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Accepted manuscript

This is a pre-copyedited, author-produced version of an article accepted for publication in *Review of Finance* following peer review. The version of record, Chen, T., Zhang, L., & Zhu, Q. (2023). Dual Ownership and Risk-Taking Incentives in Managerial Compensation. *Review of Finance*, 27(5), 1823–1857., is available online at: https://doi.org/10.1093/rof/rfad007.

Please cite the published version:

Chen, T., Zhang, L., & Zhu, Q. (2023). Dual Ownership and Risk-Taking Incentives in Managerial Compensation. *Review of Finance*, 27(5), 1823–1857.

https://doi.org/10.1093/rof/rfad007

Posted by the author at https://taochen.org

Dual Ownership and Risk-taking Incentives in Managerial Compensation

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Abstract

This paper studies how the three-way interaction among shareholders, creditors, and managers shapes firms' executive compensation. Firms with a higher ownership share by "dual holders" – institutional investors that simultaneously hold equity and bond of the company – adopt a less risk-inducing compensation structure: less stock options and more inside debt. Exploiting financial institution mergers that increase or decrease dual ownership for portfolio companies, we identify a causal link between dual ownership and CEO compensation policies. Mutual fund proxy voting data suggest that shareholder voting is an important channel for dual holders to implement less convex contracts.

We thank Alex Edmans (the Editor), the Associate Editor, an anonymous referee, Renee Adams, Yongqiang Chu, Jonathan Cohn, Weili Ge, Zhiguo He, Jun-koo Kang, Jonathan Karpoff, Inmoo Lee, Jongsub Lee, Anpeng Li, Di Li, Angie Low, Ron Masulis, Pedro Matos, Kwangwoo Park, Buhui Qiu, Gloria Yu, Alminas Zaldokas, and participants at NYU Shanghai, University of Washington, Shanghai University of Finance and Economics, SWUFE, Zhejiang University, Sun Yat-sen University, DUFE, KAIST, Tianjin University, Nanjing Agricultural University, Lingnan Workshop on Accounting and Finance, International Workshop on Corporate Finance and Innovation, NTU Finance Conference, Singapore Scholars Symposium, SFS Cavalcade Asia-Pacific, and Asia-Pacific Corporate Finance Online Workshop. Tao gratefully acknowledges the financial support from SSHR2025 SEED GRANT 2021 and Singapore Ministry of Education Academic Research Fund Tier 1 (Reference number: RG166/18).

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1. Introduction

Financial economists have long recognized that shareholders and creditors have divergent preferences over a firm's risk-taking (Jensen and Meckling, 1976; Myers, 1977; Smith and Warner, 1979). This conflict between shareholders and creditors shapes many corporate policies, such as investment decisions and capital structure. An important agent in this shareholder-creditor conflict is firm managers, who decide corporate policies. Since the incentives of managers are not automatically aligned with the incentives of shareholders, shareholders write managerial contracts to increase this alignment. Given managers' under-diversified labor income risk and the ensuing conservatism (Smith and Stulz, 1985; Hirshleifer and Thakor, 1992), such contracts often include stock options, which have been shown to effectively induce managerial risk-taking.[1]

While managers, shareholders, and creditors have typically been considered as separate entities, we have recently seen the rise of shareholders who simultaneously hold the same firm's bonds through their affiliation with financial conglomerates. Such investors are dubbed "dual holders" (Jiang, Li, and Shao, 2010). In our sample of S&P1500 companies, shareholders' parent institutions collectively hold an average amount of 16.5% of the outstanding bonds issued by the same company. For these dual holders, their objective is to maximize the total value of their portfolio debt and equity. Compared to pure equity holders, dual-holding shareholders have less appetite to incentivize managers to take more risks. Hence, we posit that there should be a negative relationship between dual ownership and the use of option-based compensation.

To empirically evaluate our hypothesis, we examine the relation between a firm's level of shareholder–bondholder overlap ("dual ownership") and the structure of its executive compensation. Since dual holders prefer managers to take a lower level of risk than pure equity holders, we expect a negative relationship between the level of a firm's dual ownership

[1]For example, see Guay (1999); Coles, Daniel, and Naveen (2006); Low (2009); Gormley, Matsa, and Milbourn (2013); Bakke, Mahmudi, Fernando, and Salas (2016).

and the use of option-based compensation, captured by the sensitivity of compensation to stock price volatility ("vega").

We classify investors at the financial institution ("fund family") level. When a fund family holds both equities and bonds of the same firm above a certain threshold, it is identified as a *significant dual holder* of the firm.[2] We further construct a continuous measure, *relative bond exposure*, that characterizes an average shareholder's dollar value exposure to the firm's bonds relative to its total holdings in the firm. Using a sample of U.S. public companies between 2006 and 2016, we show that the presence of one additional significant dual holder decreases the usage of option grants (as a fraction of total annual compensation) by 0.75 percentage point, or 4 percent of the sample-average option payments. It also lowers CEO vega. Using relative bond exposure yields similar results. The effect of dual ownership on managerial compensation is particularly pronounced when firms are under financial distress.

What forms of compensation do dual holders prefer to hand out to executives instead? Sundaram and Yermack (2007) and Edmans and Liu (2010) argue that pensions and deferred compensation serve as *inside debt* and provide CEOs with a payoff structure similar to that of creditors. Consistent with this argument, we find that if a firm has a higher level of dual ownership, the CEO holds more inside debt, measured by how a one-dollar increase in the value of the firm affects the value of the CEO's inside debt (including deferred compensation and pensions) relative to inside equity claims. This finding uncovers another lever through which dual holders can align managerial incentives with their own risk preferences.

One challenge that arises when interpreting our baseline findings is that the ownership structure of a firm might be jointly determined with its managerial incentive structure. For example, equity holders may choose to simultaneously acquire bond positions of a firm while knowing that its compensation structure discourages managerial risk-taking. We use two distinct identification strategies to address such endogeneity concerns.

[2]In the baseline specifications, we require a significant dual holders to hold at least 1% of the firm's outstanding equity and at least 1% of the firm's outstanding bonds. Our results are robust to alternative threshold levels.

First, we exploit shocks to firms' level of dual ownership brought about by mergers between financial institutions, similar to He and Huang (2017) and Chu (2018). Consider a fund family that holds substantial equity ownership of a firm but has no exposure to its debt. If this fund family merges with another financial institution that holds substantial ownership of bonds of the same firm, the combined entity would become a significant dual holder of the firm after the merger. The decisions to undertake such mergers are usually dictated by the business synergy between the two financial institutions, and this is plausibly exogenous to the fundamentals of the particular portfolio company in question. This setting allows us to attribute the post-merger changes in managerial incentives to the influence of dual holders.

Consistent with our hypothesis, a difference-in-differences analysis with matched control firms reveals that firms that gain significant dual holders from financial company mergers reduce their use of option grants by 1.9 percentage points, or 11 percent to the mean, after the merger. Their CEO vega also decreases significantly. Examining the dynamics of the treatment effect, we find no differential trend in option-based compensation between the treated and control firms before the mergers. These results suggest that dual ownership has a plausibly causal impact on managerial compensation.

