major customers. The average total sales to major customers, which is the percentage of supplier total sales captured by all major customers, is 27.4% showing that sales derived from such customers are significant for the business of the supplier.

[9] Using 49-Fama French industries and product market peers of Hoberg and Phillips (2016).

Table 2.2 shows the univariate comparison of several key independent variables between firms with and without at least one major customer in a given year. Table 2.2 shows that firms with at least one major customer are smaller, less profitable, have lower sales, higher growth opportunities, and higher stock return volatility compared to firms without major customers. Also, CEOs of firms with major customers appear to be younger and less likely to hold the chairman title. More importantly, table 2.2 shows that firms with concentrated customer bases have, on average, a significantly lower number of peers (29.7) and also less similarity in terms of products description (4.2) in the product market compared to firms without large customers (45.3 and 7.7, respectively). These statistics are based on firms classified as peers using Hoberg and Phillips (2016) Text-based Network Industry Classifications (TNIC), which is constructed based on firms' product similarities in 10-ks. Comparing the number of peers and product similarity lends initial support to the notion that firms with major customers may have limited peers for the purpose of relative evaluation.

2.4 Empirical Results

2.4.1 Baseline Regression

To examine whether the use of RPE would vary with firms' customer concentration, I follow prior work in testing for the implicit presence of RPE in CEO's compensation using a two-stage procedure. This technique is first used by Antle and A. Smith (1986) and since has been adopted by many other work (e.g. Bertrand and Mullainathan (2001b); Jenter and

Kanaan (2015b); Na (2020)).[10] The first stage decomposes firm performance into firm-specific and common components by regressing firm performance on peer performance:

$$\textbf{Firm performance}_{i,t} = \gamma + \delta\textbf{Peer performance}_{i,t} + \varepsilon_{i,t} \tag{2.1}$$

where Firm-specific performance is represented by the residuals ($\hat{\varepsilon}_{i,t}$) from the regression in eq.(2.1) and Common performance is defined as the regression predicted values ($\hat{\gamma}+\hat{\delta}$Peer performance). The second stage estimates the sensitivity of CEO's compensation to firm-specific and common performance components:

$$\begin{aligned}\textbf{LogComp}_{i,t} = \alpha + \beta_1\textbf{Firm-specific performance}_{i,t} &+ \beta_2\textbf{Common performance}_{i,t} \\ &+ \beta_3\textbf{Customer concentration}_{i,t} \\ &+ \beta_4\textbf{Firm-specific}_{i,t}\times\textbf{ Customer concentration}_{i,t} \\ &+ \beta_5\textbf{Common}_{i,t}\times\textbf{ Customer concentration}_{i,t} \\ &+ \beta_6\textbf{Controls}_{i,t-1} + \alpha_c + \alpha_{jt} + \varepsilon_{i,t}\end{aligned} \tag{2.2}$$

where $LogComp_{i,t}$ is the natural logarithm of CEO's total compensation. The two variables *Firm-specific performance*$_{i,t}$ and *Common performance*$_{i,t}$ are the estimates from the first-stage regression for firm i in year t. *Customer concentration*$_{i,t}$ is one of the proxies for concentrated customer base defined earlier for firm i in year t. Agency theory predicts that if strong-form RPE holds, CEO compensation should be exclusively related to firm-specific performance ($\beta_1 > 0$)[11] and unrelated to common or exogenous performance

[10] As noted by Jenter and Kanaan (2015b), this two-stage procedure is essentially an instrumental variables estimation, in which peer performance is instrumenting for firm performance.

[11] The coefficient β_1 is also referred to in the literature as pay-performance sensitivity.

component (hence β_2 =0). The main coefficient of interests in eq.(2.2) is the one associated with interaction term $Common_{i,t}\times$ $Customer\ concentration_{i,t}$. If firms with major customers use less RPE in compensating their CEOs, I expect the coefficient on the interaction to be positive (β_5 >0), which would imply that firms' CEOs are compensated for (and punished by) common or exogenous performance among their peers.

I follow the literature and include several control variables shown to be significantly related to executives' compensation. Control variables include firm's size, return on assets (ROA), Tobin's Q, leverage, 12-month compound stock returns, stock return idiosyncratic volatility, Industry competition, log of CEO's tenure, and CEO's duality. I include in all regressions α_c, which represents CEO fixed effects based on unique CEO-firm combination (identified by co_per_rol in Execucomp) to control for compensation difference that result from unobserved heterogeneity among executives (J. R. Graham, S. Li, and Qiu (2012); Qui 2011; Coles and Z. (Li (2020)) and for time-invariant unobserved heterogeneity during the tenure of a given CEO. Furthermore, I include in regressions α_{jt}, which represents industry $\times$ year fixed effects based on two-digit SIC industries classification to control for unobserved heterogeneity across industries within a given year.[12] Finally, to mitigate outliers' potential effects, I cluster standard errors at the firm level and winsorize continuous control variables at the 1st and 99th percentiles.

Table 2.4 shows the results from estimating eq.(2.2). In columns (1), (2), and (3) and consistent with the literature on pay-for-performance, I find the sensitivity of CEO compensation to be positively related to firm-specific performance. More importantly, the

[12]The inclusion of these fixed effects is to control for unobserved, omitted, and time-varying industry characteristics such as changes in aggregate demand, technology, or industry regulations and norms.

coefficients on *Common* $\times$ *Customer concentration* are positive and significant, implying that the sensitivity of CEO compensation to common or systematic performance is higher for firms that deal with major customers.[13] Economically, for a firm with a sample mean sale to major customers, a one standard deviation increase in customer concentration results in a 17% increase in the sensitivity of CEO compensation to common performance.[14] Furthermore, table 2.4 shows that the coefficient on *Common* $\times$ *Customer concentration* is positive and significant using different measures of concentration as in columns (2) and (3).

2.4.2 Alternative Approach to Testing for RPE

The previous section shows that the sensitivity of CEO compensation to peer-wide performance is higher for firms that deal with significant customers. To further validate this finding, I use an alternatives approach commonly used by prior work to test for RPE through regressing CEO compensation on firm and peer performance directly in one-step regression. Following this approach, weak-form RPE holds if the sensitivity of CEO compensation is positively related to firm performance (indicating pay-for-performance) and negatively related to peers' (lower pay for higher common performance). The existence of these relationships would suggest that corporate boards filter out some of the peers' performance from firm performance when compensating their CEOs. I estimate the one-step regression as following:

[13] Note that the coefficients estimated on the main effect for Firm-specific and Common performance are now conditional on the values of customer concentration. In other words, the coefficient estimates on Firm-specific and Common performance without interaction reflect the sensitivity of CEO compensation to Firm-specific and Common performance for a firm for which customer concentration = 0.

[14] The coefficient of *Common* $\times$ *Customer concentration* (.187) and the coefficient on *Common* (.032) suggest that the sensitivity of CEO compensation to common performance for a firm with a sample mean sale to major corporate customers is 1.44% (equal to (.032+.187)*.066). For a one standard deviation increase in Customer concentration for an average firm in the sample, the sensitivity of CEO compensation to common performance will be 1.69%, which constitutes an increase of 17%.

$$\begin{aligned}\textbf{LogComp}_{i,t} = \alpha + \beta_1 \textbf{Firm performance}_{i,t} &+ \beta_2 \textbf{Peer performance}_{i,t} \\ &+ \beta_3 \textbf{Customer concentration}_{i,t} \\ &+ \beta_4 \textbf{Firm performance}_{i,t} \times \textbf{Customer concentration}_{i,t} \\ &+ \beta_5 \textbf{Peer performance}_{i,t} \times \textbf{Customer concentration}_{i,t} \\ &+ \beta_6 \textbf{Controls}_{i,t-1} + \alpha_c + \alpha_{jt} + \varepsilon_{i,t}\end{aligned} \tag{2.3}$$

where the main variable of interest in eq.(2.3) is $\textit{Peer performance}_{i,t} \times \textit{Customer concentration}_{i,t}$. If firms with major customers use less RPE in compensating their CEOs, then I expect the coefficient on the interaction to be positive and significant ($\beta_5 > 0$).

Table 2.5 shows the results from the estimation. Across all specifications, I find evidence for pay-for-performance, as CEO compensation is positively and significantly related to firm performance. Moreover, the negative and significant coefficients on *Peer performance* across all specifications are consistent with the idea that firms with no customer concentration partly filter out the effect of systematic component of firm performance on CEO compensation. Examining the interaction term *Peer performance* × *Customer concentration*, I find the coefficients from two out of the three specifications to be positive and significant, which suggests less filtering of peer performance by firms that deal with major customers.

Collectively, tables 2.4 and 2.5 provide strong evidence that the sensitivity of CEO compensation to common performance is higher for firms that deal with major customers (less use of RPE). The finding holds after using an alternative research design to detect RPE and controlling for CEO and industry-year fixed effects. The following sections examine possible explanations for the lack of RPE in firms' CEO compensation.

2.4.3 The Impact of Peers Availability

This section examines whether firms link CEO compensation to common or systematic performance due to the lack of appropriate peers. Firms' product uniqueness and undiversified nature of revenues may make it less likely for their boards to identify similar peers exposed to common shocks. Furthermore, the limited number of peers would make average peer performance, which is the benchmark in RPE, a noisy measure of common shocks deeming RPE less useful.[15] Thus, if the lack of RPE is related to peers' limited availability and suitability, then I expect the positive sensitivity of CEOs' compensation to systematic performance to diminish or even disappear when many informative peers are present.

To test the above prediction, I partition the full sample into quartiles based on the number of peers available to each vocal firm. I define *Many peers* as an indicator equals to one for firm-years in the top quartile of number of peers, zero otherwise. Next, I interact the indicator with Firm-specific, Common performance, and Customer concentration measures in the regression in Table 2.6. In Table 2.6, I show that the coefficient on *Common* × *Customer concentration* across all specifications is positive and significant, indicating a positive sensitivity of pay to common or systematic performance for firms with major customers and a relatively low number of peers.

Supporting the lack of peers explanation, I find the coefficient of *Common* × *Customer concentration* × *Many peers* is negative in all specifications and significant at

[15]Note that the noise in average peer performance is at highest when there are only a few peers.

the 5% level in two out of the three specifications. Economically, the magnitude of the negative finding is important. The sensitivity of pay to common performance is close to zero or even negative when there exists a large number of peers for firms (the sum of the coefficient of *Common* × *Customer concentration* and the coefficient *Common* × *Customer concentration* × *Many peers* is close to zero or even negative). Put differently, firms with major customers tend to rely less on RPE in CEO compensation, in general, but RPE is present when there are many peers. These results support the hypothesis that firms with large customers link compensation to common performance because of the lack of peers.

2.4.4 The Impact of Possible Disruption to the Relationship with Major Customers

Another explanation for why firms rely less on RPE is to avoid the potential disruption to the relationship with significant customers, triggered by excessive risk-taking by the CEOs induced through tournament-like incentives associated with RPE. If this is a valid explanation, then I expect the positive sensitivity of CEOs' compensation to common performance to disappear in situations when the likelihood of losing large customers or the cost associated with losing the customer is lower.

Government customers, contrary to corporate customers, are generally more solvent, provide more stable business relations, are less likely to announce bankruptcy, and are not necessarily profit-driven (Banerjee, Dasgupta, and Y. Kim (2008); Goldman, So, and Rocholl (2012)). For example, through financial assisting programs such as the Troubled Asset Relief Program (TARP), government customers may have the intention of lifting firms from distress situations and maintaining jobs and employment at these firms.[16] Table 2.3 (column 4) suggests that systematic risk is 0.119 lower for a firm that depends on governmental customers.[17] Thus, the unique characteristics of government customers indeed make the supplier-customer relationship more stable, safer and lower the supplier's risk exposure. Therefore, I expect that having Government customers would encourage the supplier's board to include RPE in the CEO's contract since there is less fear of losing business relations with this type of customer.[18]

To test the above prediction, I first divide customers into Corporate (Government) customers and recalculate Sale major customers, HHi, and Sale largest customer for each group.[19] Table 2.7 shows the re-estimation results of eq.(2.2) with the above variables. Across the three specifications in table 2.7, the estimates on customer concentration measures that belong to corporate customers are positive and significant. In contrast, the corresponding governmental customer concentration measures are negative but insignificant. This result indicates that firms do not significantly reduce the sensitivity of CEO compensation to common performance when the safer government customers represent customer concentration. The finding is inconsistent with the notion that firms' boards reward CEOs for common performance to avoid potential disruption to customers' business relations triggered by CEOs' excessive risk-taking.

[16]For example, President George W. Bush in 2008 agreed to use TARP program funds to bail out the major three automotive firms, with executives of General Motors Company and Chrysler LLC warning of bankruptcy and the loss of 1 million jobs.

[17]12.4% lower relative to the full sample average.

[18]Since Corporate customers are profit-driven, such customers may switch the supplier if the supplier's CEO undergo too many risky projects, which would make the supply-chain less reliable and less stable.

[19]Government customers include the U.S. military, department of defense, Medicaid, and Medicare.

Another situation where it is less likely that a supplier would lose large customers is when customers face high switching costs. Firms that capture a high share of industry sales are less likely to lose their customers since such customers would have fewer alternatives to purchase from and thus have higher switching costs (Inderst and Wey (2007); Hui, Klasa, and Yeung (2012)). I define supplier market share as the supplier's total sales divided by the total sales of the supplier's 2-digit (3-digit) SIC industry. I create an indicator, *High Mkt share*, which equals one if a particular supplier market share is above the sample median in a given year, zero otherwise, and include its interaction with Firm-specific, Common performance, and Customer concentration measures. The estimates from the table 2.8 show the coefficient on *Common* × *Customer concentration* to be positive and significant in all specification. The coefficient on *Common* × *Customer concentration* × *High Mkt share* is positive and insignificant across all specifications, inconsistent with the disruption explanation.

As the last test for this explanation, I focus the analysis on firms that commit to relation-specific investments (RSI). Stakeholders of firms that make relation-specific investments and have unique products suffer more significant losses in case of firm's liquidation (Titman and Wessels (1988a)). Furthermore, firms that invest in RSI face the risk of redeployment of assets or losing the value of RSI in case major customers terminate the business relation (Banerjee, Dasgupta, and Y. Kim (2008)). These reasons would intensify firms' concerns about losing their major customers, leading firms that invest heavily in RSI to rely less on RPE. To test this prediction, I define supplier RSI as the sum of supplier's

R&D and capital expenditures scaled by total assets.[20] I also define RSI as the sum of SGA and advertising expenses scaled by sales.[21] I create an indicator, *High RSI*, which equals one for firm-years in the top quartile of the RSI based on each respective measure in the sample, zero otherwise, and include its interaction with Firm-specific, Common performance, and Customer concentration measures in the regression. The estimation in table 2.9 shows again the coefficient on *Common* × *Customer concentration* to be consistently positive and significant, while across all specifications, none of the estimates on *Common* × *Customer concentration* × *High RSI* is significant. The collective evidence in this section is inconsistent with the hypothesis that firms use less RPE in CEO compensation because of possible disruption to the business relationship with major customers due to excessive risk-taking by the CEOs.

2.5 Robustness

2.5.1 Explicit Relative Performance Evaluation

In this part of the analysis, I take advantage of the expanded compensation disclosures mandated by the SEC in 2006 to examine whether firms' practices of using explicit RPE in CEO compensation plans support the results from implicit RPE tests in tables 2.4 and 2.5.

I collect data on CEOs' compensation plans that rely on explicit relative performance from ISS Incentive Lab from 2006 to 2018 for the largest 750 U.S. firms by market

[20]The idea here is that firms' spending on R&D CapEx represents current and future investment to produce and develop products that are specific to their customers. Firms have to wait for parts of these investments to earn future economic profits. See Levy (1985) and Allen and Phillips 2000) for justification of usuing R&D as a proxy for RSI.

[21]This measure capture investment in unique assets, see Titman and Wessels (1988a); and Hui, Klasa, and Yeung (2012).

capitalization. I define *RPE* as an indicator that equals one if the CEO's incentive compensation has an explicit relative performance condition, zero otherwise.[22] Peer groups in explicit RPE can be a customized group of peers or a market (industry-specific) index. Thus, I create *RPE peers (index)*, which is an indicator that equals one if CEO's incentive compensation is relative to performance against peers(index), zero otherwise.

To examine the relationship between RPE in compensation contracts and customer concentration, I first conduct a univariate comparison between firm-years with and without major customers. Table 2.11 indicates that the proportion of firm-years with major customers and use explicit RPE (.355) is significantly smaller than that of firm-years without customers (.385). Moreover, the comparison shows that the proportion of firms with major customers that use RPE linked to peers is significantly smaller than firms without large customers. There is no significant difference among the two groups in terms of using RPE linked to market or industry index. Interestingly, examining the difference in the number of peers included in RPE, firms with large customers include a significantly lower number of peers than other firms (about three peers lower). The finding is consistent with table 2.2, which shows that firms with major customers have significantly lower product market peers. Further, Poisson model estimates in table 2.12 shows that customer concentration is negatively related to number of peers. The univariate and Poisson model analysis suggests that while firms with significant customers may use explicit RPE in the compensation contracts, firms' boards rely less on customized peer groups. Lastly, among firms that use RPE with customized peers, the number of peers is lower for firms with major customers.