Our second identification strategy makes use of shareholder voting records on proposals related to executive compensation. Equity-based compensation is subject to shareholder approval. Under the assumption that investors' votes reveal their true preferences, we expect dual holders to be more likely to vote against proposals that would increase the use of option grants in future managerial compensation, and vice versa. This setting allows us to alleviate endogeneity concerns through two sets of fixed effects: one set for each proposal and one set for each fund–quarter combination. The proposal fixed effects allow us to compare the voting pattern of dual holders to the votes of pure equity holders of the *same* company at the same point in time, addressing the potential selection bias of companies. The fund–quarter fixed effects absorb all variations within individual funds, thus alleviating concerns

that dual-holding funds have inherently different voting patterns. This method exploits the fact that the same fund may be a dual holder of some portfolio firms but a pure equity holder for others.

The voting analyses show that mutual funds from a significant dual-holder family are 2.8 percentage point more likely to *dissent* in an option-increasing proposal, when controlling for the two sets of high-dimensional fixed effects. This increase in dissent votes is economically substantial because, on average, the dissent vote for management-sponsored compensation proposals is only 11 percent. For the subset of proposals that eventually reduce the use of options ("option-decreasing proposals"), significant dual holders are 1.9 percentage point more likely to vote in favor of the proposal. These findings suggest that shareholder voting is one of the mechanisms that dual holders use to influence executive incentives.

Our paper sheds new light on how institutional shareholders shape corporate governance structure and executive compensation. Hartzell and Starks (2003) argue that institutional investors mitigate the agency problem of managers by increasing the pay-to-performance sensitivities of executive compensation. More recent studies show that institutional investors are heterogeneous in their ability to monitor executives and affect corporate governance (e.g., Almazan, Hartzell, and Starks, 2005; Chen, Harford, and Li, 2007). For example, Appel, Gormley, and Keim (2016) show that a moderate shift (2 to 3%) from active institutional investors to passive institutional investors is associated with more independent directors, removal of takeover defenses, and more equal voting rights. Our paper argues that financial institutions themselves may have divergent interests in how they set managerial incentives because of their portfolio value is also exposed to the debt of the company.

While we do not directly examine firms' risk-taking decisions in relation to dual ownership, a growing literature has documented that the presence of dual holders reduces corporate risk-shifting by lowering equity payouts (Chu, 2018), increasing the probability of being acquired (Bodnaruk and Rossi, 2016), curbing overinvestment (Anton and Lin, 2020),

and cutting corporate R&D investment (Yang, 2021).[3] This nascent literature faces one unsolved question: What are the plausible channels through which dual holders influence a firm's policies? We contribute to this debate by showing that the alignment of managerial compensation incentives is one mechanism that institutional investors can use to reduce the risk-taking of their portfolio companies while avoiding micromanagement of these companies.

This paper also extends our understanding of managerial compensation more generally. Managerial compensation incentives are used mostly to align the interests of managers with those of shareholders (e.g., Jensen and Murphy, 1990; Aggarwal and Samwick, 1999; Guay, 1999; Coles, Daniel, and Naveen, 2006). However, these incentives have value implications for other stakeholders as well (DeFusco, Johnson, and Zorn, 1990; John and John, 1993). Our evidence suggests that dual holders' preferences regarding firm risk differ from those of pure equity holders, and dual holders seek to implement managerial contracts that are more compatible with their risk preferences.

2. Data and Sample Construction

2.1 Data Sources

We start constructing our sample by using managerial compensation information from the Execucomp database. Execucomp covers the top five highest-paid executives of companies in the S&P 1500. For the purpose of our study, we focus on the compensation of CEOs. Our sample starts in 2006 and ends in 2016.[4]

We collect the equity holding data of 13f institutions from the Thomson Reuters s34 Ownership database. The bond holdings of mutual funds and insurance companies (and the financial institutions that they belong to) come from Thomson Reuters eMAXX (formerly

[3]The literature also shows that the mitigation of shareholder–creditor conflict reduces the cost of debt and the use of covenants ex ante (Wei and Yermack, 2011; Jiang et al., 2010; Chava, Wang, and Zou, 2019).

[4]Hayes, Lemmon, and Qiu (2012) document that, following the adoption of FAS 123R in 2005, U.S. companies significantly reduce their use of option-based compensation. To avoid confounding effects from the accounting rule change, we start our sample from 2006 (after the adoption of FAS 123R).

Lipper eMAXX). When we merge the managerial compensation data of a firm with its bondholder information, we require a firm to have a positive amount of corporate bonds outstanding. To aggregate multiple bond issues of the same company to construct firm-level measures, we use Mergent FISD database to extract issuer identities, par amount outstanding, and bond maturities of outstanding issues. We exclude convertible bonds from our sample. Bonds are matched to their issuer primarily by CUSIP. Firm characteristics and industry classifications are obtained from the Compustat. Past returns of a firm's stock are sourced from the CRSP. We exclude financial and utilities stocks. Our baseline sample includes 7,343 firm–years.[5]

For our identification strategy, we utilize mergers between financial institutions that create dual holders. We extract mergers and acquisitions (M&A) deals between financial firms from the Securities Data Company (SDC) in our sample period. For our analyses of mutual funds' voting behavior, we obtain the voting records of all mutual fund shareholders from Institutional Shareholder Services (ISS) Voting Analytics.

2.2 Measuring Dual Ownership

We define dual holders as financial institutions that simultaneously hold stocks and bonds of a firm. Financial conglomerates are the ultimate parent firms of mutual funds and insurance companies. We manually identify the financial conglomerates (typically mutual fund families) that exist in both the 13f database and the eMAXX database. This manual identification process involves searching firms' information online through the SEC's directory of investment or Morningstar's directory of mutual fund families. Due to mergers and acquisitions between financial firms, a fund's parent institution may change from time to time. We track such changes using M&A data from the SDC. A financial institution typically has

[5]We start from 22,115 firm-years with available CEO compensation information in the intersection between Compustat and Execucomp. We then require a firm-year to have outstanding corporate bonds that are covered under the eMaxx database. This reduces the sample size to 10,799 firm-years. We further exclude firms in the financial or utility industry, which leaves us with 8,246 observations. Finally, we exclude observations with missing variables.

multiple funds that hold stocks of the same firm. In such cases, we aggregate them to obtain the financial institution's stock holding of the firm for each quarter. Similarly, we aggregate a financial institution's bond holding for a firm–quarter across multiple underlying entities.

We start by identifying dual holders at the investor level. For a given firm (e.g., Verizon Communications, Inc), if a financial institution (e.g., T. Rowe Price Associates) holds at least 1% of a firm's shares outstanding and at least 1% of the firm's bond outstanding through all its subsidiary funds, then the financial institution is defined as a *significant dual holder* of the company. We choose this threshold to ensure that significant dual holders have both sufficient incentives to reduce firm risk and non-trivial voting power to change executive compensation.

Next, at the firm level, we measure the level of dual ownership in several ways: First, we define *num_dual* as the number of the firm's significant dual holders, as defined above. We also measure dual ownership by using the total equity ownership across all significant dual holders of the company (*dual_equity*) and the total bond ownership of all significant dual holders (*dual_bond*). The variable *dual_equity* is defined as the number of shares held by significant dual holders as a fraction of total shares outstanding. The variable *dual_bond* is defined as the total par value of bonds held by significant dual holders as a fraction of the total par value of bonds outstanding. For firms that have no significant dual holder, all three measures are set to zero.

While the variable *significant dual holder* has the benefit of being easy to interpret and is used in the literature (e.g., Bodnaruk and Rossi, 2016; Chu, 2018), it invariably involves an arbitrary threshold for *significant* dual holders. To complement this measure, we construct a continuous variable to measure a firm's level of dual ownership: *relative bond exposure*. For each investor–firm pair, we first calculate the ratio of the dollar par amount of an investor's bond holdings to the total value of an investor's total holdings (par value of bond positions

and market value of equity positions):

$$relative\ bond\ exposure_{i,j,t} = \frac{\$BondPosition_{i,j,t}}{\$EquityPosition_{i,j,t} + \$BondPosition_{i,j,t}} \quad (1)$$

At the firm level, we calculate the weighted-average of this measure across all of the firm's shareholders, using each investor's equity holding value as weights.