[22]An example of such condition would be when the firm specifies that total stock return or ROA should be higher than the median of a pre-defined comparison group for the CEO to receive compensation payout

Next, in a regression setting, I assess whether firms with significant customers are more or less likely to include explicit RPE in the CEO's compensation plan. Estimates from columns (1) through (3) in table 2.13 indicate that only governmental concentration measures are positively and significantly associated with the explicit use of RPE. Firms are likely to benchmark performance against an index when there is no proper peer group, are the dominant in the industry, or share commonalities with firms in the index. Moreover, the tournament-like incentives introduced by RPE are more likely to exist when peers are explicit and customized peers rather than a market index. Thus, examining which type of customer is associated with which kind of peer group is important for the interpretation of the results uncovered thus far.

In columns (4) through (6) of table 2.13, I examine the likelihood of firms employing RPE that uses customized peer groups as a benchmark. The results from these columns indicate that the concentration of government customers is positively and significantly associated using customized peers. On the other hand, the corresponding corporate customer concentration measures are negative and insignificant. The result is consistent with the notion that firms use explicitly customized peers in RPE to encourage risk-taking only when dealing with safer government customers. Finally, in the last three columns in table 2.13, I test the relationship between customer concentration and propensity to use index-based RPE. Interestingly, only the concentration of corporate customers is positively and significantly associated with relative evaluation against a market or industry index.

Overall, this section shows that the number of explicit peers is lower for firms with significant customers. Also, these firms choose to measure CEO performance relative to a market-wide index rather than a custom peer group when explicitly using RPE. Collectively, the conclusion from this section is consistent with the finding from implicit RPE tests, which showed that the limited availability of peers might constrain firms' use of RPE.

2.5.2 Misidentifying of Peers

One possible criticism of the findings is the misidentification of the peer group. Tests in previous sections assume that the analysis correctly identified the group of peers. If this assumption is invalid, then the paper's main finding is wakened. While I follow the justified prior work in defining peer groups, I cannot verify this assumption. However, running the main tests with different peer group definitions and an alternative research design and finding the main result to hold should solidify the paper's main results. To that extent, I use 49-Fama French industry classification to define industry-size matched peers and also the specification in Albuquerque (2013) with product market peers from Hoberg and Phillips' (2016). Results (in appendix) shows the main findings to hold under these tests.

2.5.3 Other Explanations for the Lack of RPE

An alternative explanation for the lack of RPE is CEO power. CEOs of firms with significant customers may be entranced and influence their boards to rely less on RPE. While I control for CEO tenure and duality in the main tests, I run further tests to rule out this explanation. First, I partition the sample by the median of CEOs' stock ownership and repeat the analysis. In an untabulated result, I find that the sensitivity of pay to common performance is positive and significant only in the sub-sample of low ownership. The differences in pay sensitivity for firms with low and high ownership are also statistically insignificant. I also interact CEO tenure and duality with Firm-specific and Common performance and find the main result to hold (shown in appendix). The evidence is inconsistent with the notion that the paper's main finding is a manifestation of rent extraction by powerful CEOs. It is also worth noting that the inclusion of CEO fixed effects rules out the concern that unobservable CEO characteristics, which may affect the use of RPE and customer concentration simultaneously, are driving the results.

I further examine Aggarwal and Samwick (1999) argument that strategic interaction in concentrated industries may make it optimal for firms to place a greater positive weight on peer performance relative to firm performance. Also, I look at the notion that firms exposed to higher risk may award less incentive pay to their CEOs (Holmstrom and Milgrom (1987)). To control for these effects and provide further robustness to the main finding, I allow Firm-specific and Common performance in the main model in eq.(2.3) to vary with the firm's industry competition and idiosyncratic stock volatility. Estimation results (in appendix) shows the main findings to hold even after controlling for these alternative explanations.

2.6 Summary and Conclusion

Customer concentration in supplier-customer relationships has a significant influence on various corporate policies. One intriguing aspect is the relationship between customer concentration and CEO compensation and incentives. Specifically, firms with concentrated customer bases can benefit from RPE to mitigate their CEOs' higher systematic risk exposure and provide unique incentives that encourage value-increasing actions. On the other hand, however, firms may find RPE costly and less appealing because of peers' limited availability and suitability or avoid the possible disruption to the relationship with significant customers. Due to these opposing views, I examine the use of RPE by firms with major customers to understand whether the costs of implementing RPE would outweigh the benefits of its use.

The evidence shows that the sensitivity of CEO compensation to common or systematic performance is higher for firms that deal with major customers (less use of RPE). This result is robust to different RPE research designs, tests of explicit RPE, and controlling for CEO and industry-year fixed effects. Additional tests indicate that the positive sensitivity of CEO pay to common performance seems to be fully explained by the lack of peers. Furthermore, I do not find support for other explanations for the lack of RPE, such as the possibility of disruption to the relationship with significant customers, CEO power, industry strategic interactions, or the notion of less incentive pay for risky firms.

Overall, the paper's findings add to the literature on the role of customers as important firm stakeholders. Specifically, the results add to the new line of work that shows how customer concentration impacts firm's CEO compensation (C. Liu, Masulis, and Stanfield (2021): Chen et al. (2022); A. Albuquerque, Papadakis, and Wysocki (2014)). I extend this work by showing that firms' boards seem to realize the constraints on using RPE, represented by the lack of peers, and include RPE in the contracts once enough informative peers are available.

Table 2.1: This table presents summary statistics for the panel of 3,464 unique firms over the period 1992−2019. The definitions of the variables are in the appendix. Panel A show descriptive statistics for firm and CEO characteristics. Panel B presents statistics for the measures of customer concentration, while panel C presents the same statistics for supplier-year observations in which the supplier had at least one major customer.

Panel A: Firm and CEO characteristics

	N	Mean	p25	Median	p75	Std. Dev.
Log (assets)	41,083	7.535	6.228	7.386	8.697	1.774
ROA	41,083	.038	.011	.043	.082	.093
Tobin's Q	41,083	1.857	1.076	1.413	2.115	1.271
Log (market capitalization)	41,083	7.361	6.250	7.224	8.350	1.594
Leverage	41,083	.210	.054	.195	.329	.170
Stock return	41,083	.163	-.128	.098	.342	.620
Systematic risk	41,083	.966	.468	.863	1.335	.725
Idiosyncratic risk	41,083	.101	.062	.088	.123	.060
Industry competition	41,083	.011	0	.0001	.0009	.065
CEO ownership	41,083	2.148	0	.219	1.176	5.783
Chairman	41,083	.391	0	0	1	.488
Tenure	41,083	5.07	2	4	7	3.93

Panel B: Customer concentration Measures

	N	Mean	p25	Median	p75	Std. Dev.
Major corporate customer	41,083	.2019	0	0	0	.4014
Major government customer	41,083	.0547	0	0	0	.2273
Sale corporate customer	41,083	.0668	0	0	0	.1716
Sale government customer	41,083	.0248	0	0	0	.1245
HHI corporate	41,083	.0196	0	0	0	.1098
HHI government	41,083	.0113	0	0	0	.0733
Largest corporate customer	41,083	.0472	0	0	0	.1173
Largest government customer	41,083	.0202	0	0	0	.0985

Panel C: Supplier-year observations with major customers

	N	Mean	p25	Median	p75	Std. Dev.
Major corporate customer	10,007	.828	1	1	1	.376
Major government customer	10,007	.224	0	0	0	.417
Sale corporate customer	10,007	.274	.112	.202	.396	.253
Sale government customer	10,007	.101	0	0	0	.236
HHI corporate	10,007	.080	.012	.032	.084	.211
HHI government	10,007	.046	0	0	0	.142
Largest corporate customer	10,007	.193	.11	.16	.24	.167
Largest government customer	10,007	.082	0	0	0	.186

Pairwise Correlation

	Sale corporate customer	HHi corporate	Largest corporate customer
Sale corporate customers	1.0000		
HHi corporate	0.712***	1.0000	
Largest corporate customer	0.923***	0.709***	1.0000

Table 2.2: This table presents the comparison of firm and CEO characteristics among firm-years with and without at least one major customer. The definitions of all variables are in the appendix.

	Without major customer		With major customer		
	N	**Mean**	**N**	**Mean**	**Diff. in mean**
Log (assets)	31,076	7.714	10,007	6.984	0.730***
ROA	31,076	0.042	10,007	0.03	0.011***
Tobin's Q	31,076	1.82	10,007	1.972	-0.152***
Log (market capitalization)	31,076	7.453	10,007	7.076	0.378***
Leverage	31,076	0.216	10,007	0.195	0.021***
Stock Return	31,076	0.16	10,007	0.174	-0.015**
Stock total volatility	31,064	0.106	10,003	0.125	-0.019***
Systematic risk	31,076	0.922	10,007	1.104	-0.182***
Idiosyncratic risk	31,076	0.097	10,007	0.115	-0.018***
Industry competition	31,076	0.012	10,007	0.008	0.005***
CEO ownership	31,076	2.149	10,007	2.147	0.001
Chairman	31,076	0.409	10,007	0.337	0.072***
Tenure	31,076	5.068	10,007	5.096	-0.028
Count TNIC peers	29,094	45.331	9,447	29.706	15.624***
Similarity TNIC peers	29,094	0.039	9,447	0.034	0.004***
Total similarity TNIC	30,609	7.697	9,922	4.222	3.475***

Table 2.3: This table shows result from estimating the regressions that relate systematic (idiosyncratic) risk to measures of customer concentration and firm characteristics. In columns (1) through (4), systematic risk is measured as the equity Beta, estimated by regressing daily individual stock returns over the fiscal year on the contemporaneous market returns. In columns (5) through (8), idiosyncratic risk is measured as Idvol, which is the annualized standard deviation of the residuals from regressing daily individual stock returns over the fiscal year on the contemporaneous market returns. Control variables include *Log (assets), ROA, Tobin's Q, Log (market cap.), Leverage, and Industry competition*. All control variables are defined in appendix. Regressions include industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Equity Beta				Idvol			
Sale corporate customer	.092**				.0249***			
	(.0407)				(.0036)			
HHI corporate		.1038**				.0264**		
		(.0504)				(.0112)		
Largest corporate customer			.1354**				.0365***	
			(.0635)				(.0055)	
Major corporate customer				.0356**				.0074***
				(.0172)				(.0013)
Major government customer				-.119***				-.0002
				(.0307)				(.0021)
Log (assets)	.0858***	.0849***	.0859***	.0848***	.0049***	.0047***	.005***	.0048***
	(.0142)	(.0142)	(.0142)	(.0142)	(.0011)	(.0011)	(.0011)	(.0011)
ROA	-1.3395***	-1.3453***	-1.3385***	-1.3422***	-.1149***	-.1166***	-.1146***	-.1166***
	(.081)	(.0812)	(.081)	(.0809)	(.0066)	(.0065)	(.0066)	(.0065)
Tobin's Q	.0894***	.0895***	.0894***	.0882***	.0118***	.0118***	.0118***	.0119***
	(.0084)	(.0084)	(.0084)	(.0083)	(.0007)	(.0007)	(.0007)	(.0007)
Log (market capitalization)	-.1676***	-.1674***	-.1677***	-.1666***	-.0184***	-.0184***	-.0184***	-.0185***
	(.0142)	(.0142)	(.0142)	(.0141)	(.0012)	(.0012)	(.0012)	(.0012)
Leverage	.0585	.0582	.0581	.0624	.0026	.0025	.0025	.0023
	(.0459)	(.0459)	(.0459)	(.0458)	(.0037)	(.0037)	(.0037)	(.0037)
Capital Exp.	.294*	.2996**	.2951**	.2813*	.022*	.0236**	.0224*	.023*
	(.1505)	(.1504)	(.1504)	(.1498)	(.0117)	(.0118)	(.0117)	(.0118)
Industry competition	.1488	.151	.1488	.1466	.0244***	.0251***	.0244***	.0258***
	(.1309)	(.1305)	(.1307)	(.131)	(.0086)	(.0085)	(.0086)	(.0086)
Observations	39,711	39,711	39,711	39,711	39,711	39,711	39,711	39,711
Adjusted R^2	.3819	.3818	.3819	.3829	.4593	.4573	.4593	.457
Industry-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓

Table 2.4: This table shows result from estimating the following model:

$$\begin{aligned}\textbf{LogComp}_{i,t} = \alpha &+ \beta_1\textbf{Firm-specific performance}_{i,t} + \beta_2\textbf{Common performance}_{i,t} \\ &+ \beta_3\textbf{Customer concentration}_{i,t} \\ &+ \beta_4\textbf{Firm-specific} \times \textbf{Customer concentration}_{i,t} \\ &+ \beta_5\textbf{Common} \times \textbf{Customer concentration}_{i,t} + \beta_6\textbf{Controls}_{i,t-1} + \tau_{tj} + \varepsilon_{i,t}\end{aligned} \tag{2.5}$$

The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm-specific and Common Performance are the firm-specific and the common components of firm stock return, respectively. Lagged control variables include *Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return volatility, Chairman indicator, and log of CEO Tenure.* All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**
	Sale corporate customer	**HHI corporate**	**Largest corporate customer**
Firm-specific Performance	.1288***	.1331***	.1317***
	(.0179)	(.0168)	(.018)
Firm-specific × Customer concentration	.052	.0166	.0278
	(.0426)	(.0621)	(.0652)
Common Performance	.032	.0328	.0298
	(.0265)	(.0267)	(.0267)
Common × Customer concentration	**.1871***	**.659****	**.3963****
	(.1029)	**(.2865)**	**(.2003)**
Customer concentration	.0125	-.0449	.017
	(.0433)	(.0361)	(.074)
Industry competition	-.5137	-.5129	-.5161
	(.4237)	(.4251)	(.4252)
Stock volatility	-.28***	-.2847***	-.2824***
	(.0964)	(.0967)	(.0966)
Log (assets)	.2619***	.2613***	.2618***
	(.028)	(.0281)	(.028)
ROA	.3571***	.3525***	.3574***
	(.0683)	(.0685)	(.0684)
Tobin's Q	.1159***	.1161***	.1159***
	(.0161)	(.0161)	(.0161)
Leverage	-.2337***	-.2348***	-.2341***
	(.0585)	(.0585)	(.0584)
Log (tenure)	.0385**	.0381**	.0383**
	(.0179)	(.0179)	(.0179)
Chairman	.0327	.0331*	.0328
	(.02)	(.02)	(.02)
Observations	39,297	39,297	39,297
Adjusted R^2	.786	.786	.786
CEO FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
Clustered SE	✓	✓	✓

Table 2.5: This table shows result from estimating the model in Albuquerque (2013). The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm performance and Peer performance are firm stock return and peer stock return measured as the equal-weighted portfolio return of firms in the same industry and size quartile, excluding the focal firm, respectively. Lagged control variables include *Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return volatility, Chairman indicator, and log of CEO Tenure*. All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**
	Sale corporate customer	**HHI corporate**	**Largest corporate customer**
Firm Performance	.1288***	.1332***	.1317***
	(.0179)	(.0168)	(.0181)
Firm Performance × Customer concentration	.052	.0167	.0277
	(.0427)	(.0621)	(.0652)
Peer Performance	-.0764***	-.0791***	-.0804***
	(.0202)	(.0203)	(.0205)
Peer Performance × Customer concentration	**.1067**	**.5068****	**.2911***
	(.0919)	**(.226)**	**(.1757)**
Customer concentration	.0215	-.0036	.0409
	(.0433)	(.0323)	(.0715)
Industry competition	-.5136	-.5128	-.5161
	(.4236)	(.4251)	(.4252)
Stock volatility	-.2805***	-.285***	-.2828***
	(.0965)	(.0968)	(.0967)
Log (assets)	.2618***	.2613***	.2618***
	(.0281)	(.0281)	(.0281)
ROA	.3574***	.3529***	.3578***
	(.0684)	(.0686)	(.0685)
Tobin's Q	.116***	.1161***	.1159***
	(.0162)	(.0161)	(.0162)
Leverage	-.2331***	-.2342***	-.2334***
	(.0585)	(.0585)	(.0585)
Log (Tenure)	.0385**	.0381**	.0384**
	(.0179)	(.0179)	(.0179)
Chairman	.0328	.0331*	.0329*
	(.02)	(.02)	(.02)
Observations	39,291	39,291	39,291
Adjusted R^2	.7861	.7861	.7861
CEO FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
Clustered SE	✓	✓	✓