A caveat to our dual ownership measure is that we do not observe all debt holdings of a financial institution. We do not account for other forms of debt (for example, syndicated loans) that a mutual fund family may hold, either through its bank loan funds, or through its affiliated banks. Therefore, we recognize that our dual ownership measures are underestimated relative to the true level of dual ownership. However, to the extent that the unobserved part of dual ownership does not correlate with the outcome variables of interest, such data shortcomings should bias us against finding our results.[6]

2.3 Executive Compensation

We measure the risk-taking incentives in managerial compensation in several ways. First, we use the fraction of a CEO's annual compensation derived from stock option grants. This is calculated using our option grant measure, which is the fair value of the option grants awarded in a given year ($option_award_fv$ in Execucomp) scaled by the CEO's total compensation in the same year ($tdc1$).

Second, we calculate "total vega" ($vega^t$) as the change in the dollar value of CEO's *wealth* for a one percentage point change in the annualized stock return volatility, scaled by the CEO's total annual compensation. The calculation of vega follows Guay (1999) and Core and Guay (2002).

Third, we calculate "current vega" ($vega^c$) as the change in the dollar value of a CEO's

[6] A more subtle point is that loan investors are typically more senior to bondholders; hence the presence of a large group of loan creditors weakens the risk-aversion of bondholders. We address this point in cross-sectional tests in Section 3.2.

annual equity-based compensation for a one percentage point change in the annualized stock return volatility, scaled by the total annual compensation. Since current vega is derived only from the portion of option-based compensation granted to a CEO in the current year, we follow the methodologies in Hayes, Lemmon, and Qiu (2012) to identify current-year option awards from the Execucomp database. We use current vega in evaluating shifts in firms' compensation policies, as it captures the composition of executive pay in a given year. Such shifts can then be linked to changes in firms' ownership structure (see Section 4).

To measure the "inside debt" portion of CEO compensation, we follow the literature (e.g., Sundaram and Yermack, 2007; Edmans and Liu, 2010; Cassell, Huang, Sanchez, and Stuart, 2012) in defining inside debt as how a one-dollar increase in the value of the firm affects the value of the CEO's inside debt relative to inside equity claims. A CEO's inside debt holdings include accumulated pension benefits and deferred compensation, both reported in Execucomp since 2006. A CEO's equity holdings include restricted stocks and unexercised options. The inside debt measure is defined as:

$$CEO\ relative\ incentive\ ratio = \Delta CEO\ IDH / \Delta CEO\ EH, \tag{2}$$

where $\Delta CEO\ EH$ is the dollar value sensitivity of a CEO's restricted stocks and unexercised options to a dollar's change in the firm value. By definition, restricted stocks have a delta of 1.0. We calculate the delta of each tranche of a CEO's unexercised option at the end of each calendar year. $\Delta CEO\ EH$ represents the total summed deltas of both restricted stocks and options. Following the assumptions in Wei and Yermack (2011) and Cassell et al. (2012), we set $\Delta CEO\ IDH$ to be equal to $CEO\ IDH$.

2.4 Summary Statistics

In Table 1, we tabulate the summary statistics for executive compensation, dual ownership, and other characteristics for the firms in our main sample. Option grants comprise

18.6% of a CEO's annual compensation, on average. There is also considerable variation across firms, as the standard deviation for option grants is 17.7%. In terms of total vega, the average value is 2.3% of total compensation. This means when an average firm's annual stock volatility increases by one percentage point, the CEO's wealth would increase by 2.3% of her annual compensation. The average current vega is 0.44% of annual compensation. The relative magnitudes of option grants, total vega, and current vega are in line with the corresponding post-FAS 123R summary statistics reported by Hayes, Lemmon, and Qiu (2012). The average total compensation delta for our sample firms is 6.97% of annual compensation, while the current delta is 0.81% of annual compensation. On average, CEOs' relative incentive ratio, reflecting the level of insider debt, is 46.7%.

With regard to dual ownership, the average firm has 1.10 significant dual holders. When the sample is broken down further, we observe that 52% of firm–years have at least one significant dual holder, and the 75th percentile of firm–years has two significant dual holders. When we account for firms that have no significant dual holder, we observe that a firm's significant dual holders hold, on average, 4.8% of firm equity and 8.0% of firm bonds. The relative bond exposure is 7.9%, indicating that the average institutional shareholder has bond holdings equivalent to 7.9% of its total holdings value. Conditional on firm–years having at least one significant dual holder, the average firm has 2.14 significant dual holders. The average dual equity ownership and bond ownership are 9.3% and 15.5%, respectively.

3. Empirical Findings

3.1 Baseline Results

We test our hypothesis that dual ownership is negatively related to risk-taking incentives in a firm's managerial contract. Focusing on the three measures of risk-taking incentives (option grants, current vega ($vega^c$), and total vega ($vega^t$)), we estimate the following

regressions:

$$\frac{Option\ grants_{i,t+1}}{Total\ compensation_{i,t+1}} = \alpha_t + \beta Dual_{i,t} + Controls_{i,t} + \epsilon_{i,t} \tag{3}$$

$$\frac{Vega^k_{i,t+1}}{Total\ compensation_{i,t+1}} = \alpha_t + \beta Dual_{i,t} + Controls_{i,t} + \epsilon_{i,t}, \qquad k \in \{c, t\}, \tag{4}$$

where the level of dual ownership is measured by two different sets of proxies: (a) the number of significant dual owners (*num_dual*), and (b) the weighted-average *relative bond exposure* of all firm's shareholders. Note that the right-hand-side variables are measured at the end of the previous fiscal year. Year fixed effects are included, since we are interested in cross-sectional variations. We also include industry fixed effects to absorb the heterogeneity across 2-digit SIC industries. In some of the specifications, we further control for firm fixed effects to isolate within-firm variations. Our hypothesis predicts that β will be negative.

Table 2 displays results that suggest a negative association between dual ownership and risk-taking incentives in managerial compensation. Column (1) shows that, on average, firms that have more significant dual holders pay a smaller fraction of their annual CEO compensation in the form of stock options, controlling for a host of firm characteristics. An increase of one significant dual holder reduces the option grants awarded in the next year by 0.754 percentage point, which translates to 4.1 percent of sample-average option compensation. This difference is statistically significant ($t = 3.29$) when the standard errors are clustered at the firm level. This is consistent with our main hypothesis that firms with significant dual holders have compensation policies that encourage less risk-taking.

In Column (3), we measure the dual ownership of a firm using a continuous variable, *relative bond exposure*, which captures the portion of average shareholder's position value derived from its bond holdings. We find that the level of dual ownership, proxied by this variable, is negatively related to the use of options in CEO compensation. A one standard deviation increase (9.8) in *relative bond exposure* is associated with a 1.23 percentage points decrease in option grants. Both measures of dual ownership consistently indicate that dual

holding is associated with the use of fewer risk-inducing incentives in CEO compensation.