Table 2.6: This table shows impact of peers' availability on the use of RPE by firms with customer concentration. The dependent variable is the natural logarithm of one plus total compensation, LogComp. *Firm-specific and Common Performance* are the firm-specific component and the Common component of firm stock return, respectively. *Many peers* is an indicator equals to one for firm-years in the top quartile based on the number of peers in the sample, zero otherwise. Lagged control variables include *Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return volatility, Chairman indicator, and log of CEO Tenure*. All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1) Sale corporate customer	(2) HHI corporate	(3) Largest corporate customer
Firm-specific Performance	.1256***	.1335***	.1278***
	(.0225)	(.0217)	(.0228)
Firm-specific × Many peers	.0075	.002	.0088
	(.027)	(.0256)	(.0272)
Firm-specific × Customer concentration	.0844	-.0527	.0833
	(.0614)	(.1525)	(.0988)
Firm-specific × Customer concentration × Many peers	-.0521	.0754	-.0804
	(.0815)	(.1652)	(.1235)
Common Performance	.0231	.0244	.0193
	(.0273)	(.0278)	(.0275)
Common × Many peers	.1056	.0795	.0978
	(.1038)	(.1038)	(.1035)
Common × Customer concentration	**.3112****	**1.2009****	**.6771****
	(.1355)	**(.5093)**	**(.2891)**
Common × Customer concentration × Many peers	**-.3824****	**-1.0103***	**-.6802****
	(.1884)	**(.5236)**	**(.3271)**
Customer concentration	.017	-.0322	.0191
	(.0433)	(.0314)	(.0735)
Many peers	-.091	-.084	-.0864
	(.1193)	(.1188)	(.1192)
Observations	39,291	39,291	39,291
Adjusted R^2	.732	.732	.732
Controls	✓	✓	✓
CEO FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
Clustered SE	✓	✓	✓

Table 2.7: This table shows result impact of dealing with Corporate and Government customers on the use of RPE. The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm-specific and Common Performance are the firm-specific component and the Common component of firm stock return, respectively. Corporate (Government) customer represent corporate (governmental) customer concentration measure . Lagged control variables include Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return volatility, Chairman indicator, and log of CEO Tenure. All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**
	Sale customer	**HHI**	**Largest customer**
Firm-specific Performance	.1291***	.1334***	.1324***
	(.0183)	(.017)	(.0185)
Firm-specific × Corporate customer	.0518	.0166	.0169
	(.0429)	(.0622)	(.0659)
Firm-specific × Government customer	-.0603	-.0292	-.0184
	(.0806)	(.125)	(.1004)
Common Performance	.0319	.0325	.0301
	(.0265)	(.0268)	(.0268)
Common × Corporate customer	**.1884***	**.6611****	**.4007****
	(.1032)	**(.2867)**	**(.2039)**
Common × Government customer	**-.1572**	**-.5305**	**-.3798**
	(.1468)	**(.343)**	**(.2381)**
Corporate customer	.0127	-.0449	.0239
	(.0433)	(.0362)	(.0759)
Government customer	.0146	.0125	-.08
	(.0883)	(.1086)	(.1096)
Observations	39,291	39,291	39,291
Adjusted R^2	.7861	.7861	.7861
Controls	✓	✓	✓
CEO FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
Clustered SE	✓	✓	✓

Table 2.8: The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm-specific and Common Performance are the firm-specific component and the Common component of firm stock return, respectively. In columns 1-3 (4-6), supplier market share is the supplier's total sales divided by the total sales of the supplier's 2-digit (3-digit) SIC industry. *High Mkt share* is an indicator variable set to one if the particular supplier market share is above the sample median in a given year, zero otherwise. Lagged control variables include Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return volatility, Chairman indicator, and log of CEO Tenure. All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively

	Market share based on 2-digit SIC industries			**Market share based on 3-digit SIC industries**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Sale customer	**HHi**	**Largest customer**	**Sale customer**	**HHi**	**Largest customer**
Firm-specific Performance	.1314***	.1347***	.1348***	.1363***	.1401***	.139***
	(.0178)	(.0162)	(.0179)	(.0189)	(.017)	(.019)
Firm-specific × High Mkt share	-.0088	-.0069	-.011	-.0177	-.0184	-.0198
	(.0319)	(.0312)	(.0322)	(.0334)	(.0325)	(.0336)
Firm-specific × Customer concentration	.0273	.00004	-.0022	.0309	.0046	.0098
	(.0449)	(.0601)	(.0684)	(.0478)	(.0625)	(.073)
Firm-specific × Customer concentration × High Mkt share	.1763	.2961	.2741*	.2038*	.6437**	.3398*
	(.1082)	(.2682)	(.1589)	(.1126)	(.2988)	(.1799)
Common Performance	.0263	.0319	.0258	-.0007	.006	-.0029
	(.038)	(.0369)	(.0374)	(.042)	(.0407)	(.0412)
Common × High Mkt share	.0057	-.0041	.001	.0451	.0384	.0459
	(.039)	(.0373)	(.0392)	(.0415)	(.0404)	(.0416)
Common × Customer concentration	**.1915***	**.4828***	**.3441***	**.2119***	**.5469***	**.3826***
	(.1059)	**(.2688)**	**(.1993)**	**(.1177)**	**(.2929)**	**(.2192)**
Common × Customer concentration × High Mkt share	**.0336**	**1.2147**	**.3638**	**-.0583**	**.5934**	**.0437**
	(.2495)	(.7862)	(.4575)	(.226)	(1.0048)	(.4534)
Customer concentration	.0128	-.0381	.016	.0248	-.0166	.055
	(.0428)	(.0326)	(.0731)	(.0451)	(.0269)	(.0694)
High Mkt share	.0761***	.0754***	.075***	-.0263	-.0269	-.0272
	(.0257)	(.0256)	(.0257)	(.0255)	(.0256)	(.0256)
Observations	39,291	39,291	39,291	38,158	38,158	3,8158
Adjusted R^2	.732	.732	.732	.731	.731	.731
Controls	✓	✓	✓	✓	✓	✓
CEO FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓

Table 2.9: The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm-specific and Common Performance are the firm-specific component and the Common component of firm stock return, respectively. In columns 1-3 (4-6), supplier relationship-specific investment (RSI) is defined as the sum of supplier's R&D and CapEx scaled by total assets (sum of SG&A and advertising expenses scaled by sales). In columns 1-3 (4-6), *High RSI* is an indicator equals one for firm-years in the top quartile of the RSI in the sample, zero otherwise. Lagged control variables include Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return volatility, Chairman indicator, and log of CEO Tenure. All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively

	R&D			SG&A		
	(1) Sale customer	(2) HHi	(3) Largest customer	(4) Sale customer	(5) HHi	(6) Largest customer
Firm-specific Performance	.1233***	.1284***	.1258***	.141***	.1453***	.1444***
	(.021)	(.02)	(.0211)	(.0218)	(.0198)	(.0219)
Firm-specific × High RSI	.0163	.0137	.0187	-.0255	-.0261	-.0265
	(.0266)	(.0248)	(.0266)	(.0295)	(.0275)	(.03)
Firm-specific × Customer concentration	.0736	-.0252	.0478	.0402	-.0019	.0106
	(.0634)	(.1269)	(.0941)	(.0499)	(.0631)	(.0676)
Firm-specific × Customer concentration × High RSI	-.0467	.0616	-.0509	.0225	.0399	.0286
	(.0813)	(.1571)	(.1194)	(.0859)	(.1616)	(.1392)
Common Performance	.0275	.0291	.0248	.0381	.0425	.039
	(.0266)	(.0271)	(.027)	(.0265)	(.027)	(.0271)
Common × High RSI	.003	-.006	.0009	-.0155	-.0311	-.028
	(.0439)	(.0415)	(.0451)	(.0477)	(.0478)	(.0504)
Common × Customer concentration	**.2685***	**.9182****	**.5436****	**.2282****	**.5748****	**.3843****
	(.1448)	**(.4306)**	**(.2602)**	**(.1044)**	**(.2596)**	**(.1937)**
Common × Customer concentration × High RSI	**-.1439**	**-.4134**	**-.2618**	**-.1445**	**.3267**	**.048**
	(.1939)	**(.5301)**	**(.3495)**	**(.2527)**	**(.8761)**	**(.4991)**
Customer concentration	.0154	-.0606	.0169	.0118	-.0418	.0154
	(.0438)	(.0514)	(.0749)	(.0426)	(.0373)	(.074)
High RSI	-.0118	-.0109	-.0111	-.0214	-.0235	-.0223
	(.0211)	(.0211)	(.0211)	(.0258)	(.0259)	(.0259)
Observations	38,062	38,062	38,062	39,257	39,257	39,257
Adjusted R^2	.731	.731	.731	.732	.732	.732
Controls	✓	✓	✓	✓	✓	✓
CEO FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓

Table 2.10: This table presents summary statistics for the panel of 1,140 unique firms from ISS Incentive Lab over the period 2006−2018. The definitions of the variables are in the appendix. Panel A show descriptive statistics for firm and CEO characteristics. Panel B presents statistics for the measures of customer concentration and Proxies for RPE usage, while panel C presents customer concentration statistics for supplier-year observations in which the supplier had at least one major customer.

Panel A: Firm and CEO characteristics

	N	Mean	p25	Median	p75	Std. Dev.
Log (assets)	10,122	8.69	7.68	8.60	9.71	1.46
Log (sales)	10,122	8.20	7.33	8.18	9.15	1.33
ROA	10,122	.049	.016	.049	.089	.088
Tobin's Q	10,122	1.86	1.09	1.48	2.18	1.21
Log (market capitalization)	10,122	8.54	7.70	8.43	9.44	1.28
Leverage	10,122	.199	.06	.18	.29	.15
Stock Return	10,122	.137	-.09	.10	.30	.55
Stock total volatility	10,121	.09	.054	.07	.11	.05
Industry competition	10,122	.022	0	.0002	.004	.095
Total blockholder ownership %	10,122	29.51	16.4	24.83	35.3	24.05
CEO ownership	10,122	3.16	.21	.54	1.32	64.75
Age	10,122	56	52	56	61	6
Tenure	10,122	6.50	3	5	9	4.77
Duality	10,122	.46	0	0	1	.49

Panel B: Customer concentration and RPE usage

	N	Mean	p25	Median	p75	Std. Dev.
Major corporate customer	10,122	.204	0	0	0	.403
RPE	10,122	.379	0	0	1	.485
REP peers	10,122	.233	0	0	0	.423
RPE index	10,122	.149	0	0	0	.356
Number Of peers	1,935	17.19	11	15	20	12.9
RPE to total compensation	10,088	.123	0	0	.236	.188

Panel C: Supplier-year observations with major customers

	N	Mean	p25	Median	p75	Std. Dev.
Sale corporate customer	2,065	.297	.14	.225	.4	.203
HHI corporate	2,065	.072	.019	.037	.078	.104
Largest corporate customer	2,065	.207	.13	.17	.235	.122

Table 2.11: This table presents Univariate Comparison for RPE usage among firm-years with and without at least one major customer for the panel of 1,140 unique firms over the period 2006−2018. RPE is an indicator that equals one if CEO's incentive compensation contains an explicit relative performance condition, zero otherwise. RPE peers (index) is an indicator that equals one if CEO's incentive compensation is relative to performance against peers (index), zero otherwise. Difference in mean is shown in the last column, where *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	Without major customer		**With major customer**		
	N	**Mean**	**N**	**Mean**	**Diff. in Mean**
RPE	8,057	0.385	2,065	0.355	0.030**
RPE peers	8,057	0.238	2,065	0.216	0.021**
RPE index	8,057	0.15	2,065	0.147	0.003
Number of peers	1,562	17.74	373	14.87	2.874***

Table 2.12: This table shows result from estimating the following Poisson model:

$$\textbf{Number of Peers}_{i,t} = \alpha + \beta_1 \textbf{Customer concentration}_{i,t} + \beta_2 \textbf{Controls}_{i,t-1} + \tau_t + \pi_j + \varepsilon_{i,t}$$

where the dependent variable is *Number of Peers*. *Customer concentration* is one of the measures of customer concentration. Controls include lagged firm, CEO, and governance characteristics. Lagged control variables include *Log (assets), sales growth, ROA, Tobin's Q, Leverage, Industry competition, Stock return, Total volatility, Duality, log (Tenure), Total blockholder ownership*. Regressions include industry (two-digit SIC industries) and year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**
		Number of Peers		
Major corporate customer	-.1820***			
	(0.059)			
Sale corporate customer		-.572***		
		(0.159)		
HHI corporate			-2.166***	
			(0.595)	
Largest corporate customer				-1.004***
				(0.270)
Observations	1,931	1,931	1,931	1,931
Pseudo R^2	0.225	0.227	0.228	0.228
Controls	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓

Table 2.13: This table shows result from estimating the following linear probability model:

$$\mathbf{RPE}_{i,t} = \alpha + \beta_1 \mathbf{Customer\ concentration}_{i,t} + \beta_2 \mathbf{Controls}_{i,t-1} + \tau_t + \pi_j + \varepsilon_{i,t}$$

where the dependent variable in columns 1-3 is *RPE*, an indicator that equals one if CEO's incentive compensation contains an explicit relative performance condition, zero otherwise. The dependent variable in columns 4(7)-6(8) is *RPE peers (index)*, an indicator that equals one if CEO's incentive compensation is relative to performance against peers (index), zero otherwise. *Customer concentration* is one of the measures of customer concentration. Controls include lagged firm, CEO, and governance characteristics. Lagged control variables include *Log (assets), sales growth, ROA, Tobin's Q, Leverage, Industry competition, Stock return, Total volatility, Duality, log (Tenure), Total blockholder ownership*. Regressions include industry (two-digit SIC industries) and year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		RPE			RPE peer			RPE index	
Sale corporate customer	.1647			-.2465			.486**		
	(.2014)			(.2161)			(.2329)		
Sale government customer	.6418*			.5687*			.1912		
	(.3429)			(.338)			(.3595)		
HHI corporate		.5521			-.5331			1.1234**	
		(.4693)			(.6131)			(.5114)	
HHI government		.8176			1.0733**			-.3406	
		(.499)			(.4802)			(.4667)	
Largest corporate customer			.0701			-.4414			.5619
			(.3098)			(.3698)			(.3527)
Largest government customer			.7385*			.8205*			.0051
			(.4422)			(.4301)			(.4404)
Observations	10,093	10,093	10,093	9,872	9,872	9,872	9,651	9,651	9,651
Pseudo R^2	.217	.216	.216	.175	.175	.175	.132	.131	.131
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Appendix A

Variable Definition

Variable	Definition
CEO stock ownership (%)	CEO total ownership of firm stock; from Execucomp variable "shrown tot pct".
Count TNIC peers	The number of product market peers; from Hoberg and Phillips' (2016) Text-based Network Industry Classifications (TNIC).
Duality	A dummy variable that takes the value of 1 if the CEO is also the Chairman, 0 otherwise; from Incentive Lab.
HHi corporate	The Herfindahl-Hirschman Index of sales determined as the sum of squares of sales percentage to each reported major corporate customer; from Compustat Segments database.
Idiosyncratic Risk	Idvol, the annualized standard deviation of the residuals from regressing daily individual stock returns over the fiscal year on the contemporaneous CRSP value-weighted
Industry competition	The Herfindahl-Hirschman Index of sales within each two-digit SIC industry; from Compustat.
Largest corporate customer	The percentage of supplier sales the belongs to the single largest corporate customer; from Compustat Segments database.
Leverage	Long-term debt (book value)/ total assets; from Compustat.
Log (Assets)	Natural logarithm of book value of assets; from Compustat.
Log (Market Cap)	Natural logarithm of Market value of equity; obtained as (fiscal year end-month share-outstanding × fiscal year end-month closing price); from CRSP.
ROA	Net income/Total assets; from Compustat.
Sale corporate customer	The percentage of supplier total sales captured by corporate customers that account for more than 10% of total sales; from ompustat Segments database.
Sales Growth (%)	The average sales growth for the previous three years; from Compustat.
Similarity TNIC peers	The average similarity score for the vocal firm's product market peers; from Hoberg and Phillips' (2016) Text-based Network Industry Classifications (TNIC).
Stock Return	Compound returns for last 12 months of fiscal period; from CRSP.
Stock return volatility	The stock return idiosyncratic volatility, calculated as the standard deviation of daily excess returns relative to CRSP value-weighted index over the 250 trading days prior to fiscal-year end; from CRSP.
Systematic Risk	Equity beta, estimated by regressing daily individual stock returns over the fiscal year on the contemporaneous CRSP equally-weighted market returns; from CRSP.
Tenure	The number of years as CEO; calculated from ExecuComp.
Tobin's Q	(Book value of total assets + Market value of equity – Book value of equity)/Book value of total assets; from Compustat.
Total Blockholders ownership (%)	The aggregate ownership percentage of all Blockholders; from Incentive Lab.
Total compensation	CEO compensation calculated as the sum of salary, bonus, non-equity incentives, option awards, stock awards, other compensation, deferred compensation (TDC1); from ExecuComp.
Total similarity TNIC	The similarity score for the vocal firm's and all peers in the product market; from Hoberg and Phillips' (2016) Text-based Network Industry Classifications (TNIC).