Furthermore, in Columns (2) and (4), we repeat the analyses while including firm fixed effects in the regressions. These specifications absorb the effect of time-invariant firm characteristics. The estimates on the number of significant dual owners and on *relative bond exposure* are both significantly negative, suggesting that there is a negative within-firm relationship between the level of dual ownership and the use of option in CEO compensation. Comparing the magnitude of coefficients estimated under firm fixed effects, we observe that the impact of dual ownership is mildly moderated. This is largely due to the fact that the level of dual ownership is somewhat persistent within a firm, which limits within-firm variations. In Section 4, we further utilize a research design that exploits financial institution M&As to focus on cases where the level of dual ownership changes substantially within a company.

In Columns (5) to (8), we use the current-year vega of CEO compensation scaled by total compensation, as the dependent variable. This dependent variable is highly correlated with current-year option grants ($corr = 0.74$). The results in Column (5) indicate that an increase of one significant dual holder is associated with a decrease in the current vega by 0.021 percentage point. Column (7) shows that *relative bond exposure* significantly reduces the current vega in CEO compensation. The results on current vega are robust to the inclusion of firm fixed effects in regressions.

Finally, in Columns (9) to (12), the dependent variable is total vega ($vega^t$), which takes into account the cumulative effect of a firm's past and current option granting. The results are consistent with findings from other specifications. The coefficient on the number of significant dual holders and the coefficient on *relative bond exposure* are negative and statistically significant.

The relation between the control variables and the risk-taking incentives in CEO compensation is largely consistent with prior literature (e.g., Guay, 1999). For example, book-to-market ratio is negatively related to risk-taking incentives. This is consistent with the

argument that firms with a better investment opportunity set tend to use more convex contracts. We further control for total institutional equity ownership and institutional bond ownership: two variables that are positively related to our dual ownership measures. Both variables seem to be uncorrelated with managerial compensation convexity.

Taken together, our baseline tests suggest that a firm's level of dual ownership is negatively associated with the risk-taking incentives in its managerial contracts. This is consistent with our argument that shareholders with simultaneous bond holdings prefer that firms take less risks and align managerial interests with less convex compensation. The finding that dual holders affect managerial compensation also provides a plausible channel for dual ownership to affect other firm-level policies (e.g., payouts, R&D investments), as documented by other studies (e.g., Chu, 2018).

3.2 Cross-sectional Variations in the Effect of Dual Ownership

To further sharpen our baseline results, we proceed to examine the cross-sectional variations in the effect of dual ownership. The first set of cross-sectional tests focuses on firms' level of financial distress. Theories suggest that the conflict between shareholders and creditors is more acute when a firm is closer to financial distress (Smith and Warner, 1979; Gilson and Vetsuypens, 1993). Therefore, it is potentially more important for dual holders in distressed firms to align the interests of managers by reducing the risk-taking incentives in managerial contracts. We conjecture that the negative relation between dual ownership and CEO vega is more pronounced for firms that are more likely to be in financial distress.

To test this conjecture, we sort firms into two groups (*low* and *high*) each year based on their distance to default to the cross-sectional median. We calculate distance to default following the methodology of Bharath and Shumway (2008).[7] Intuitively, firms with a lower distance to default are closer to financial distress. Dual holders in these firms should be more

[7] Bharath and Shumway (2008) shows that it is the functional form of the Merton DD model that makes it useful and important for predicting defaults. Their version of distance to default performs as well as the original Merton distance to default in predicting default events.

concerned about the risk-taking activities of managers. For each subsample, we separately run the baseline regressions in Equation 4, using the value of annual option grants and total vega as dependent variables.

The results are presented in Panel A of Table 3. Consistent with our conjecture, the relation between managerial risk-taking incentives and dual ownership is more negative and significant for firms that have a lower distance to default. For example, Columns (1) and (2) report that an increase of one significant dual holder reduces the annual compensation in the form of option grants by 1.161 percentage points ($t = 4.59$) for low distance-to-default firms. As a comparison, this coefficient is only -0.316 and insignificant for high distance-to-default firms. The difference in coefficients between these two subsamples is statistically significant. Similarly, Columns (3) and (4) show that institutional shareholders' relative bond exposure has a significantly negative impact on option grants only for firms with a relatively low distance-to-default.

In Columns (5) to (8), we repeat this analysis using total vega (scaled by annual compensation) as the dependent variable. The findings are consistent, and they indicate that the risk-taking incentives in low distance-to-default firms are more sensitive to dual ownership than those in firms that are distant from financial distress.

The second set of our cross-sectional tests centers around the heterogeneity among creditors. Due to data limitations, our measure of dual ownership considers only bond holders on the creditor side. However, firms typically have other creditors, such as banks that make loans. Since corporate bonds are usually unsecured and junior to other forms of liabilities, the benefits of reducing firm riskiness would accrue to other creditors first. Depending on the initial level of firm riskiness, the presence of other creditors may reduce the incentives for dual holders, who are bond holders, to make the firm safer. Therefore, we predict that the negative relation between dual ownership and risk-taking incentives in managerial compensation is weaker for firms with significant non-bond creditors. We measure the importance of bond holders relative to other creditors using the ratio of *total bond outstanding* to *total*

liabilities at each year-end.

Panel B of Table 3 shows the results. In Columns (1) and (2), we find that the number of significant dual holders significantly and negatively predicts the future use of options in compensation only for firms with high *Bond outstanding/Total liabilities*. For example, one additional significant dual holder is associated with -0.998 percentage point change in option grant as a fraction of compensation for the high group, but the low group exhibits only a -0.182 pp change, which is statistically insignificant. When switching to other measures of dual ownership (Columns (3) to (4)) and total vega as the outcome variable (Columns (5) to (8)), we find consistent results that indicate the impact of dual ownership on risk-taking contracts is more pronounced when bondholders are the predominant class of creditors.

The third set of cross-sectional test we conduct involves CEO overconfidence. The premise of this paper's argument is that CEOs are typically more conservative than shareholders' optimum, and need to be incentivized by option-based compensation. The literature on CEO overconfidence (e.g., Malmendier and Tate, 2005, 2008; Hirshleifer, Low, and Teoh, 2012), suggests that some CEOs are overconfident and are naturally more inclined to take risks. Such CEOs do not require shareholders to use much option-based compensation to address the shareholder-manager conflict. In such cases, it is difficult for creditors (and dual holders) to force the firm to become more risk-averse.

Following Hirshleifer, Low, and Teoh (2012), we classify a CEO as overconfident when she holds vested options to the last year before expiration, and the options are at least 67% in-the-money entering the final year. Once a CEO is classified as overconfident, she remains so for the rest of the sample period. Panel C of Table 3 shows that, consistent with our hypothesis, the negative relationship between dual ownership and option-based compensation only exists in the subsample of firms with non-overconfident CEOs.

3.3 Dual Ownership and Inside Debt

Option-based compensation induces managers to take risks and undermines the value of debt, but defined benefit pensions and deferred compensation have been shown to induce CEOs to manage their firms more conservatively, thus boosting bond prices (Wei and Yermack, 2011). Economists call such incentives plans *inside debt* (Sundaram and Yermack, 2007; Edmans and Liu, 2010). Inside debt is a significant component of managerial compensation: Cassell et al. (2012) report that the average ratio of CEOs' inside debt holdings relative to their equity holdings is 0.40.

Given the prevalence of inside debt and the fact that inside debt aligns managerial incentives with creditors, we hypothesize that institutional investors with dual ownership would have a stronger preference for inside debt as a form of CEO compensation compared to pure equity holders. Therefore, we expect firms with a higher level of dual ownership to pay their CEOs with more inside debt.