Appendix B

Additional Tables

Customer Concentration and Risk. The table shows result from estimating the regressions that relate systematic (idiosyncratic) risk to measures of customer concentration and firm characteristics. In columns (1) through (4), systematic risk is measured as the equity Beta, estimated by regressing daily individual stock returns over the fiscal year on the contemporaneous market returns. In columns (5) through (8), idiosyncratic risk is measured as Idvol, which is the annualized standard deviation of the residuals from regressing daily individual stock returns over the fiscal year on the contemporaneous market returns. Control variables include *Log (assets), ROA, Tobin's Q, Log (market cap.), Leverage, and Industry competition*. All control variables are defined in appendix. Regressions include industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Equity Beta				Idvol			
Sale corporate customer	.092**				.0249***			
	(.0407)				(.0036)			
HHI corporate		.1038**				.0264**		
		(.0504)				(.0112)		
Largest corporate customer			.1354**				.0365***	
			(.0635)				(.0055)	
Major corporate customer				.0356**				.0074***
				(.0172)				(.0013)
Major government customer				-.119***				-.0002
				(.0307)				(.0021)
Log (assets)	.0858***	.0849***	.0859***	.0848***	.0049***	.0047***	.005***	.0048***
	(.0142)	(.0142)	(.0142)	(.0142)	(.0011)	(.0011)	(.0011)	(.0011)
ROA	-1.3395***	-1.3453***	-1.3385***	-1.3422***	-.1149***	-.1166***	-.1146***	-.1166***
	(.081)	(.0812)	(.081)	(.0809)	(.0066)	(.0065)	(.0066)	(.0065)
Tobin's Q	.0894***	.0895***	.0894***	.0882***	.0118***	.0118***	.0118***	.0119***
	(.0084)	(.0084)	(.0084)	(.0083)	(.0007)	(.0007)	(.0007)	(.0007)
Log (market capitalization)	-.1676***	-.1674***	-.1677***	-.1666***	-.0184***	-.0184***	-.0184***	-.0185***
	(.0142)	(.0142)	(.0142)	(.0141)	(.0012)	(.0012)	(.0012)	(.0012)
Leverage	.0585	.0582	.0581	.0624	.0026	.0025	.0025	.0023
	(.0459)	(.0459)	(.0459)	(.0458)	(.0037)	(.0037)	(.0037)	(.0037)
Capital exp.	.294*	.2996**	.2951**	.2813*	.022*	.0236**	.0224*	.023*
	(.1505)	(.1504)	(.1504)	(.1498)	(.0117)	(.0118)	(.0117)	(.0118)
Industry competition	.1488	.151	.1488	.1466	.0244***	.0251***	.0244***	.0258***
	(.1309)	(.1305)	(.1307)	(.131)	(.0086)	(.0085)	(.0086)	(.0086)
Observations	39,711	39,711	39,711	39,711	39,711	39,711	39,711	39,711
R-squared	.3819	.3818	.3819	.3829	.4593	.4573	.4593	.457
Industry-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓

Customer Concentration and Future Stock Return Volatility. The table shows result from estimating the regressions that relate volatility at time $(t+1)$ to firm measures of customer concentration and firm characteristics at time (t). In columns (1) through (4), volatility is measured as the realized stock return volatility, and in columns (5) through (8) as Idiosyncratic stock return volatility. Idiosyncratic stock return volatility is the standard deviation of daily market-adjusted abnormal returns (adjusted with CRSP value-weighted market returns) over the past fiscal year. Control variables include *Log (assets), ROA, Tobin's Q, Log (market cap.), Leverage, and Industry competition.* All control variables are defined in appendix. Regressions include industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Realized return volatility$_{t+1}$				**Idiosyncratic return volatility$_{t+1}$**			
Sale corporate customer	.0182***				.0046***			
	(.0032)				(.0006)			
HHI corporate		.0166***				.0039**		
		(.0054)				(.0015)		
Largest corporate customer			.0244***				.0065***	
			(.0046)				(.0008)	
Major corporate customer				.0061***				.0017***
				(.0012)				(.0002)
Major government customer				-.003				-.0004
				(.0023)				(.0004)
Log (assets)	.0147***	.0145***	.0147***	.0146***	.0024***	.0024***	.0024***	.0024***
	(.0014)	(.0014)	(.0014)	(.0014)	(.0003)	(.0003)	(.0003)	(.0003)
ROA	-.1819***	-.1833***	-.1819***	-.1829***	-.0375***	-.0379***	-.0374***	-.0377***
	(.0095)	(.0094)	(.0095)	(.0095)	(.0016)	(.0016)	(.0016)	(.0016)
Tobin's Q	.0162***	.0162***	.0162***	.0163***	.0032***	.0032***	.0032***	.0032***
	(.0008)	(.0008)	(.0008)	(.0009)	(.0002)	(.0002)	(.0002)	(.0002)
Log (market capitalization)	-.026***	-.026***	-.026***	-.026***	-.0053***	-.0053***	-.0053***	-.0053***
	(.0015)	(.0015)	(.0015)	(.0015)	(.0003)	(.0003)	(.0003)	(.0003)
Leverage	.0028	.0027	.0028	.0027	.0002	.0001	.0001	.0001
	(.0035)	(.0035)	(.0035)	(.0035)	(.0007)	(.0007)	(.0007)	(.0007)
Capital exp.	.0751***	.0763***	.0754***	.0754***	.0103***	.0106***	.0104***	.0104***
	(.0126)	(.0127)	(.0126)	(.0127)	(.0024)	(.0024)	(.0024)	(.0024)
Industry competition	.0079	.0084	.008	.0086	.0025	.0027	.0025	.0027
	(.0081)	(.0081)	(.0081)	(.0081)	(.0017)	(.0017)	(.0017)	(.0018)
Observations	37,447	37,447	37,447	37,447	37,875	37,875	37,875	37,875
R-squared	.4503	.4494	.4501	.4498	.5553	.5536	.5551	.5545
Industry-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓	✓	✓

Using Peers based on Fama French 48 Industry Classification. The table shows result from re-estimating the model in Table (4) using Fama French 48 industry classification peers. The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm-specific and Common Performance are the firm-specific component and the Common component of firm stock return, respectively. Lagged control variables include *Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return, stock return volatility, Chairman indicator, and log of CEO Tenure.* All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1) Sale corporate customer	(2) HHI corporate	(3) Largest corporate customer
Firm-specific Performance	.1307***	.1355***	.1332***
	(.0178)	(.0167)	(.0179)
Firm-specific × Customer concentration	.0394	-.0335	.0158
	(.0425)	(.0684)	(.0647)
Common Performance	.011	.015	.0088
	(.03)	(.0297)	(.0303)
Common × Customer concentration	**.2494*** **	**.6396** **	**.4182** **
	(.0889)	**(.2634)**	**(.1731)**
Customer concentration	-.0035	-.1132*	.0099
	(.046)	(.0602)	(.0761)
Observations	39,406	39,406	39,406
Adjusted R^2	.7864	.7865	.7865
Controls	✓	✓	✓
CEO FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
Clustered SE	✓	✓	✓

Using Peers based on Hoberg and Phillips (2016) Text-based Network Industry Classifications (TNIC). The table shows result from re-estimating the model in Table (5) with peers classified using Hoberg and Phillips (2016) TNIC. The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm performance and Peer performance are firm stock return and peer stock return measured as the equal-weighted portfolio return of TNIC-identified peers, excluding the focal firm, respectively. Lagged control variables include Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return, stock return volatility, Chairman indicator, and log of CEO Tenure.All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10,a 0.05 and a 0.01 levels, respectively

	(1)	(3)	(5)
	Sale corporate customer	HHI corporate	Largest corporate customer
Firm Performance	.1254***	.1298***	.1276***
	(.0179)	(.0169)	(.018)
Firm Performance × Customer concentration	.0511	.0087	.0371
	(.0428)	(.0632)	(.0662)
Peer Performance	-.0323**	-.0313**	-.0339**
	(.0143)	(.0137)	(.0149)
Peer Performance× Customer concentration	**.11***	**.3606****	**.1947***
	(.0611)	**(.1607)**	**(.1114)**
Customer concentration	.0061	.0022	.0284
	(.0441)	(.0302)	(.074)
Observations	36,956	36,956	36,956
Adjusted R^2	.786	.786	.786
Controls	✓	✓	✓
CEO FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
Clustered SE	✓	✓	✓

Controlling for CEO Power. The table shows result from re-estimating the model in Table (4) and allowing Firm-specific and Common performance to vary with CEO tenure and duality. The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm-specific and Common Performance are the firm-specific component and the Common component of firm stock return, respectively. Lagged control variables include *Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return, stock return volatility, Chairman indicator, and log of CEO Tenure.* All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1) **Sale corporate customer**	**(2)** **HHI corporate**	**(3)** **Largest corporate customer**
Firm-specific Performance	.0659***	.0717***	.0691***
	(.0239)	(.0241)	(.0244)
Firm-specific × Customer concentration	.0647	.0419	.0468
	(.0432)	(.0619)	(.0646)
Firm-specific × Log (Tenure)	.0346**	.0337**	.0345**
	(.0159)	(.0163)	(.0161)
Firm-specific × Chairman	.0679***	.068***	.0674***
	(.0233)	(.0235)	(.0234)
Common Performance	-.0325	-.0328	-.0363
	(.0437)	(.0438)	(.0437)
Common × Customer concentration	**.2128****	**.7181****	**.4315****
	(.1027)	**(.2863)**	**(.2001)**
Common × Log (Tenure)	.0444*	.0453*	.0454*
	(.0235)	(.0234)	(.0234)
Common × Chairman	.016	.0168	.017
	(.0348)	(.035)	(.0348)
Customer concentration	.0094	-.0497	.0163
	(.0428)	(.0341)	(.0736)
Log (Tenure)	.0279	.0274	.0275
	(.0188)	(.0189)	(.0189)
Chairman	.0301	.0303	.03
	(.0209)	(.0209)	(.0209)
Observations	39291	39291	39291
Adjusted R^2	.732	.732	.732
Controls	✓	✓	✓
CEO FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
Clustered SE	✓	✓	✓

Controlling for Industry strategic Interactions and Less Incentive Pay for Risky Firms Explanations. The table shows result from re-estimating the model in Table (4) and allowing Firm-specific and Common performance to vary with industry competition and stock idiosyncratic volatility. The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm-specific and Common Performance are the firm-specific component and the Common component of firm stock return, respectively. Lagged control variables include *Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return, stock return volatility, Chairman indicator, and log of CEO Tenure.* All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Sale corporate customer		**HHI corporate**		**Largest corporate customer**	
Firm-specific Performance	.1288***	.1463***	.1331***	.1501***	.1317***	.1497***
	(.0179)	(.02)	(.0168)	(.0185)	(.018)	(.02)
Firm-specific × Customer concentration	.052	.0343	.0166	-.0044	.0278	.0023
	(.0426)	(.0432)	(.0621)	(.0617)	(.0652)	(.0657)
Firm-specific × Industry competition		-.9433**		-.9525**		-.9506**
		(.4718)		(.4687)		(.4715)
Firm-specific × Stock volatility		-.0289		-.03		-.0302
		(.0226)		(.0228)		(.0229)
Common Performance	.032	.0633	.0328	.064	.0298	.0586
	(.0265)	(.0489)	(.0267)	(.0492)	(.0267)	(.0495)
Common × Customer concentration	**.1871***	**.1691***	**.659****	**.6176****	**.3963****	**.3704***
	(.1029)	**(.1017)**	**(.2865)**	**(.2823)**	**(.2003)**	**(.1973)**
Common × Industry competition		-.1883		-.1869		-.1868
		(.3244)		(.3241)		(.3254)
Common × Stock volatility		-.0606		-.0626		-.0541
		(.1388)		(.1398)		(.14)
Customer concentration	.0125	.017	-.0449	-.0393	.017	.0221
	(.0433)	(.043)	(.0361)	(.0369)	(.074)	(.0732)
Industry competition	-.5137	-.5031	-.5129	-.5032	-.5161	-.5062
	(.4237)	(.424)	(.4251)	(.4254)	(.4252)	(.4257)
Stock volatility	-.28***	-.169	-.2847***	-.1687	-.2824***	-.1692
	(.0964)	(.1103)	(.0967)	(.1105)	(.0966)	(.1104)
Observations	39,297	39,297	39,297	39,297	39,297	39,297
Adjusted R^2	.786	.786	.786	.786	.786	.786
Controls	✓	✓	✓	✓	✓	✓
CEO FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓

Controlling for Industry Strategic Interactions and Less Incentive Pay for Risky Firms Explanations. The table shows result from re-estimating the model in Table (5) and allowing Firm and peer performance to vary with industry competition and stock idiosyncratic volatility. The dependent variable is the natural logarithm of one plus total compensation, LogComp. Firm performance and Peer performance are firm stock return and peer stock return measured as the equal-weighted portfolio return of firms in the same industry and size quartile, excluding the focal firm, respectively. Lagged control variables include *Log (assets), ROA, Tobin's Q, Leverage, Industry competition, Stock return, stock return volatility, Chairman indicator, and log of CEO Tenure*. All variables are defined in appendix. Regressions include CEO, industry-year fixed effects. Standard errors are reported in parentheses and are clustered at the firm level; *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Sale corporate customer		**HHI corporate**		**Largest corporate customer**	
Firm Performance	.1288***	.1464***	.1332***	.1501***	.1317***	.1497***
	(.0179)	(.02)	(.0168)	(.0185)	(.0181)	(.02)
Firm Performance × Customer concentration	.052	.0343	.0167	-.0043	.0277	.0022
	(.0427)	(.0433)	(.0621)	(.0618)	(.0652)	(.0657)
Firm Performance × Industry competition		-.9431**		-.9522**		-.9504**
		(.4718)		(.4687)		(.4715)
Firm Performance × Stock volatility		-.0289		-.0299		-.0302
		(.0226)		(.0228)		(.0229)
Peer Performance	-.0764***	-.0654**	-.0791***	-.0678**	-.0804***	-.0717**
	(.0202)	(.0328)	(.0203)	(.033)	(.0205)	(.0334)
Peer Performance × Customer concentration	**.1067**	**.1065**	**.5068****	**.4907****	**.2911***	**.2907***
	(.0919)	**(.0912)**	**(.226)**	**(.2236)**	**(.1757)**	**(.174)**
Peer Performance × Industry competition		.5955*		.6038*		.6024*
		(.3515)		(.3506)		(.3536)
Peer Performance × Stock volatility		-.0253		-.026		-.0191
		(.1135)		(.1144)		(.1145)
Customer concentration	.0215	.0259	-.0036	.0006	.0409	.046
	(.0433)	(.0432)	(.0323)	(.0334)	(.0715)	(.071)
Industry competition	-.5136	-.4544	-.5128	-.4539	-.5161	-.4569
	(.4236)	(.4203)	(.4251)	(.4217)	(.4252)	(.4219)
Stock volatility	-.2805***	-.1715	-.285***	-.1712	-.2828***	-.1711
	(.0965)	(.1088)	(.0968)	(.1089)	(.0967)	(.1088)
Observations	39,291	39,291	39,291	39,291	39,291	39,291
Adjusted R^2	.7861	.7863	.7861	.7863	.7861	.7863
Controls	✓	✓	✓	✓	✓	✓
CEO FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Clustered SE	✓	✓	✓	✓	✓	✓

Chapter 3

CEO Partisanship and Capital Structure Adjustments[1]

3.1 Introduction

A growing literature shows that political leanings play an important role in finance, including CEOs' impact on corporate policies, investors' portfolio choices and entrepreneurial activity.[2] For example, Francis et al. (2016) conclude that tax sheltering is lower among firms with Democratic-leaning CEOs while Di Giuli and Kostovetsky (2014) find they are more focused on corporate responsibility activities. Hutton, Jiang, and A. Kumar (2014)

[1]Co-authored with Jean Helwege and Raymond Kim

[2]See Hutton, Jiang, and A. Kumar (2014); Di Giuli and Kostovetsky (2014); Elnahas and D. Kim (2017); Bayat and Goergen (2020); Francis et al. (2016); Meeuwis et al. (2018) and Cohen, Hazan, and Weiss (2021) for studies relating political views to corporate financial policies. Evidence from investors' portfolios and stock returns also show a role for partisanship Hong and Kostovetsky (2012); Cassidy and Vorsatz (2021); Cookson, Engelberg, and Mullins (2020); Kaustia and Torstila (2011); Sheng, Sun, and W. Wang (2021). Studies by Kempf and Tsoutsoura (2021); Dagostino, Gao, and Ma (2021), and Jiang, A. Kumar, and Law (2016) show that political views color the behavior of analysts and lenders. Engelberg et al. (2021) examine the relationship between political preferences and entrepreneurship.

find that Republican CEOs are more cautious about using leverage and they undertake less research and development (R&D). These results align with studies of state and federal taxes that indicate Democrats are more tolerant of high taxes than Republicans (Reed (2006); Inclan, Quinn, and Shapiro (2001)). They are also consistent with the psychology literature (e.g Jost et al. (2003) and McCrae (1996)) that relates political conservatism to uncertainty avoidance and views Democrats as more open to change. In this paper, we examine CEOs' political leanings and changes in their firms' capital structures. In particular, we focus on CEOs' attitudes about risk and taxes, as proxied by political affiliation, and how they affect the speed of adjustment (SOA) to the firm's target leverage ratio.