To empirically evaluate this hypothesis, we calculate a CEO's relative incentive ratio as how a one-dollar increase in the value of the firm affects the value of the CEO's inside debt relative to inside equity claims. We then regress this relative incentive ratio on measures of firm-level dual ownership:

$$CEO\ relative\ incentive\ ratio_{i,t+1} = \alpha_t + \beta Dual_{i,t} + Controls_{i,t} + \epsilon_{i,t}, \tag{5}$$

where $Dual_{i,t}$ represents the level of dual ownership, proxied by the number of significant dual owners (num_dual) or the weighted-average *relative bond exposure* of all firms' shareholders.

Table 4 presents the results. In Column (1), where the level of dual ownership is measured by the number of significant dual holders, an additional significant dual holder is associated with a 2.92 percentage point increase in CEO's relative incentive ratio, corresponding to a 6% change relative to the average level of CEO relative incentive ratio in our sample. This result suggests that dual holders indeed have a stronger preference for inside debt compen-

sation than pure shareholders. In Column (3), we find that the *relative bond exposure* of shareholders positively explains the relative importance of inside debt in CEO compensation. In terms of economic magnitude, a one standard deviation increase in *relative bond exposure* (9.80) is associated with a 7.88 percentage points increase in CEO relative incentive ratio. In Columns (2) and (4), we further control for firm fixed effects in regressions, and the coefficients on dual ownership measures are still significantly positive.

The results in this section give us a more complete picture of how dual ownership affects the incentive structure of executive compensation. In addition to limiting option-based compensation, dual holders seek to align managerial incentives with creditors by using instruments with debt-like payoff structures.

4. Identification: Financial Company M&As

The baseline results suggest an inverse relation between dual ownership and the risk-taking incentives embedded in executive compensations. However, this interpretation might be subject to endogeneity concerns. One source of endogeneity is reverse causality: Suppose a firm's managerial compensation has already been established. In that case, the firm's shareholders and bondholders may select to dual-invest based on the risk-taking incentives in the compensation. For example, existing shareholders may invest in a firm's bonds if the firm's managerial compensation encourages less risk-taking. Another source of endogeneity is omitted variables: There may be unobservable firm characteristics that both attract dual-holding asset managers and are negatively related to firms' propensity for using option-based compensation.

To address the endogeneity concern, we use several identification strategies. First, motivated by the extant literature (He and Huang, 2017; Chu, 2018; He, Liang, Wang, and Xia, 2020), we take advantage of mergers between financial institutions that shock firms' ownership structure and, in our context, exogenously increase the level of dual ownership for their

portfolio companies. Suppose that financial company A holds a significant share of *Innocent Inc.*'s stock but not its bonds, while financial company B holds a significant share of *Innocent Inc.*'s bonds but not its stock. When A and B merge to form a new financial institution AB, the new entity becomes a significant dual holder of *Innocent Inc.* The causes of the merger between financial institutions are plausibly exogenous to the shareholder–bondholder conflicts of their portfolio companies. Therefore, such a setting helps us to better identify the causal effect of dual ownership on managerial compensation.

In order to identify mergers and acquisitions that create dual holders, we start by extracting 135 M&A deals between financial firms from SDC from 2006 to 2015.[8] We require the financial institutions in these deals to both appear in our sample of equity holders and bond holders. We then select deals in which the merged entity holds at least 1% of shares outstanding and at least 1% of bond outstanding of the firm. This requirement reduces the number of M&A deals to 26. Finally, to ensure that our selected mergers materially shock the dual ownership level of a firm, we require that neither of the two parties involved in the merger were a significant dual holder before the deal.

We find 18 such M&A deals from 2006 to 2015. After we exclude firms in the financial and utilities industry and merge the remaining firms with the Execucomp data, we are left with 168 treated firms. If any firm appears multiple times as treated through the sample period, we only include the first time it gains significant dual holder through financial institution mergers. Table 5 tabulates the list of M&A deals and the number of treated firms for each merger event. The largest merger was a merger between Ameriprise Financial and Columbia Management Group, which creates 44 treated firms. On average, each M&A affects 9.3 treated firms.

By construction, treated firms gain additional significant dual holders after the merger. Figure 1 shows the evolution of the number of significant dual holders and the equity owner-

[8]Our sample starts from 2006 to ensure that we have at least one year of observation before the merger (we deem the first full year *after* the merger as the "post" year). The sample ends in 2015 so that we have at least one year of observations after the merger.

ship by dual holders around the merger events. The number of significant dual holders stays relatively stable in the years after the merger. At the end of Year $t+3$, the average treated firm has 0.8 more significant dual holders than it had before the merger. Similarly, the increase in equity ownership held by significant dual holders remains almost flat throughout the post-merger period, as shown in Panel (b). These patterns show that financial company mergers generate significant dual holders, which may exert persistent impact on the affected firms.

We then match the control firms with the treatment firms. We require any candidate for control firms to never appear as treated firms throughout our sample. Control firms are required to have outstanding bonds held by financial institutions. All firms are ranked into quintiles based on their size, book-to-market ratio, and past performance. We require the control firms to be in the same quintiles as the treatment firms. We rank the differences between the control firms and the treatment firms from smallest to largest in terms of size, book-to-market ratio, and past performance and sort all candidate firms based on their total rank. For each treated firm, we keep one control firm that has the smallest total rank difference.[9]

We then run stacked difference-in-differences regressions using the complete firm-years of treatment and control firms:

$$\frac{Option\ grant_{i,t}}{TotalComp_{i,t}} = \alpha + \beta_1 treated_i * post_{i,t} + \beta_2 treated_i + \theta Z_{i,t-1} + \epsilon_{i,t} \tag{6}$$

$$\frac{Vega^c_{i,t}}{TotalComp_{i,t}} = \alpha + \beta_1 treated_i * post_{i,t} + \beta_2 treated_i + \theta Z_{i,t-1} + \epsilon_{i,t} \tag{7}$$

where $treated_i$ is a dummy that equals one for the treatment firm and zero otherwise; $post_{i,t}$ is a dummy that equals one for treatment firms after the M&A occurs, and zero otherwise. For control firms, $post_{i,t}$ is also set to one after the matched treatment firm undergoes the M&A. Vector $Z_{i,t-1}$ represents a set of firm characteristics. We include the complete time-series

[9] We show in Internet Appendix Table A.1 that the characteristics of treated firms and control firms are very similar before the M&A events.

of observations for the treated and control firms. Standard errors are clustered at the firm level. Similar to Gormley and Matsa (2011), we include cohort-by-year fixed effects, where a cohort of treated and control firms have their merger events take place at the same year. Allowing the year fixed effects to vary by cohort takes account for the potential dynamic effect of treatment (Baker, Larcker, and Wang, 2022). In some specifications, we further control for industry fixed effects and firm fixed effects.

If the effect of dual ownership on managerial compensation is causal, one should expect the treated firms, which experience an exogenous increase in dual ownership, to shift to a managerial compensation structure that is less risk-inducing. This is precisely what we find in Table 6. Column (1) shows that, compared to control firms, firms that gain significant dual holders after the financial firm merger reduce their use of option grants by 1.78 percentage points afterwards. After we absorb firm-level heterogeneity by using firm fixed effects, the relative change in the use of options is -1.95 percentage points (Column (2)), and it is statistically significant at the 1% level ($t = 4.57$). The economic magnitude associated with the treatment is large: Gaining a significant dual holder through financial firm mergers reduces the use of options by around 11% relative to the sample mean.

In Columns (3) and (4) of Table 6, we further examine the current-year vega of CEO compensation in the diff-in-diff setting. Compared to control firms, treatment firms' vega drops by 0.14 percentage point after the M&A events ($t = 4.09$), as shown in Column (3). Including firm fixed effects reduces the magnitude of the results only slightly and the effect is still significantly negative (Column (4)). The sizable impact of merger events suggests that an exogenous mitigation of creditor–shareholder conflicts subsequently reduces the risk-taking incentives in firms' executive compensation. We control for the level of common ownership in treated and control firms, as common ownership may also increase following mergers of financial institutions. The coefficient on common ownership is statistically indistinguishable from zero, suggesting that common ownership has no effect on the vega of CEO compensation.[10]

[10]Our results do not appear to be solely driven by the M&A deals that took place during the Great Financial Crisis. Internet Appendix Table A.2 shows that the diff-in-diff results are robust to dropping

To further ensure that our findings are not confounded by differential trends between the treated and control firms, we further examine the dynamic treatment effects of financial company mergers. We construct six binary variables: $Year(t-3)$, $Year(t-2)$, $Year(t-1)$, $Year(t)$, $Year(t+2)$, and $Year(t >= 3)$ based on the year relative to the merger event. We fully interact these time-dummies with *treated* in the following regressions:

$$\frac{Option\ grant_{i,t}}{TotalComp_{i,t}} = \alpha + \sum_{k=-3}^{3} [\gamma_k treated_i * Year(t+k)_{i,t}] + \sum_{k=-3}^{3} \delta_k Year(t+k) + \beta_2 treated_i + \theta Z_{i,t-1} + \epsilon_{i,t} \quad (8)$$

If the parallel trend assumption is valid, we should expect γ_{-3}, γ_{-2} and γ_{-1} to be indistinguishable from zero.

Table 7 displays the results for dynamic effects. Consistent with a parallel trend between treated firms and control firms before the merger, the interaction terms between *treated* and $Year(t-3)$, $Year(t-2)$, $Year(t-1)$, or $Year(t)$ are indistinguishable from zero across all specifications, regardless of whether option grant value or current vega is used as the dependent variable. More importantly, the interaction terms with *treated* become significantly negative for $Year(t+1)$, $Year(t+2)$ and $Year(t >= 3)$, indicating that the influence of dual holders, induced by financial company mergers, starts to shape the compensation structure of companies one or two years after the merger takes place.

In Figure 2, we plot the dynamic treatment effects of financial firm mergers on the current vega of firm CEOs. The point estimates from Year t-3 to Year t+3 are shown in the figure, as well as the 90% confidence intervals. It is evident that there is a parallel trend for CEO vega between the treated firms and control firms before the takeover events. The treated firms start to reduce their risk-taking incentives only *after* the financial-firm mergers. These findings give us confidence that the relation between dual ownership and risk-taking

mergers in 2008 and 2009.

incentives in executive compensation is likely causal.

In addition to the merger events that create significant dual holders for affected firms, we further utilize a similar, but different setting where the level of dual ownership is *reduced* in an arguably exogenous manner. This setting also involves acquisition events between financial institutions. In these events, the target financial institution was a significant dual holder of the treated firms before the acquisition. During the acquisition, the target institution partially sold its assets to the acquirer and ceased to be a dual holder of the treated companies. Our conjecture is that the risk-taking incentives in the treated firms would *increase* following the acquisitions, consistent with a negative relationship between dual ownership and compensation convexity.

We identify 51 treated firms from partial asset sales of financial institutions.[11] We match each treated firm with a control firm on size, book-to-market ratio, and past performance. We then conduct stacked diff-in-diff regressions on the sample of treated and control firms:

$$\frac{Option\ grant_{i,t}}{TotalComp_{i,t}} = \alpha + \beta_1 treated_i * post_{i,t} + \beta_2 treated_i + \theta Z_{i,t-1} + \epsilon_{i,t} \tag{9}$$

Table 8 reports the diff-in-diff results. After treated firms lose a significant dual holder during the financial institution asset sales, their use of option grants in CEO compensation increases by 3.8 to 4.5 percent, relative to the amount of total compensation. Accordingly, the current vega in CEO pay package also increases. While the statistical significance of these results are modest due to the small number of treated firms, the findings in Table 8 suggest that the relationship between the level of dual ownership and CEO compensation convexity is symmetric. In other words, the results in this section indicate that both an increase and a decrease in the level of dual ownership have a plausibly causal effect on managerial compensation structure.

[11] The treated firms are derived from the acquisition of Mellon Financial by the Bank of New York, the acquisition of Putnam Investments by Great-West Lifeco, the acquisition of Natixis by BPCE SA, and the acquisition of Delaware Management by the Macquarie Group.

5. Voting Patterns of Dual Holders

In this section, we examine the voting pattern of mutual funds on compensation proposals, and we show that dual holders and pure equity holders vote differently. This may serve as a mechanism for dual holders to establish their preferred managerial compensation structure.

Equity-based compensation requires shareholder voting, per SEC Release No. 34-48108. Such votes are binding and are mandatory for the approval or amendment of any equity-based compensation plan. Dual-holding fund families have the infrastructure to coordinate within the family. Many asset managers have installed family-level corporate governance teams dedicated to handling voting and other corporate governance matters. Empirical evidence shows that funds in the same family typically vote in unison on corporate governance matters. For example, in a sample of say-on-pay votes, Cai and Walkling (2011) report that in 98% of proposals voted at shareholder meetings, all funds in the same family cast the same vote.

Our hypothesis is that, compared to pure equity holders, mutual funds that belong to dual-holding families are more likely to vote in a manner that reduces future risk-taking incentives in managerial compensation. To be clear, we do not argue that voting is the *only* mechanism used by dual holders to affect managerial compensation. Communicating behind the scenes may be another mechanism through which institutional dual holders may influence a firm's managerial compensation structure (McCahery, Sautner, and Starks, 2016). Nevertheless, even though the majority of compensation proposals in the sample receive shareholder approvals and dissent votes are unlikely to be pivotal, the level of dissent votes conveys the preferences of shareholders, and it could serve as a credible threat when institutional investors work behind the scenes (Yermack, 2010; Aggarwal, Dahiya, and Prabhala, 2019).

The voting records of mutual funds come from the ISS Voting Analytics. For every proposal of the Russell 3000 Index companies from 2003, ISS maintains records of firm information, proposal types, fund-level votes, and voting results. Our focus is on management-

sponsored compensation proposals, which are coded by ISS as M0522 ("Approve Omnibus Stock Plan"), M0524 ("Amend Omnibus Stock Plan"), and M0535 ("Approve/Amend Executive Incentive Bonus Plan").

It is difficult to determine ex ante whether a proposal would increase or decrease the risk-taking incentives based on the content of proposals, as they often detail a comprehensive compensation package. Therefore, we must take an indirect approach by examining the (majority) subset of *approved* proposals and how *ex post* CEO compensation structures evolve. For every proposal that is approved, we compare the value of CEO option grants relative to total compensation ($option/tdc1$) in the three years before voting (averaged between Year $t-3$ to Year $t-1$) and the three years after voting (averaged between Year $t+1$ to Year $t+3$).[12] If the value of option grants, scaled by total compensation, increases by 10% or more after the vote (relative to the pre-voting period), we classify the vote as an *option-increasing* vote; If option grants decrease by 10% or more after the vote (relative to the pre-voting period), we classify the vote as an *option-decreasing* vote. The rest of the proposals are defined as *option-neutral*. The use of thresholds ensures that our specification is robust to small measurement errors in option compensation. Proposals that are rejected by shareholders are dropped from the sample. Our sample includes 360 option-increasing proposals, 376 option-decreasing proposals, and 278 option-neutral proposals.