In the trade-off theory of capital structure shareholder value is maximized by balancing the tax benefits of debt with the costs of financial distress that accompany leverage. If Democrat and Republican managers' political views lead to different perceptions of the value of the tax deductibility of debt and the risks of higher leverage, then their firms' capital structures will differ. Hutton, Jiang, and A. Kumar (2014) argue that the Republican managers' risk aversion leads to a preference for lower levels of debt. However, we note that their tax aversion leads to a preference for higher leverage. Similarly, while Democrats' greater risk tolerance implies higher debt levels, their tolerance for higher taxes suggests they will use less leverage. Thus, partisan CEOs' use of debt depends on whether concerns about risk or taxes dominate. We hypothesize that CEOs' capital structure choices will vary not only with their political beliefs on average but they will depend on deviations from their target leverage ratios. That is, for firms that are underlevered, movements up towards the target will depend mainly on their attitudes towards taxes (i.e., risk aversion would not factor into the decision given the low likelihood of bankruptcy). For over-levered firms, tax savings would not be a consideration while fear of bankruptcy would be.

Prior research highlights the tendency of firms to revert to their target leverage ratios slowly and finds that the speed depends on adjustment costs (Flannery and Rangan (2006); Hovakimian, Opler, and Titman (2001); Faulkender et al. (2012); R. Huang and Ritter (2009); Warr et al. (2012); Cook and Tang (2010)). For example, Byoun (2008) finds that SOAs are faster for over-levered firms that have a surplus. Morellec, Nikolov, and Schurhoff (2012) conclude that managers' self-interest not only lowers target leverage ratios but leads to inertia in movement to the target. We posit that managers of over-levered firms who are fearful of financial distress, such as partisan Republicans, would reduce their debt quickly. For these CEOs the dislike of taxes will not be a factor given that they have exhausted the tax benefits of debt. In contrast, an over-levered firm run by a partisan Democrat, who is assumed to be less risk averse, would not be as willing to incur the adjustment costs of deleveraging. Therefore, the SOA for over-levered firms isolates the impact of attitudes toward risk from managers' attitudes toward taxes. Similarly, firms that are below their target leverage ratios offer an opportunity to focus on the role of taxes, given that bankruptcy risk is negligible. Among partisan Democrats, their greater tolerance for taxes leaves them with little sense of urgency in raising debt levels, while partisan Republican CEOs are expected to move up toward the optimal leverage ratio more quickly. Thus, adjustment speeds of underlevered firms measure the impact of managers' attitudes toward taxes that is not confounded with attitudes toward risk.

Using data from 2003-2019, we identify partisan CEOs with political contribution data and examine the SOAs of their firms. CEOs who contribute exclusively to one party (partisan Democrats or partisan Republicans) are compared to managers who made no contributions and to CEOs that contributed to both parties (bipartisan Democrat or bipartisan Republican, depending on the fraction donated to each party). Our main result is that under-levered firms with partisan Democrat CEOs take longer to reach their target capital structures. We do not find significant differences among bipartisan Democrat, bipartisan Republican, or partisan Republican CEOs. Given that under-levered firms are less likely to experience financial distress, we interpret the slower SOAs of partisan Democrat CEOs as evidence of their greater tolerance for taxes. Our finding that partisan Democrats have significantly slower SOA compared to nonpartisan CEOs when under-levered is not isolated to growth firms, tech firms, or under-levered firms with a financial surplus (identified by Byoun (2008) as slow SOA firms).

Next, we examine how SOAs respond to an exogenous shock to the tax benefits of corporate debt, which occurred with the 2017 Tax Cut and Jobs Act (TCJA). The TCJA limited interest tax deductions and reduced corporate tax rates from 35% to 21%, which would reduce the marginal benefit of debt (Binsbergen, J. Graham, and Yang (2010); Carrizosa, Gaertner, and Lynch (2020)). We expect this tax change to impact both the target leverage ratio and how quickly firms adjust to it. Our results show that the TCJA seems to affect only under-leveraged firms with partisan Democrat CEOs, as these firms reduced their SOA significantly after the act's passage. In contrast, Republican CEOs did not have different SOAs after the TCJA compared to nonpartisan CEOs.

We also examine the active/passive adjustments to target and find that partisan Democrats are more likely to increase leverage via share repurchases before but not after the act's passage when a surge in buyback activity fueled a public debate over the appropriate use of the subsequent increase in corporate cash flows (Bennett and Z. Wang (2021)). For example, Senators Sanders and Schumer proposed a limit on share repurchases at firms that had not used the TCJA tax savings to raise employees' wages.[3] We conclude that this led some firms with Democrat-leaning CEOs to avoid repurchases during this period.

Our findings contribute to the extensive literature that relates CEO characteristics, personal choices, and personalities to corporate financial decisions (Cronqvist, Makhija, and Yonker (2012); Benmelech and Frydman (2015); Hong and Kostovetsky (2012); Di Giuli and Kostovetsky (2014); Elnahas and D. Kim (2017); Hutton, Jiang, and A. Kumar (2014); Bayat and Goergen (2020)). Our evidence is particularly relevant to the literature on tax-sheltering, which finds mixed results on the behavior of political CEOs (Francis et al. (2016); Christensen et al. (2015)). Our paper also contributes to the capital structure literature by showing how CEO views affect the speed of adjustment to a target leverage ratio. Prior literature attributes variation in debt adjustment speeds to adjustment costs, macro-economic factors, and firm-specific characteristics (Fischer, Heinkel, and Zechner (1989); Byoun (2008); Faulkender et al. (2012); Chang, Chou, and T.-H. Huang (2014); Korajczyk and Levy (2003); Cook and Tang (2010)). Agency costs that affect the speed of adjustment, such as in Morellec, Nikolov, and Schurhoff (2012) and Chang, Chou, and T.-H. Huang (2014), may be greater among CEOs with strong political views.

[3] See New York Times, February 3, 2019, "Schumer and Sanders: Limit Corporate Stock Buybacks".

In Section 3.2, we present our testable hypotheses. In Section 3.3, we discuss the data on CEOs, political contributions, and capital structure used in the empirical tests. Next, in Section 3.4, we present our empirical results. Section 3.5 provides evidence from additional tests. Finally, in Section 3.6, we summarize and conclude.

3.2 Hypothesis Development and Empirical Approach

3.2.1 Partisanship

Prior studies in the psychology literature conclude that differences in the personalities of conservatives and liberals are significant, with Republicans more often having closed personalities and Democrats open (Jost et al. (2003); Carney et al. (2008); McCrae (1996)). The closed personalities of Republicans are described as tending toward risk aversion, favoring order and respect for authority, and emphasizing individual accountability, whereas Democrats are linked to curiosity, are found to be less reserved and are more concerned with equality of outcomes (Carney et al. (2008); Jost et al. (2003) and Chin and Semadeni (2017)). Consistent with these views of Democrat and Republican character traits, studies of CEOs and mutual fund managers find that donors to the Democratic Party place a greater emphasis on corporate social responsibility (Hong and Kostovetsky (2012); Di Giuli and Kostovetsky (2014)). Further supporting evidence comes from research on firm risk and CEO partisanship, which finds that Republican managers generally follow conservative investment and leverage policies (Hutton, Jiang, and A. Kumar (2014); Elnahas and D. Kim (2017)).

Democrats and Republicans have significantly different taxes policies when in control of federal and state leadership positions, reflecting their differing views on the size of government, individual accountability and equality of outcomes (Reed (2006) and Inclan, Quinn, and Shapiro (2001)). However, the evidence on taxes at the firm level are mixed. Francis et al. (2016) find that Republican CEOs' political ideologies drive greater tax sheltering but Christensen et al. (2015) find that Republican managers are associated with less tax avoidance compared to liberal managers.

3.2.2 Capital Structure

Based on these findings, we hypothesize that CEOs' politically-motivated and contrasting views about risk and taxes will affect how CEOs assess the costs and benefits debt. The most important factor that prevents firms from having very high leverage is the cost of financial distress. Therefore, we expect risk averse Republican-leaning CEOs to use less leverage and for more open, adventurous partisan Democrat CEOs to take on more debt as they expand their companies. However, given that one of the primary benefits of leverage is a reduction in taxes, we expect an offsetting effect on leverage for Republican CEOs, who value individual accountability more than equality of outcomes. Likewise, we expect an offsetting effect for CEOs who strongly support the Democratic Party, in that their views favoring larger government and the taxes that support it will lead them to use less leverage. Hence, both Republicans and Democrats have contradictory views that support both higher leverage and lower leverage. Republican managers' risk aversion suggests less debt, while their tax aversion suggests more debt. Democrats' risk tolerance suggests higher debt, while their tax tolerance indicates less debt.

In order to separate these opposite impacts on CEOs' leverage choices, we examine under-levered and over-levered firms and their adjustment speeds as they move back towards their target leverage ratios. We follow the approach of Flannery and Rangan (2006) and Byoun (2008) to estimate the target leverage ratio with yearly cross-sectional regressions. The target leverage ratio for firm i in year t is defined as:

$$\frac{D_{i,t}}{A_{i,t}}^{*} = \Sigma\beta_j x_{ij,t-1} + \varepsilon_{i,t} \tag{3.1}$$

The set of firm characteristics, $x_{ij,t-1}$, includes lagged values of operating income, market-to-book ratio, depreciation and amortization, size (measured by the log of total assets), fixed assets, R&D expenditures, an indicator variable for firms that are missing R&D expenditures, and the industry median debt ratio. This specification for estimating the target book leverage is similar to those in Flannery and Rangan (2006); Titman and Wessels (1988b); Rajan and Zingales (1995); Hovakimian, Opler, and Titman (2001); Fama and French (2002); Kayhan and Titman (2007) and Byoun (2008).

Using the coefficients, β_j, we obtain estimates of the target leverage ratio, $\frac{D_{i,t}}{A_{i,t}}^{*}$, from the fitted values for each firm and year. This allows us to estimate a partial adjustment model, as in Hovakimian, Opler, and Titman (2001); De Miguel and Pindado (2001); Fama and French (2002) and Kayhan and Titman (2007):

$$\Delta D_{i,t} = \lambda\big([\frac{D^{*}_{i,t}}{A_{i,t}}]A_{i,t} - D_{i,t-1}\big) \tag{3.2}$$

where λ_i is the speed of adjustment. In Equation (3.2) the quantity in parentheses equals the *required* change in debt needed to reach the target leverage ratio. We refer to this as the *Target Deviation*. If the coefficient λ_i equals one in Equation (3.2) then the left-hand side (the change in debt) equals the amount required to reach the target and the adjustment to the target is complete in one period. In contrast, any positive value of λ_i that is below one implies that the adjustment toward the target in any given year is a partial one. The literature emphasizes that λ_i is expected to be less than one because of high costs of adjustment. The left-hand side variable, $\Delta D_{i,t}$, is equal to the change in the sum of the book values of long-term and short-term debt.

Studying firm SOAs allows us to exploit a capital structure framework that separates out partisan views on taxes and risk. When the firm is under-levered, the risk of bankruptcy is low, and movements towards the target capital structure reflect a desire to take advantage of the tax treatment of debt. For managers that are particularly concerned with lowering taxes (partisan Republicans), the SOA should be higher when shocks cause the firm to be below its target. When a firm's debt is above its target, the CEO is more focused on bankruptcy risk. In this situation, earnings are more likely to be negative, causing tax considerations to diminish in importance. Partisan Democrats are expected to be less concerned about distress costs while partisan Republicans are more likely to move down to their target debt ratios quickly.

Table 3.1 summarizes our framework for examining capital structure choices and SOAs. In the left column, which considers under-levered firms, low bankruptcy risk and high tax benefits allow us to focus on the differing political views towards taxes. For

Republican CEOs we expect tax aversion to result in faster SOAs while risk aversion would not be a significant factor. For Democrat CEOs, we expect tax-tolerant attitudes to result in slower SOAs while risk tolerance is a negligible factor in this situation. In over-levered firms, shown on the right, higher bankruptcy risk is the dominant concern while the tax benefits of debt are not expected to be a factor. Taxes are not a consideration in this setting because an over-levered firm is likely to already have maximized the tax benefits of debt. Thus, examining over-levered firms allows us to isolate the impact of risk aversion on capital structure changes. We expect faster SOAs for risk-averse Republican CEOs that wish to lower debt quickly. For Democrat CEOs, who are likely to be less cautious, we expect slower SOAs.

This framework leads to the following hypotheses:

Hypothesis 1: *CEOs' political ideologies are related to SOAs.*

Hypothesis 2A: *Democrats will have slower SOAs when under(over)-levered, in line with their attitudes towards taxes (risk).*

Hypothesis 2B: *Republicans will have faster SOAs when over(under)-levered, in line with their attitudes towards risk (taxes).*

To test whether our hypotheses are true we examine partial adjustment speeds for under-levered and over-levered firms. Specifically, we amend Equation (3.2) to include indicator variables for under-levered and over-levered firms and their interactions with indicator variables for partisanship:

$$
\begin{aligned}
\Delta D_{i,t} = \alpha &+ \lambda \mathit{Target\ Deviation}_{i,t} \\
&+ \delta_1(\mathit{Target\ Deviation}_{i,t} \times D_{i,t}^{below} \times DEM_{i,t}) \\
&+ \delta_2(\mathit{Target\ Deviation}_{i,t} \times D_{i,t}^{above} \times DEM_{i,t}) \\
&+ \delta_3(\mathit{Target\ Deviation}_{i,t} \times D_{i,t}^{below} \times REP_{i,t}) \\
&+ \delta_4(\mathit{Target\ Deviation}_{i,t} \times D_{i,t}^{above} \times REP_{i,t}) + \Sigma\omega_{i,j} Z_{ij,t} + \varepsilon_{i,t}
\end{aligned}
\tag{3.3}
$$

where ΔD_{it} and $\mathit{Target\ Deviation}_{i,t}$ are the same as in Equation (3.2). $D_{i,t}^{below}$ is an indicator variable equal to one if leverage is below the target and $D_{i,t}^{above}$ is a dummy variable equal to one if leverage is above the target. An alternative specification, not shown, omits $\mathit{Target\ Deviation}_{i,t}$ in the first line of the equation and instead includes two variables that reflect whether the firm is above or below its target (i.e., the interactions of the deviation with $D_{i,t}^{above}$ and with its *Below* counterpart). The indicator variables for partisanship, REP_{it} and DEM_{it}, are set to one for firms whose CEOs are frequent donors to the Republican Party and Democratic Party, respectively. The subscript t on the political indicator variables allows for the possibility that the CEO of a firm is replaced with another who holds a different political affiliation. If a firm has the same CEO throughout the sample period the partisanship indicator variables have the same values for all years. The control variables in $Z_{ij,t}$ include CEO characteristics and, as was the case in Equation (3.2), industry and year fixed effects. We expect the coefficients on the interaction terms to be significant if CEO political ideology is related to SOAs, as in Hypothesis (1). More specifically, we expect the views of Democrat CEOs to have slower SOAs than their conservative Republican counterparts, so that δ_1 and δ_2 will be negative while δ_3 and δ_4 will be positive. This means firms with Democrat CEOs will move more slowly towards their target leverage ratios after a shock compared to firms with non-partisan CEOs and firms with bipartisan CEOs (those who donate to both parties). Likewise, the firms with Republican CEOs are expected to have faster SOAs than other firms.

SOAs reflect active and passive changes in capital structures Faulkender et al. (2012). For under-levered firms, active movement towards the target may be in the form of share buybacks financed with new debt, which suggests a preference to reduce taxes. Alternatively, active movement up to the target could result from new debt issuance that funds capital expenditures or R&D. For over-levered firms, active changes in capital structure include equity issuance or asset sales where the proceeds are used to pay down debt. Equity issuance could be in the form of a seasoned equity offering (SEO) or equity issuance to employees in lieu of cash compensation. To estimate the impact of active and passive changes to leverage we follow Faulkender et al. (2012) and define adjustment to a passive capital structure as:

$$\frac{D_{i,t}}{A_{i,t}} - D^p_{i,t-1} = \gamma(\frac{D^*_{i,t}}{A_{i,t}} - D^p_{i,t-1}) + \epsilon \tag{3.4}$$

where

$$D^p_{i,t-1} = \frac{D_{i,t-1}}{A_{i,t-1} + NI_{i,}} \tag{3.5}$$

and $NI_{i,t}$ is net income in period t. The left-hand side of Equation (3.4) is the active adjustment of the leverage ratio. In this specification, γ measures the SOA given that the firm has moved away or towards its target due to the profits from operations.

Hypothesis 3: *CEOs' political ideologies affect active and passive adjustments to the target leverage ratio.*

3.2.3 Heterogeneous Effects of the TCJA

We next consider how partisanship affects SOAs when taxes change. The Tax Cut and Jobs Act (TCJA) was an exogenous legislative shock that reduced the marginal benefit of debt by limiting corporate interest deductions and lowering the corporate tax rate from 35% to 21%. In addition to affecting the target capital structure, the shock should also affect the SOAs of partisan Democrats and Republicans. The treatment effects (i.e the effect of TCJA) should be heterogeneous depending on the firm's deviation from its target (over- or under-levered) and CEOs' views associated with political ideologies. In response to the TCJA, a tax-tolerant CEO may allow his under-levered firm to remain below the target more than other CEOs. Likewise, we would also see a risk averse CEO of an over-levered firm reduce debt more rapidly than other CEOs as the tax benefits of debt are diminished by the TCJA.