The voting setup allows us to mitigate endogeneity concerns by controlling for two sets of high-dimensional fixed effects: the proposal fixed effects and the fund-by-quarter fixed effects. The proposal fixed effects absorb heterogeneity across firm-time, alleviating the selection issue of which firms tend to have dual holders. The fund-by-quarter fixed effects absorb the heterogeneity across mutual funds at each point in time, mitigating the concern that dual-holdings mutual funds are inherently different from other funds. The identifying variations take advantage of the fact that the same fund (family) can be a dual holder for

[12]The use of three-year averages before and after the proposal is motivated by the fact that the proposed executive equity-based compensation typically lays out compensation plans for multiple years. See, for example, Shue and Townsend (2017).

some of its portfolio companies and a pure equity holder for other portfolio companies.

We examine option-increasing, option-decreasing, and option-neutral proposals separately. In each subsample, a dummy indicating that fund i votes "yes" for proposal j is regressed on measures of dual ownership and high-dimensional fixed effects. As dual holders have stronger preferences than pure equity holders for lower risk-seeking incentives in managerial contracts, we expect that dual holders are less likely to vote for option-increasing proposals, and more likely to vote for option-decreasing proposals. The regressions are as follows:

$$Dummy(vote_yes_{i,j,t}) = \alpha_j + \gamma_{i,t} + \beta * dual_{i,j,t} + \gamma * equity_ownership_{i,j,t} + \epsilon_{i,j,t} \qquad (10)$$

where $dual_{i,j,t}$ is measured by either (i) a dummy variable indicating that fund i is a significant dual holder of firm j at quarter t, or (ii) the *relative bond exposure* of fund i's family. Consistent with earlier tests, a mutual fund is classified as a firm's significant dual holder if the mutual fund belongs to a financial conglomerate that is a significant dual holder of the firm (at least 1% of equity and 1% of bond). The standard errors are clustered at financial institution level to account for the correlation across mutual funds from the same family.

Our empirical specification on voting is parsimonious. It should be noted that any firm-specific characteristics, observed or unobserved, cannot drive the results on dual ownership, as firm characteristics are absorbed by proposal fixed effects. Proposal-specific factors, such as ISS recommendations, are also subsumed by proposal fixed effects. Likewise, time-varying traits of mutual funds cannot explain our results either, because fund-by-quarter fixed effects fully account for the heterogeneity across funds.

Panel A of Table 9 shows how dual ownership affects the voting pattern of mutual funds. In Columns (1) and (2), we focus on option-increasing proposals. There are 85,310 fund–proposal–quarter observations. Mutual funds that belong to a significant dual holder are 2.8 percentage point less likely to vote for such proposals than pure equity holders. The

difference in voting patterns is statistically significant at the 5% level ($t = 2.35$). The economic magnitude associated with dual holders' voting behavior is meaningful: Across all subsamples, the mean value of $dummy(vote_yes)$ is 0.89, indicating that only 11% of voting mutual funds cast dissent votes. Therefore, a 2.8 percentage point increase in dissent votes represents a sizable increase from the sample-average dissent votes.

Consistent with extant literature, we also find that equity ownership held by the fund family is positively associated with higher probabilities of voting in favor of the management (He, Huang, and Zhao, 2019). In Column (2), we find that the relative bond exposure of a fund's parent institution negatively predicts a fund's tendency to vote for option-increasing proposals. This is consistent with our conjecture that a fund's risk preference diminishes as it becomes more exposed to the value of a firm's bonds.

Columns (3) and (4) examine the subsample of proposals that reduce the use of option by at least 10% relative to the three preceding years. We find that mutual funds that belong to a significant dual holder family are 1.9 percentage point *more* likely to vote for such option-decreasing proposals than other mutual funds. This effect is statistically significant at the 5% level and economically meaningful. The fact that dual holders' propensity to vote "yes" switches sign for the option-increasing and option-decreasing subsamples suggests that we are not capturing dual holders' general preference for voting with the management. It is also instructive that family equity ownership consistently has a positive association with favorable votes.

In addition, in Columns (5) and (6), we examine the subset of option-neutral proposals as a placebo test. When a compensation proposal does not have directional implications for the risk-taking incentives of CEOs, we find that the voting pattern of significant dual holders is statistically indistinguishable from the voting pattern of other investors. Since we have 72,084 fund–proposal–quarter in the option-neutral subsample, statistical power alone is unlikely to explain the insignificant result.

We further examine the heterogeneity of voting patterns among dual holders. Dual hold-

ers' incentive to influence the executive compensation of a firm may depend on the relative importance of the firm in a dual holder's portfolio. Since intervening in corporate governance matters entails a fixed cost for investors and consumes their constrained attention, investors should be more motivated to take actions if their (equity and bonds) investment in the firm represents a larger part of its portfolio. Following Fich, Harford, and Tran (2015), we define an indicator variable for investor–firm pairs in which the holding value of equity and bonds in the firm is in the top 10% of the investor's portfolio. We then interact this indicator with the dummy variable for significant dual holder, and we examine how the interaction term affects funds' voting behavior regarding compensation proposals. Consistent with our argument, Panel B of Table 9 shows that dual holders are more likely to vote against option-increasing compensation proposals when their investment in the company represents a greater allocation of funds (Column (1)). Similarly, Column (3) shows that dual holders are more likely to vote for option-decreasing compensation proposals when the company is a more important part of their portfolio.

Finally, we are interested in whether the distinctive voting behaviors of significant dual holders are driven in large part by passive investors, such as BlackRock, Vanguard, and State Street. These passive investors have accumulated significant positions in a wide range of companies, and this may account for the large variations in the level of dual ownership. We interact the significant dual holder dummy with an indicator for funds from the "Big 3" passive fund families (i.e., BlackRock, Vanguard, and State Street), and regress funds' voting behavior on the interaction term. Columns (2), (4), and (6) in Panel B of Table 9 show that significant dual holders from the Big 3 passive families have a *weaker* tendency to vote in a way to reduce option-based compensation. This suggests that active investors are the main driving force behind dual holders' voting behavior, who aim to influence corporate executive compensation.

6. Robustness Checks

In baseline tests, we define a *significant dual holder* as a financial institution that holds at least 1% of the firm's shares outstanding and at least 1% of a firm's bonds outstanding. The choice of a 1% cutoff value trades off between the impact of dual holders and the number of classified dual holders: A higher cutoff value selects institutions that have a greater influence on corporate governance, but it reduces the statistical power of empirical tests, as fewer dual holders are classified as significant dual holders. As robustness checks, we use alternative cutoff values of 0.5% and 2% to define the number of significant dual owners. We repeat our analyses of dual ownership on option compensation with these alternative cutoffs. Internet Appendix Table A.3 shows the results are robust. The level of dual ownership has a significant and negative effect on the risk-taking incentives in executive compensation, and a significantly positive effect on the use of inside debt.

For our diff-in-diff analyses around financial company mergers, we defined treated firms if the following conditions are met: (1) A shareholder of the firm and a bondholder of the firm are involved in the merger; (2) Before the merger, the shareholder holds at least 1% of shares outstanding but no bonds of the firm, and the bondholder holds at least 1% of bonds outstanding but no equity of the firm. To check the robustness of our diff-in-diff results, we use alternative cutoff points of 0.5% and 2% when defining treated firms. In each of these alternative specifications, we once again match control firms to the treated firms under the new cutoff. Internet Appendix Table A.4 shows the treated effects (following the specification in Equation 6) under the 0.5% cutoff and the 2% cutoff for the treated firms are both negative and statistically significant.