Hypothesis 4: The *Tax Cut and Jobs Act affects SOAs differently depending on firms' deviations from their targets and CEOs' political ideologies.*

To test Hypothesis (4) we formalize the estimation of heterogeneous effects across firms based on CEO political ideology by using the marginal conditional average treatment effect (MCATE) from Grimmer, Messing, and Westwood (2017); Heckman and Vytlacil (2005); Heckman and Vytlacil (2001). To measure the effect of the exogenous tax legislation, we use the treatment indicator $T \in [0, 1]$ to assess the response of the firm's speed of adjustment $Y \in \mathbb{R}$. The Average Treatment Effect (ATE) is defined as,

$$\phi(\mathbf{T}) = E[Y(\mathbf{T}) - Y(0)]. \tag{3.6}$$

To measure how TCJA treatment effects vary across firms by relative leverage and CEO political ideology, we consider the conditional average treatment effect (CATE). The CATE is the average effect for a set of firms that share characteristics. Each firm i has an indicator variable $\mathbf{L} \in [A, B]$ equal to A if leverage is above target and B if below target. Each firm i also has a political indicator $\mathbf{P} \in$ [D,R] equal to D if the CEO donates to the Democratic Party and R if the CEO donates to the Republican Party. To formalize CATE, for each firm i, $\mathbf{G_i} = (G_{iL}, G_{iP})$ with the value of the covariates in set Γ. Given $\mathbf{G} = g$, we can define CATE as

$$\phi(\mathbf{T}, \mathbf{g}) = E[Y(\mathbf{T}) - Y(0) | \mathbf{G} = g]. \tag{3.7}$$

To empirically estimate $\phi(\mathbf{T}, \mathbf{g})$, we amend Equation (3.3) to determine the heterogenous impact across firms that share characteristics based on relative leverage and CEO political ideology,

$$
\begin{aligned}
\Delta D_{i,t} = \alpha &+ \lambda_i \, Target\ Deviation_{i,t} \\
&+ \delta_1(Target\ Deviation^{below}_{DEM\,i,t}) + \eta_1(Target\ Deviation^{below}_{DEM\,i,t} \times TCJA_t) \\
&+ \delta_2(Target\ Deviation^{above}_{DEM\,i,t}) + \eta_2(Target\ Deviation^{above}_{DEM\,i,t} \times TCJA_t) \\
&+ \delta_3(Target\ Deviation^{below}_{REP\,i,t}) + \eta_3(Target\ Deviation^{below}_{REP\,i,t} \times TCJA_t) \\
&+ \delta_4(Target\ Deviation^{above}_{REP\,i,t}) + \eta_4(Target\ Deviation^{above}_{REP\,i,t} \times TCJA_t) \\
&+ \Sigma\omega_{i,j} Z_{ij,t} + \varepsilon_{i,t}
\end{aligned}
\tag{3.8}
$$

In addition to the expectations from Equation (3.3), we expect a tax-tolerant CEO with an under-levered firm to remain below target more than other CEOs due to the TCJA. This means we expect η_1 to be negative. We also expect a risk-averse CEO of an over-levered to reduce debt more rapidly than other CEOs as the tax benefits of debt are diminished by the TCJA. This means we expect η_4 to be positive. We also expect heterogeneity in conditional average treatment effects for active adjustments in reaction to the TCJA.

3.3 Data

We start with firms in ExecuComp from 2003 to 2019 that are not in regulated industries (SIC 6000-6799 and 4800-4999).[4] We obtain information on the CEO's age, tenure with the company, compensation and gender from ExecuComp. Details of the composition of the board of directors are from BoardEx. To estimate the target leverage we use annual

[4]Firms in such industries have capital structures and financing decisions that may not convey the same information as firms that are outside the financial and utility sectors.

financial data from Compustat. This data are then matched to political contribution data from from the Federal Election Commission (FEC) website.[5] The names of the executives, firm names and locations serve as the mapping tools to the FEC data. Appendix (A) describes the process of identifying the political leanings of the CEOs and Appendix (B) the variables definitions. Our full sample consist of 16,567 firm-year observation, including 1,431 firms and 3,097 CEOs.

3.3.1 Political Classification of CEOs

We classify CEO's tenure-specific political ideology using an approach that is similar to Hong and Kostovetsky (2012), Hutton, Jiang, and A. Kumar (2014), and Elnahas and D. Kim (2017). We categorize CEOs as bipartisan Republican if the CEO made more contributions to Republican candidates or committees during his tenure. Bipartisan Democrat is defined analogously (i.e., it takes the value of one if the CEO made more contributions to the Democratic Party during his tenure, zero otherwise). A more devoted Republican, which we call partisan Republican, is defined as a CEO who contributed *exclusively* to members of the Republican Party during his or her tenure at the firm. Partisan Democrats are CEOs who only contributed to the Democratic Party during their years as head of the firm. These two measures are more restrictive than the bipartisan ones and therefore they allow us to better isolate a CEO's ideology from opportunism. For the sake of brevity, most of the analysis in our paper categorizes a CEO as belonging to one of three groups: partisan Republican, partisan Democratic, or other (nonpartisan, bipartisan Republican or

[5] https://www.fec.gov

bipartisan Democrat).[6] However, our initial analysis considers both partisan and bipartisan CEOs together. These four types together are referred to as political CEOs, which contrasts with nonpartisan CEOs.

Our approach of using a single measure of political leanings for the entire duration of a CEO's tenure at the firm lowers the measurement error, but one might be concerned that CEO political views change with age. Past work indicates that party identification is relatively stable over time (see, for example, Green, Palmquist, and Schickler (2002)). In Figure A0, we examine trends in the proportion of Republican and Democrat CEOs over time. If these proportions were unstable and dramatically fluctuated over time, we might be concerned about data errors such as incorrect political classification of CEOs, flawed FEC contribution data, or a large number of firm observations that enter and exit the panel data in different years. We find that the proportions are stable over time. Figure A0 shows the proportion of CEOs identified as partisan Republicans is about 13.6% of firms in a given year, while the proportion of CEOs identified as partisan Democrats is about 6% of the firms in a given year.

In untabulated results, we also examine correlations between political ideology and CEO characteristics. As expected, partisan Republican CEOs are more likely to be older men. The correlations between the partisan Republican indicator variable and age and gender are both significantly different from zero, but they are small in magnitude. The partisan Democrat CEO indicator is significantly negatively correlated with male gender

[6] The last group also includes CEOs that contribute to parties other than the Republican or Democratic ones or choose to contribute in manners that are not recorded by the FEC.

indicator. Partisan Democrat CEOs are also significantly older than nonpartisan CEOs, but the correlation is quite small.

3.3.2 Summary Statistics

In Table 3.2, we present the summary statistics for the variables used in our empirical analyses. We report means and standard deviations for the subsamples of firms with nonpartisan, partisan Republican, partisan Democrat, bipartisan Republican, and bipartisan Democrat CEOs. They comprise 67.3%, 13.6%, 6.1%, 8.5%, and 4.5% of the total sample, respectively. About a third of CEOs in our sample made at least one political contribution and the majority of these political CEOs contributed to only one party. Mean values for political subgroups are in bold if t-tests indicate significant differences at the 10% or lower levelwith respect to the nonpartisan group .

Table 3.2 shows that partisan Republican firms are significantly larger than firms with nonpartisan CEOs, while partisan Democrat firms are not. Leverage, measured as total debt to assets, is not significantly higher at firms run by partisan Republicans (mean of 0.193) compared to nonpartisan firms. In contrast, partisan Democrat CEO firms have a significantly lower average ratio of debt to assets (mean of 0.168 compared to 0.191 for nonpartisan firms). While this result may seem to contradict Hutton, Jiang, and A. Kumar (2014), who find that Republican CEOs have lower leverage, Table 3.2 does not hold constant the type of industry, other firm characteristics or CEO age and gender. Both partisan Republican and partisan Democrat CEOs manage firms that have significantly higher operating income compared to firms with nonpartisan CEOs. Firms with partisan Republican CEOs have significantly higher market to book, depreciation, PPE, financial and cash surpluses and lower net equity issuance than nonpartisan ones. For the sample period as a whole, partisan Democrat CEOs have significantly higher share repurchases and lower SEO issuance, and therefore more negative net equity issuance, than nonpartisan CEO firms. However, not shown, the share repurchases and SEO issues do not lead to significantly lower net equity issuance compared to partisan Republican firms. Net debt issuance is higher at partisan Republican firms while the nonpartisan and partisan Democrat debt issuance flows are not significantly different. Partisan Democrat firms have higher financial and cash surpluses and lower depreciation and PPE than nonpartisan firms. Notably, partisan Republican firms have significantly lower R&D (mean of 0.023) while partisan Democrat firms have significantly higher R&D (mean of 0.044) compared with nonpartisan firms. This suggests Democratic CEOs may be concentrated in high growth industries, which is evident by the higher proportion of high tech and pharma firms among partisan Democrats (means of .328 and .256, respectively) compared to partisan Republican (means of .159 and .108, respectively). We consider the impact of specific industries in more detail below.

3.4 Empirical Analysis

3.4.1 Target Leverage Model

We begin our empirical estimation by estimating Equation (3.1) using specifications that are common in the literature. Our results, which are available in the Appendix, are as expected. The target leverage ratio is significantly higher for larger firms, when PPE is greater, and when the industry median debt ratio is higher. The optimal capital structure involves less debt when market to book is greater and when R&D is more important. Operating income has a significant negative coefficient. Because our sample consists of companies that are large enough to be included in ExecuComp, we compare these estimates to those from regressions run on the set of all Compustat firms. The results are very similar. The only variables that lose significance are PPE and the R&D indicator for missing data, but the latter has the same sign and magnitude. Also, the coefficient on R&D expenses to assets remains significantly negative. Thus, our target leverage ratio estimates are consistent with previous empirical studies.

3.4.2 Speed of Adjustment and Partisanship

Hypothesis (1) conjectures that CEOs' political ideologies matter for firms' SOAs, which we test in Table 3.3. The estimation of Equation (3.2) is shown in column (1) and, as expected, there is a positive and significant coefficient on $Target\ Deviation$. The size of the coefficient implies that the average firm in our sample takes four years to adjust to its target leverage ratio. In the next four columns, we include specifications that reveal how the SOA varies with the political views of the CEO. Including an indicator in column (2) for political CEOs, which is set to one both partisan and bipartisan CEOs (i.e., whether they are liberal or conservative and whether they donate to one party or more), leads to a lower estimate of the SOA for politically-minded CEOs. The coefficient is negative and significant, suggesting that Hypothesis (1) is true and political leanings are associated with SOAs that are 15% slower than at firms with nonpartisan CEOs.

Including indicator variables for the various types and degrees of political views in columns (3)-(5) in Table 3.3 reveals that the slower SOAs of firms managed by political CEOs owe to the behavior of partisan Democrats. The estimates in column (3) measure the impact of political views with the interactions of the deviation variable and the two indicators for bipartisan CEOs. This specification do not show a significant relationship between ideology and adjustment speed as only the $Target\ Deviation$ coefficient is significant. In contrast, Hypothesis (1) gains support in columns (3) and (5) that include the interaction of $Target\ Deviation$ with the indicators for more politically-minded CEOs (partisan Republican and partisan Democrat). Column (4) shows a negative and significant coefficient for $Target\ Deviation$ interacted with $Partisan\ DEM$, implying that SOAs are slower among firms with partisan Democrat CEOs compared to other firms. Column (5), which includes interaction terms with indicators for both partisan and bipartisan CEOs, also reveals that partisan Democrat CEOs have a slower SOA on average. The estimated coefficient in columns (4) and (5) is about -0.09, which combined with the coefficient of about 0.25 on the target deviation variable, suggests that partisan Democrat CEO firms take about 1.7 years longer to reach their targets. While the results from Table 3.3 support Hypothesis (1), it seems that only partisan Democrat CEOs have adjustment speeds that are significantly different than the average firm's. Other political CEOs are either not very politically oriented, which could be true of bipartisan CEOs, or their attitudes do not affect their SOAs. Next, we consider whether Democrats are slower to adjust because of a higher tolerance for risk or because of their views on taxes.

3.4.3 Attitudes towards Taxes and Risk

If Hypothesis (2) is true, then SOAs for Democrat and Republican CEOs should vary depending on the firm's position relative to the target leverage ratios. To test our hypothesis we include the dummy variables *Above* and *Below*, which equal one if the firm's leverage is above (below) the target leverage, and zero otherwise. We interact these two variables with the target deviation variable as in Equation (3.3). In Table 3.4 column (1), we start by showing how movement back to the target depends on whether the firm is over-levered or under-levered. On average, firms are quicker to deleverage than to raise leverage. In column (2) we interact the *Above* and *Below* variables with the indicators for partisanship. In the case of partisan Republicans, we do not find significant differences for either over-levered or under-levered firms. For partisan Democrats, both over-levered and under-levered firms have significantly slower SOA. Specification in (2) suggests that while under-leveraged non-partisan firms take 8.7 years to revert leverage ratios back to targets, under-leveraged firms with partisan Democrat CEOs take an astonishing 22.5 years longer to revert.[7] For over-levered partisan Democrats firms, the time to adjust is 1.5 years longer than their non-partisan counterparts (4.4 vs. 2.9 years). This result is consistent with Hypothesis (2A) that under(over)-levered firms with Democrat CEOs will have slower SOAs, in line with their attitudes towards taxes (risk). In columns (3) and (4), we examine active SOAs for Democrat and Republican CEOs conditional on the firm's position relative to the target leverage ratios. Results from column (3) mirrors those in (1). In column (4), we observe that only under-levered partisan Democrat firms are actively slower to adjust to targets, which is consistent with Hypothesis (3).

Overall, under-leveraged firms are less likely to experience bankruptcy risk or costs of financial distress, thus, Democrat CEOs' slower speeds of adjustment shown in columns (2) and (4) are likely related to their tax-tolerance and desire to avoid taking advantage of tax-benefit of debt. This conclusion is somewhat consistent with the conclusions of Francis

[7] Calculated as 1/.115 =8.7 and 1/(.115-.083)=31.25. Thus, 31.25-8.7 = 22.5 years

et al. (2016). The above documented significant slower SOA represents agency costs to the shareholder of under-leveraged firms with partisan Democrat CEOs, as these firms are missing out on tax-benefits of debt.

3.4.4 Heterogeneous Treatment Effects of TCJA

Hypothesis (4) states that the Tax Cut and Jobs Act will affect SOAs differently depending on firms' deviations from their targets and CEOs' political ideologies. To test our hypothesis, we include the dummy variables $TCJA$, which equal one for years equal or greater than 2017, zero otherwise. We interact these two variables with the target deviation variable as in Equation (3.8). Table 3.5 column (1) shows the effect of the TCJA only for under-leveraged firms with partisan Democrat CEOs. The results suggests that under-leveraged firms with partisan Democrat CEOs reduced their SOA significantly after the passage of the act.[8] In column (2), we estimate the full specification as in Equation (3.8). The result is similar to the one presented in column (1). While the results from columns (1) and (2) support Hypothesis (4), it seems that passage of TCJA only affected the SOA for under-leveraged firms managed by partisan Democrat CEOs.

In columns (3) and (4), we examine whether firms responded to the Tax Cut and Jobs Act actively and adjusted their SOAs accordingly. The Results from these specifications suggest that only under-levered partisan Democrat firms actively lowered their to SOA to targets after the passage of TCJA. Collectively, the results in Table 3.5 show that the treatment effects (i.e the effect of TCJA) is heterogeneous depending on the firm's position of leverage deviation and CEOs' views associated with political ideologies. Specifically,

[8]coefficients of -.175 post-act, compared to -.066 pre-act.

the TCJA seems to affect only underleveraged firms with partisan Democrat CEOs. In contrast, for partisan Republicans, we do not find significant differences between pre and post-act periods.

3.5 Additional Analysis

3.5.1 Firm Financing by Partisan Democrat CEOs

To shed more light on how Democrat CEOs are slower in reverting to optimal target leverage, we examine several financing choices available to nonpartisan and partisan Democrat CEOs before and after TCJA. In Table 3.6 panel A, we compare financing choices among underleveraged firm-year observations. Panel A shows that in the pre-TCJA years, firms with partisan Democrat managers differ in their preferences from firms run by nonpartisan CEOs. Specifically, firms of Democrat managers have less net equity issues, higher share repurchase, issue less seasoned equity offerings, and use more operating leases. Interestingly, none of these differences exist after the passage of the TCJA, when a surge in buyback activity fueled a public debate over the appropriate use of the subsequent increase in corporate cash flows (Bennett and Z. Wang (2021)). Taking the results from tables 3.4 and 3.6 together, we conclude that public scrutiny led some firms with Democrat-leaning CEOs to avoid or lower repurchases during this period. The conclusion applies to underleveraged firms only, as panel B does not show significant differences in financing choices between firms with partisan Democrat managers or nonpartisan CEOs over the pre-post TCJA period.

3.5.2 Non-Tech Firms and the Financing Deficit

There is a valid concern that our results are driven by growth firms with lower tax benefits of debt and greater project risk. We address this concern by examining whether results are robust for low-growth firms and non-tech firms. In Table 3.7, column (1) is comprised of low-growth firms (firms below industry median market to book ratios) and the coefficient for under leveraged firms with partisan Democrat CEOs is -0.075, in line with results using the all observations in Table 3.4. In column (2), low-growth firms are defined as firms below the sample 75th percentile in market to book ratios. Here, the relevant coefficient is -0.1317***, which is also in line with Table 3.4. Column (3) removes tech firms (with 3-digit SIC codes 357, 737, 283, 873, 366, 481, 360, 365, or 367) similar to J. Francis and Schipper (1999) and Core, W. R. Guay, and Buskirk (2003). The coefficient for under leveraged firms with partisan Democrats is -0.101**, again similar to the main results in Table 3.4 which includes tech firms. Column (4) removes tech and pharmaceutical firms using four digit SIC codes (3678, 7372, 7370, 3674, 3577, 3571, 3572, 2835, 2834, and 2836) similar to Blouin, Core, and W. Guay (2010), and the relevant coefficient is -0.078**, consistent with the full sample. Overall, results indicate that slower SOA in under leveraged firms with partisan Democrat CEOs also apply to low growth firms, non-tech, and non-pharmaceutical firms.

There are also concerns that our results may be driven by underlevered firms with a financial surplus (identified by Byoun (2008) as slow SOA firms). Column (5) and (6) re-estimate the results from Table 3.4 using subsamples comprised of firms in financial deficit according to definition of Shyam-Sunder and Myers (1999) and Helwege and Liang (1996), respectively. The coefficient of $Target\ Deviation^{Below}_{Partisan-DEM}$ is -0.127* and significant in column (5) and is -0.131 in column (6). Thus overall, the results from Table 3.4 holds for underlevered firms characterised as being in financing deficit.

3.5.3 Speed of Adjustment Around CEO Turnover

In this section, we exploits a setting where a manager's political leaning changes for the same firm by looking at CEO turnover events. While this exercise does not lead to a causal interpretation of our result, it allows us to see the extent to which managerial political ideology affects leverage choices. We compare leverage speed of adjustment for old and new CEOs with different political ideologies. To do so, we construct two samples of turnover events where we require the replaced and the new CEO to be in office for at least 4 or 5 years, respectively. The samples capture the old CEO's last years and the immediate years of the new one. Using these two samples, we estimate specifications similar to the one on column (2) of table 3.4. We use $New\_CEO\_DEM(REP)$, which indicates if the new CEO is partisan Democrat (Republican) while the previous is either partisan Republican (Democrat) or nonpartisan. Table 3.8 shows the estimation results. Column (1) indicates that underleverage firms have slower SOA when switching from a partisan Republican or nonpartisan CEO to a partisan Democrat manager. Column (2) shows the same results with a somewhat larger magnitude. Overall, these results are in line with those reported in Table 3.4, which indicates that partisan Democrat CEOs' slower speed of adjustment is likely related to their tax-tolerance and desire to avoid taking advantage of the tax-benefit of debt.

3.6 Conclusion

In this paper, we examine the impact of CEO partisanship on the speed of adjustment to the firm's target capital structure. Our results suggest that managers' political ideologies are important for capital structure, particularly among CEOs who are the most strongly aligned with Democrats. While previous research Hutton, Jiang, and A. Kumar (2014) finds evidence that risk aversion propels Republican CEOs to use less leverage, we note that both risk aversion and attitudes towards the role of government should play a role in the capital structure decisions of politically-minded CEOs. If Republicans are indeed significantly more risk averse than Democrats, on average, and CEOs make capital structure decisions that reflect the differences, then Republican CEOs should use lower leverage. However, Republicans are also known to prefer a smaller role for government and thus should choose higher levels of debt to minimize their tax expenses. We note a similar contradiction in the personalities of Democrats, who being more open and adventurous, are expected to have higher leverage ratios. Despite their greater willingness to take on risk, however, Democrat CEOs are expected to be more supportive of government spending and the taxes that support it. Their greater desire for wealth redistribution and egalitarianism suggest that they would be less concerned with reducing their tax bills via high leverage. Thus, we consider CEOs' views on risk and taxes when examining their attitudes towards capital structure. Our approach focuses on the speed of adjustment (SOA) towards the target leverage ratio. When shocks push firms above their target ratios, the risk of bankruptcy looms larger. Thus, a risk averse Republican CEO should be more eager to return to the target capital structure and the SOA downward to the target should be relatively fast. In contrast, firms that are under-levered after a positive profit shock are more likely to focus on the tax benefits of increased debt. For Republican CEOs, such shocks would also lead to a faster SOA as they are expected to more energetically find ways to reduce their taxes. In contrast, we expect partisan Democrat CEOs to move slowly towards target capital structures, as they are willing to take on greater risk when over-levered and may only lethargically pursue the tax benefits of debt when under-levered. Thus, we separate out the confounding effects of political leanings by looking under-levered and over-levered firms separately.

We find that under-levered firms with partisan Democrat CEOs have significantly slower SOA compared to nonpartisan CEOs. We do not find that SOAs are faster for partisan Republican CEOs, whose movements towards the optimal capital structure are similar to those of nonpartisan CEOs and those who donate to both parties. Given that under-levered firms are less likely to experience financial distress, we interpret the slower SOAs of partisan Democrat CEOs as evidence of their greater tolerance for taxes. Our findings are not isolated to to growth firms, tech firms, or under-levered firms with a financial surplus (identified by Byoun (2008) as slow SOA firms). We also examine how SOAs respond to an exogenous shock to the tax benefits of corporate debt, which occurred with the 2017 Tax Cut and Jobs Act (TCJA). Our estimates indicate that the TCJA seems to affect only under-levered firms with partisan Democrat CEOs, who reduced their SOA significantly after the act's passage. In contrast, for partisan Republicans, we do not find significant differences between pre and post-act periods. Interestingly, we find that partisan Democrats are more likely to increase leverage via share repurchases before but not after the passage of the TCJA when a surge in buyback activity fueled a public debate over the appropriate use of the subsequent increase in corporate cash flows. We conclude that such public scrutiny led some firms with Democrat-leaning CEOs to avoid repurchases during this period.

Figure A0: Proportion of Republican and Democrat CEOs Over 2003-2019.

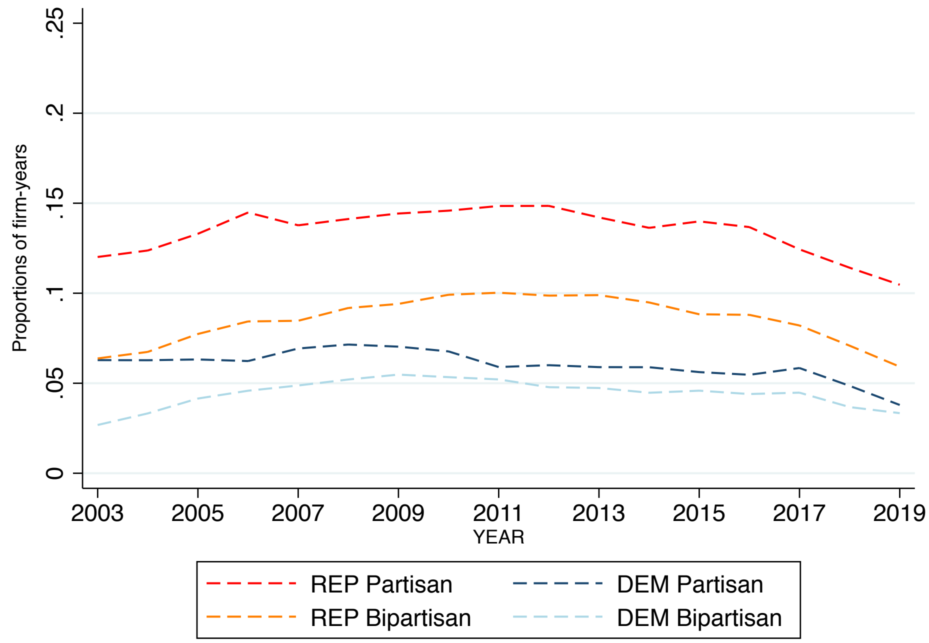

Table 3.1: This table shows expected outcomes for the speed of adjustment based on political preferences and the deviation from the firm's target leverage ratio.

	Under-Levered *Low Bankruptcy Risk* *High Tax Benefits*	**Over-Levered** *High Bankruptcy Risk* *Low Tax Benefits*
Republican	Risk Aversion: Negligible Tax-Aversion: **Faster SOA**	Risk Aversion: **Faster SOA** Tax Aversion: Negligible
Democrat	Risk Tolerance: Negligible Tax Tolerance: **Slower SOA**	Risk Tolerance: **Slower SOA** Tax Tolerance: Negligible

Table 3.2: This table provides summary statistics of firm and CEO variables categorized by CEO political ideology. SEO Issues is an indicator that equals 1 if the firm has a seasoned equity offering in year t, 0 otherwise. Financial Deficit is an indicator that equals 1 if the firm has a financing deficit. All variables are defined in greater detail in Appendix. Figures in bold indicate that t-tests of mean values are significantly different from the respective nonpartisan mean value at the 10% or lower level.

	Nonpartisan N=11,152		**Partisan Republican** N=2,245		**Partisan Democrat** N=1,014		**Bipartisan Republican** N=1,416		**Bipartisan Democrat** N=740	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total Debt ($M)	2,112	15,126	2,179	5,549	1,890	9,040	**2,818**	5,990	2,591	4,773
Total Assets ($M)	7,045	29,779	**9,954**	28,262	7,816	31,629	**11,679**	27,483	**10,455**	17,555
Total Debt/Assets	0.191	0.161	0.193	0.152	**0.168**	0.168	**0.242**	0.155	**0.230**	0.164
Market to Book	1.617	1.103	**1.737**	1.147	**2.021**	1.371	1.572	1.063	**1.466**	1.061
Op Income/Assets	0.126	0.095	**0.158**	0.086	**0.137**	0.103	**0.142**	0.078	**0.134**	0.069
Depreciation/Assets	0.041	0.025	**0.047**	0.027	**0.036**	0.021	0.040	0.026	**0.036**	0.018
PPE/Assets	0.234	0.208	**0.302**	0.226	**0.199**	0.187	**0.304**	0.250	**0.263**	0.214
R&D Exp/Assets	0.034	0.056	**0.023**	0.039	**0.044**	0.065	**0.019**	0.038	**0.020**	0.039
Asset Sales/Assets	0.046	0.325	0.048	0.325	**0.074**	0.172	**0.028**	0.144	0.039	0.134
Net Debt Issues/Assets	0.010	0.091	**0.015**	0.084	0.012	0.088	**0.017**	0.083	**0.016**	0.083
Net Equity Issues/Assets	-0.020	0.069	**-0.023**	0.060	**-0.025**	0.084	-0.016	0.057	-0.023	0.063
Share Repurchase/Assets	0.033	0.063	0.035	0.057	**0.041**	0.078	**0.029**	0.049	0.035	0.060
SEO Issues (Dummy)	0.020	0.139	0.020	0.142	**0.009**	0.094	**0.034**	0.181	0.027	0.162
Operating Lease/Assets	0.082	0.146	0.084	0.152	**0.093**	0.162	**0.072**	0.124	0.076	0.115
SSM Deficit (Dummy)	0.397	0.489	**0.373**	0.483	0.401	0.490	0.407	0.492	0.378	0.485
HL Deficit (Dummy)	0.358	0.479	**0.340**	0.474	**0.314**	0.464	0.374	0.484	0.336	0.473
High Tech (Dummy)	0.272	0.445	**0.159**	0.365	**0.328**	0.469	**0.091**	0.287	**0.222**	0.416
Tech & Pharma (Dummy)	0.172	0.378	**0.108**	0.310	**0.256**	0.436	**0.084**	0.277	**0.137**	0.344
% Independent Directors	0.844	0.129	**0.838**	0.085	**0.819**	0.098	0.841	0.079	**0.804**	0.112
CEO Age	56.1	7.1	**57.0**	6.6	**56.9**	8.7	**57.2**	7.5	56.4	9.4
Tenure	5.64	4.30	**7.05**	4.92	**6.51**	4.31	**7.97**	5.11	7.22	4.73
Duality	0.49	0.50	**0.65**	0.48	**0.58**	0.49	**0.72**	0.45	0.77	0.42

Table 3.3: The dependent variable is change in Total Debt scaled by Total Assets. Target leverage is estimated using yearly cross sectional regressions with firm characteristics at $t-1$ (Equation 3.1), which is further defined in Appendix. Target Deviation is the Target Leverage Ratio minus the lagged Total Debt to Assets ratio (Equation 3.2). Political equals 1 if the CEO made political contributions, 0 otherwise. Bipartisan REP (DEM) equals 1 if the CEO made over 50%, but less than 100% of contributions to the Republican (Democrat) party, 0 otherwise. Partisan REP (Partisan DEM) equals 1 if the CEO contributed exclusively to the Republican (Democrat) party, 0 otherwise. Controls include the CEO age, tenure, duality, and the percentage of independent directors on a firm's board. Fixed effects are at the industry and year levels, independently. Standard errors are clustered at the firm level. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively. Standard errors are in parentheses.

	Δ Total Debt/Total Assets				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Target Deviation	.242***	.253***	.241***	.252***	.253***
	(.012)	(.015)	(.013)	(.014)	(.015)
Target Deviation $_{Political}$		-.037*			
		(.019)			
Target Deviation $_{Bipartisan-REP}$			.001		-.011
			(.031)		(.032)
Target Deviation $_{Bipartisan-DEM}$			.018		.007
			(.031)		(.032)
Target Deviation $_{Partisan-REP}$				-.036	-.036
				(.024)	(.025)
Target Deviation $_{Partisan-DEM}$				-.091**	-.092**
				(.037)	(.037)
Observations	13,154	13,154	13,154	13,154	13,154
Adj. R^2	.15	.15	.15	.15	.15
Controls	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

Table 3.4: The dependent variable in (1) and (2) is Total Debt scaled by Total Assets while (3) and (4) uses Equation 3.4's active adjustment of leverage. Target leverage is estimated using yearly cross sectional regressions with firm characteristics at $t-1$ (Equation 3.1), which is further defined in Appendix . In Columns (1) and (2) Target Deviation is Target Leverage minus lagged Total Debt to Assets (Equation 3.2) and in Column (3) and (4) it is Target Leverage minus lagged passive capital structure $D^{P}_{i,t-1}$ (Eq. 3.5). Above (Below) refers to a firm that is above (below) its target leverage ratio. Partisan REP (Partisan DEM) equals 1 if the CEO contributed exclusively to the Republican (Democrat) party, 0 otherwise. Controls include the CEO age, tenure, duality, and the percentage of independent directors on a firm's board. Fixed effects are at the industry and year levels, independently. Standard errors are clustered at the firm level. *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively. Standard errors are in parentheses.

	Δ Total Debt/Assets		**Active Adjustment**	
	(1)	**(2)**	**(3)**	**(4)**
Target Deviation^{Above}	.326***	.342***	.198***	.204***
	(.023)	(.026)	(.026)	(.029)
Target Deviation^{Below}	.111***	.115***	.082***	.088***
	(.025)	(.026)	(.017)	(.018)
Target Deviation$^{Below}_{Partisan-DEM}$		-.083**		-.057*
		(.036)		(.031)
Target Deviation$^{Above}_{Partisan-DEM}$		-.116**		-.030
		(.054)		(.051)
Target Deviation$^{Below}_{Partisan-REP}$		.001		-.020
		(.026)		(.019)
Target Deviation$^{Above}_{Partisan-REP}$		-.057		-.026
		(.040)		(.042)
Observations	13,154	13,154	13,154	13,154
Adj. R^2	.16	.16	.10	.10
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 3.5: The dependent variable in (1) and (2) is Total Debt scaled by Total Assets while (3) and (4) uses Equation 3.4's active adjustment of leverage. Target leverage is estimated using yearly cross sectional regressions with firm characteristics at $t-1$ (Equation 3.1), which is further defined in Appendix. In Columns (1) and (2) Target Deviation is Target Leverage minus lagged Total Debt to Assets (Equation 3.2) and in Column (3) and (4) it is Target Leverage minus lagged Active Adjustment (Eq. 3.5). Above (Below) refers to a firm that is above (below) its target leverage ratio. TCJA equals 1 for all years that are equal or greater than 2017, 0 otherwise. Partisan REP (Partisan DEM) equals 1 if the CEO contributed exclusively to the Republican (Democrat) party, 0 otherwise. Controls include the CEO age, tenure, duality, and the percentage of independent directors on a firm's board. Fixed effects are at the industry and year levels, independently. Standard errors are clustered at the firm level. *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively. Standard errors are in parentheses.

	Δ Total Debt/Assets		**Active Adjustment**	
	(1)	**(2)**	**(3)**	**(4)**
Target Deviation^{Above}	.327***	.342***	.199***	.204***
	(.023)	(.026)	(.026)	(.029)
Target Deviation^{Below}	.116***	.116***	.086***	.089***
	(.025)	(.026)	(.017)	(.018)
Target Deviation$^{Below}_{Partisan-DEM}$	-.063*	-.062*	-.035	-.038
	(.036)	(.036)	(.031)	(.032)
Target Deviation$^{Below}_{Partisan-DEM} \times$ TCJA	-.175***	-.178***	-.158***	-.158***
	(.054)	(.054)	(.047)	(.047)
Target Deviation$^{Above}_{Partisan-DEM}$		-.122**		-.032
		(.055)		(.053)
Target Deviation$^{Above}_{Partisan-DEM} \times$ TCJA		.128		.047
		(.159)		(.140)
Target Deviation$^{Below}_{Partisan-REP}$		.005		-.016
		(.027)		(.02)
Target Deviation$^{Below}_{Partisan-REP} \times$ TCJA		-.046		-.052
		(.055)		(.036)
Target Deviation$^{Above}_{Partisan-REP}$		-.051		-.019
		(.042)		(.044)
Target Deviation$^{Above}_{Partisan-REP} \times$ TCJA		-.065		-.095
		(.065)		(.072)
Observations	13,154	13,154	13,154	13,154
Adj. R-squared	.16	.16	.10	.10
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 3.6: This table displays the mean and mean differences of firm financing variables classified by Nonpartisan and Democrat CEOs. Panel A (B) includes Under (Over) leveraged firm-year observations. *, ** and ***denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

Panel A: Under Leveraged

	Nonpartisan DEM	**Mean**	**Partisan DEM**	**Mean**	**Mean Difference**
Pre-TCJA					
Asset Sale	7,761	0.059	580	0.082	-0.023
Net Debt Issue	7,761	0.026	580	0.02	0.005
Net Equity Issue	7,761	-0.022	580	-0.032	0.010***
Share Repurchase	7,761	0.037	580	0.049	-0.012***
SEO Issue	7.761	0.018	580	0.005	0.013**
Operating leases	7,761	0.093	580	0.111	-0.018**
Post-TCJA					
Asset Sale	1,169	0.029	86	0.063	-0.033
Net Debt Issue	1,169	0.045	86	0.044	0
Net Equity Issue	1,169	-0.027	86	-0.02	-0.007
Share Repurchase	1,169	0.035	86	0.033	0.002
SEO Issue	1,169	0.013	86	0.012	0.001
Operating leases	1,169	0.084	86	0.089	-0.005

Panel B: Over Leveraged

	Nonpartisan DEM	**Mean**	**Partisan DEM**	**Mean**	**Mean Difference**
Pre-TCJA					
Asset Sale	5,022	0.031	325	0.063	-0.032***
Net Debt Issue	5,022	-0.016	325	-0.009	-0.007
Net Equity Issue	5,022	-0.014	325	-0.012	-0.002
Share Repurchase	5,022	0.027	325	0.029	-0.002
SEO Issue	5,022	0.030	325	0.012	0.018*
Operating leases	5,022	0.066	325	0.067	-0.001
Post-TCJA					
Asset Sale	861	0.021	23	0.075	-0.054**
Net Debt Issue	861	-0.008	23	-0.006	-0.003
Net Equity Issue	861	-0.024	23	-0.033	0.008
Share Repurchase	861	0.033	23	0.036	-0.003
SEO Issue	861	0.010	23	0.043	-0.033
Operating leases	861	0.057	23	0.039	0.019

Table 3.7: This table replicates Table 3.4 Column (2) by using non-tech firms and firms with financing deficits. All definitions can be found in Appendix. Column (1) excludes firms with above industry median Market Value of Assets to Total Assets. Column (2) repeats (1) at the 75th percentile. Column (3) excludes High Tech firms and Column (4) excludes Tech or Pharmaceutical firms as defined in Appendix. Lastly, Columns (5) and (6) indicates firms with a Financing Deficit. Controls include the CEO age, tenure, duality, and the percentage of independent directors on a firm's board. Fixed effects are at the industry and year levels, independently. Standard errors are clustered at the firm level. *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively. Standard errors are in parentheses.

	Δ Total Debt/Total Assets					
	Below 50% MVA/A	Below 75% MVA/A	No High Tech	No Tech No Pharma	Financial Deficit (SSM)	Financial Deficit (HL)
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Target Deviation^{Above}	.401***	.381***	.355***	.337***	.316***	.426***
	(.037)	(.032)	(.024)	(.027)	(.047)	(.04)
Target Deviation^{Below}	.094***	.148***	.137***	.128***	.098*	.14**
	(.027)	(.032)	(.03)	(.028)	(.053)	(.054)
Target Deviation$^{Below}_{Partisan-DEM}$	-.075	-.117***	-.101**	-.078**	-.127*	-.131
	(.047)	(.041)	(.042)	(.039)	(.069)	(.088)
Target Deviation$^{Above}_{Partisan-DEM}$	-.142*	-.171***	-.074	-.097	-.187***	-.18*
	(.075)	(.055)	(.067)	(.064)	(.07)	(.095)
Target Deviation$^{Below}_{Partisan-REP}$	.071*	.014	-.02	-.008	.023	.092*
	(.041)	(.033)	(.028)	(.028)	(.049)	(.055)
Target Deviation$^{Above}_{Partisan-REP}$	-.07	-.069	-.024	-.033	-.07	-.083
	(.06)	(.046)	(.046)	(.043)	(.085)	(.08)
Observations	6,356	9,652	9,918	11,018	5,080	4,448
Adj. R-squared	.21	.20	.18	.16	.11	.17
Controls	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Table 3.8: This table displays speed of adjustment towards target leverage around CEO turnover events. The sample in Column (1) looks at turnover events where replaced CEOs and new CEOs stay at least 4 years in office. Column (2) uses a 5 year time frame. The sample captures the last years of the old CEO and the immediate years of the new CEO. The dependent variable is change in Total Debt scaled by Total Assets. Target Deviation is Target Leverage Ratio minus the lagged Total Debt to Assets ratio (Equation 3.2). New_CEO_DEM (REP) equals 1 if the new CEO is Partisan DEM (REP) while the previous CEO is either Partisan REP (DEM) or nonpartisan, zero otherwise. Controls include the CEO age, tenure, duality, and the percentage of independent directors on a firm's board. Fixed effects are at the industry and year levels, independently. Standard errors are clustered at the firm level. *, ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively. Standard errors are in parentheses.

	Δ Total Debt/Total Assets	
	(1)	**(2)**
Target Deviation^{Above}	.375***	.372***
	(.058)	(.063)
Target Deviation^{Below}	.112***	.115***
	(.035)	(.04)
Target Deviation$^{Below}_{New_CEO_REP}$	-.111	.161
	(.072)	(.126)
Target Deviation$^{Below}_{New_CEO_DEM}$	-.214**	-.232**
	(.099)	(.097)
Target Deviation$^{Above}_{New_CEO_REP}$	.122	.164
	(.113)	(.1)
Target Deviation$^{Below}_{New_CEO_REP}$	.022	-.035
	(.06)	(.064)
Observations	2,682	2,092
Adj. R^2	.17	.18
Controls	✓	✓
Industry FE	✓	✓
Year FE	✓	✓

Appendix A

Political Contributions Data

In this section we describe the process of creating the sample of CEOs whose firms are in ExecuComp and whose contributions to political parties are in the FEC data. To match the two sources of data we begin with the FEC data, which provides information about the size of a contributor's donation (for all amounts of $200 or more), the donor's name, occupation, employer, and address. Individuals can make contributions directly to candidates or through the candidates' party committees. Also, individuals can make contributions through their firms' Political Action Committees (PACs).[9] When identifying an executive's political ideology, prior research considers only the individual direct contributions to candidates or candidates' party committees (Hutton, Jiang, and A. Kumar (2014), Francis et al. (2016), Elnahas and D. Kim (2017)). The rationale is that contributions made through firm's PACs are likely to reflect the strategic motives of the firm, and not necessarily the true political ideology of its executives.

Our selection criterion is outlined in the Table below. During the 2003 to 2019 period, there were eight Presidential, House and Senate election cycles that involved over 75 million individual contributions.[10] We start from the year 2003 due to the fact that the occupation and employer fields in the FEC's website were separated that year and they are more populated from election cycle 2003–2004 forward. This helps in obtaining a

[9]Firms may not contribute directly to candidates, but can do so by establishing a political committee. The firm cannot use its own cash to fund these committees, instead relying on its executives' contributions.

[10]Each election cycle starts from an odd year, thus, 2003-2004 is one election cycle and 2005-2006 is another.

more accurate match with the ExecuComp data. Using the occupation field, we select only individuals in the campaign finance data whose occupation is listed as "CEO", which results in 1,116,000 observations.[11] We then remove contributions made to PACs, which reduces the potential sample to 564,052 observations. Of these, 206,177 individual contributions by CEOs are matched to CEOs in ExecuComp during the sample period. Matching is done by mapping contributor's name and zip code.

Selection Criterion. This table reports selection criterion used to generate the final sample used in the analysis.

	Observations
Individuals with "CEO" occupation in FEC website (2003-2019)	1,116,000
Less: contributions made through PACs	551,948
Personal contributions to candidates or candidates' party committees	564,052
Less: CEOs not in ExecuComp	357,875
Personal contributions from CEOs in ExecuComp	206,177
Less: CEOs' contributions in years not at office	176,816
CEOs' tenure specific contributions	29,361
Annual aggregated CEOs' contributions	4,725
Merged to ExecuComp initial sample, Compustat, and Boardex	25,172 firm-year
Final sample with necessary independent variables	16,567 firm-year

The matched 206,177 contributions include those made during the CEO's tenure at the firm and any other contributions made during 2003 to 2019. Since we are interested in examining the effect of CEO's political ideology on firm's capital structure, we focus only on contributions made during the CEO's tenure to better capture the ideology while in office.[12] This rationale leads to 29,361 contributions made by CEOs while at the job. After these steps, the sample is checked by hand for errors.[13] Several CEOs make more

[11] This approach is similar to Francis et al. (2016), who identified 1,468 CEO donors between 1992-2007.

[12] This also follows Elnahas and D. Kim (2017).

[13] Done by checking the match of the CEOs and contributors names, company and employer names, and zip codes.

than one donation in a given year, thus, we aggregate the donations to obtain the total contributions to each party made by each CEO per year. We merge those annual aggregated direct contributions to the ExecuComp initial sample then to Compustat to obtain financial information and finally to Boardex to get details on the composition of the board of directors and have. After applying the necessary filters to calculate target leverage, our sample consist of 16,567 firm-year observation, including 1,431 firms and 3,097 CEOs.

Appendix B

Variable Definitions

Variable	Definition
Asset Sales	Ratio of asset sales to book assets
Bipartisan DEM	CEO whose lifetime political contributions were over 50% but less than 100% to the Democratic Party
Bipartisan REP	CEO whose lifetime political contributions were over 50% but less than 100% to the Republican Party
CEO Age	Age of CEO
Depreciation	Depreciation and Amortization (DP)
Duality	Indicator that equals 1 if the CEO is also the chairman of the board, zero otherwise.
HL Deficit	Dividends (DV)+ Capital Expenditure (CAPX)+Acquisitions (AQC)- Operating Income Before Depreciation (OIBDP)
Independent Directors	Ratio of independent directors to total number of board members
Market to Book	Ratio of Market Value of Assets (CSHO*PRCC+DLC+DLTT+PSTKL-TXDB) to Total Assets (AT)
Market Value of Assets	Common Shares Outstanding (CSHO)* Annual Price Close (PRCC)+Debt in Current Liabilities (DLC)+Long Term Debt (DLTT)+Preferred Stock/Liquidating Value (PSTKL)-Deferred Taxes(TXDB)
Net Debt Issues	Ratio of the change in current and long-term debt to book assets
Net Equity Issues	Ratio of net equity issuance to book assets
Non Partisan CEO	CEO who never made a political donation from 2003-2019
Operating Income	Operating Income Before Depreciation (OIBDP)
Operating Lease	Sum of current rental payment and the discounted present value of future rental commitments (up to five years), sclaed by total assets.
Partisan DEM	CEO whose lifetime political contributions were solely to the Democratic Party
Partisan REP	CEO whose lifetime political contributions were solely to the Republican Party
Political CEO	CEO who made at least one political contribution from 2003-2019
PPE	Property Plant and Equipment-Total Net (PPENT)
R&D	Research and Development Expense (XRD)
SEO Issues	Indicator that equals 1 if the firm issued a Seasoned Equity Offering that year, zero otherwise.
Share Repurchase	Ratio of share repurchases to book assets
SSM Deficit	Cash Dividends (DV)+Net Investment(CAPX+IVCH+AQC-SPPE-SIV-IVSTCH-IVACO)+Change in Net Working Capital (WCAPC+CHECH +DLCCH)-Operating Cash Flow(OANCF-RECCH-INVCH-APALCH-TXACH-EXRE)
Tenure	How long the CEO has held their position
Total Assets	Book Assets (AT)
Total Debt	Debt in Current Liabilities (DLC) + Long Term Debt (DLTT)
Total Debt to Assets	Ratio of Total Debt (DLC+DLTT) to Total Assets (AT)

Appendix C

Additional Tables

Propensity Score Matching (PSM). The dependent variable is change in Total Debt scaled by Total Assets. Target leverage calculation follows Flannery and Rangan (2006) and Byoun (2008) and Target Deviation is the Target Leverage Ratio minus the lagged Total Debt to Assets ratio (Equation 3.2). Matching is based on 3 digit SIC codes, total assets, total debt, market-to-book, operating income, CEO age, CEO tenure, duality, and fiscal year. All specifications include industry and year fixed effects and standard errors are clustered at the firm level. ** and *** denote significance at a 0.10, a 0.05 and a 0.01 levels, respectively.

	NP-REP		**NP-DEM**		**REP-DEM**	
	(1)	(2)	(3)	(4)	(5)	(6)
Target Deviation	.231***	.23***	.227***	.255***	.224***	.268***
	(.014)	(.016)	(.025)	(.028)	(.019)	(.022)
Target Deviation $_{Bi-REP}$	.017					
	(.029)					
Target Deviation $_{PartisanREP}$		.011				
		(.025)				
Target Deviation $_{Bi-DEM}$			.023		.043	
			(.036)		(.032)	
Target Deviation $_{PartisanDEM}$				-.083**		-.112***
				(.038)		(.032)
Observations	6,876	6,876	3,318	3,318	3,124	3,124
Adj. R^2	.166	.166	.19	.193	.177	.182
Industry FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Parameter Estimates from Cross-Sectional Regressions on Determinants of Debt Ratio. This table presents the mean and the standard errors of parameter estimates from the yearly regressions. The sample in (1) and (3) include all COMPUSTAT firm-year observations (42,312 obs.). The sample in (2) and (4) include the intersection of Execucomp and COMPUSTAT firm-year observations (17,978 obs.). The reported mean slope coefficient is the average of the slopes of annual regressions. The time-series standard errors (in parentheses) are the time-series standard deviation of the regression coefficients divided by $\sqrt{17}$, as in Fama and French (2002). The significance levels of 10%, 5%, and % are represented by *, **, and *** respectively. The dependent variables are Total Debt/AT in (1) and (2), and Total Debt/MVA in (3) and (4).

	TDA (1)	**TDA (2)**	**TDM (3)**	**TDM (4)**
Intercept	-0.007	-0.091***	0.098***	0.042***
	(0.011)	(0.017)	(0.014)	(0.012)
Op Income/Assets	-0.1085***	-0.1294***	-0.1914***	-0.2759***
	(0.007)	(0.014)	(0.014)	(0.027)
Market to Book	-0.011***	-0.012***	-0.045***	-0.040***
	(0.001)	(0.001)	(0.003)	(0.002)
Depreciation/Assets	0.275***	0.371***	0.171	0.174
	(0.060)	(0.110)	(0.105)	(0.130)
Ln (Assets)	0.019***	0.029***	0.015***	0.021***
	(0.001)	(0.001)	(0.001)	(0.001)
PPE/Assets	0.043***	-0.004	0.069***	0.056***
	(0.009)	(0.009)	(0.025)	(0.010)
R&D Exp/Assets	-0.202***	-0.266***	-0.310***	-0.354***
	(0.010)	0.044	(0.032)	(0.040)
R&D Dummy	0.006***	0.006	0.010**	0.015***
	(0.001)	(0.004)	(0.005)	(0.003)
Industry Median Debt	0.472***	0.555***	0.453***	0.501***
	(0.014)	(0.022)	(0.024)	(0.022)
Adjusted R2	0.237	0.291	0.252	0.381
	(0.006)	(0.009)	(0.023)	(0.005)

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