7. Conclusions

This paper examines how the shareholder–creditor conflict shapes executive incentive contracts. In particular, we examine how dual holders affect a firm's use of risk-inducing CEO compensation. We find that various measures of dual ownership are negatively related to both option grants as a fraction of total compensation and the vega of compensation. At the same time, dual ownership is positively associated with the use of inside debt in CEO pay.

To establish a causal interpretation, we utilize mergers between financial institutions that create significant dual holders of their portfolio companies. Firms that experience such exogenous increases in their dual ownership subsequently reduce option grants and their compensation vega relative to matched control firms. We further examine shareholder voting on compensation proposals. Compared to pure equity holders, dual holders are more likely to vote against proposals that increase the use of option compensation and vote for option-decreasing proposals.

Data availability

The data underlying this article were provided by S&P Global, Refinitiv, the Securities Data Company (SDC), the Institutional Shareholder Services (ISS) Voting Analytics, and the CRSP under license. The datasets were purchased through our research funding or our institutions. As such, we do not personally own the data and would not be allowed to make them available to third parties. Part of the data is manually collected. Data will be shared on request to the corresponding author with permission of the relevant third parties.

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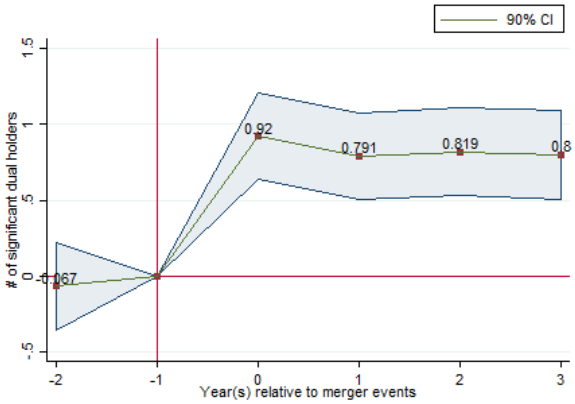
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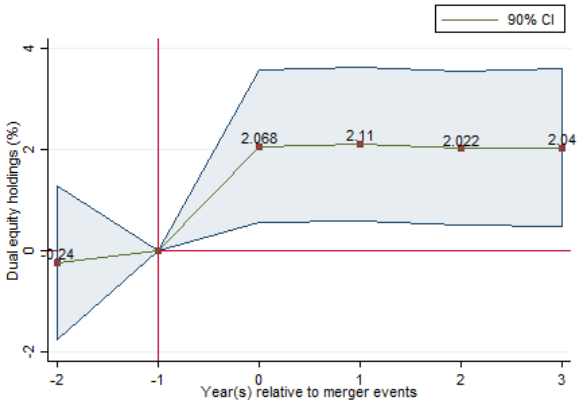
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Fig. 1. The impact of financial institution mergers on treated firms' dual ownership

These figures show the impact of financial institution mergers on the level of dual ownership for the treated firms. The mergers take place between the end of year $t-1$ and year t. The shaded area represents 90 percent confidence intervals. Panel (a) shows treated firms' number of significant dual holders. Panel (b) shows the equity ownership held by significant dual holders.



(a) # of significant dual holders



(b) Dual equity holdings (%)

Fig. 2. Dynamic treatment effects of financial company mergers on option-based compensation

These figures show the dynamic treatment effects of financial company mergers that create significant dual holders on CEO current vega of the portfolio companies. The mergers take place between the end of year $t-1$ and year t. The point estimates correspond to the coefficients on the interaction between *treated* and $Year(t+i)$ from Equation (7). The range represents 90 percent confidence intervals.

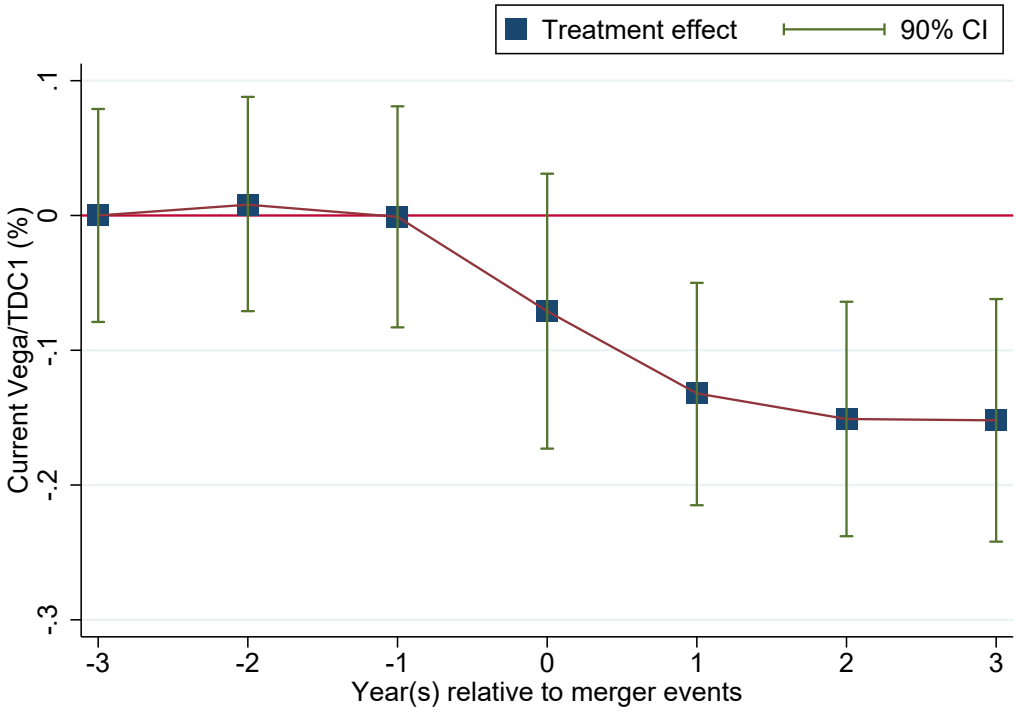


Table 1. Summary statistics

This table shows the summary statistics of firm-level variables. Total CEO vega and delta are calculated as in Core and Guay (2002). Current CEO vega and delta only consider stock-based compensation in current year. New option grants and total compensation are *option_award_fv* and *tdc*1 obtained from the Execucomp in current year. CEO relative incentive ratio (%) measures how a one-dollar increase in the value of the firm affects the value of the CEO's inside debt relative to inside equity claims. *Significant dual holders* are institutional investors which hold at least 1% of the firm's total outstanding equity and at least 1% of the firm's total outstanding bonds. *Dual equity ownership* is the total equity holdings held by significant dual holders as a percentage of total shares outstanding. *Dual bond ownership* is the total bond holdings held by significant dual holders as a percentage of total bond outstanding. *Relative bond exposure* is defined as the ratio of an institutional investor's value of bond holdings over its total holdings value of the same firm, weighted-averaged across all institutional shareholders of the firm. *Significant non-dual holders* are institutional investors which hold at least 1% of the firm's total outstanding equity and no bonds. *Book leverage* is defined as the sum of long term debt and short term debt divided by total assets. *Return on asset* is operating income before depreciation divided by total assets. *Stock past performance* is the compounded stock return in previous 12 months adjusted by market return. *Stock return volatility* is the standard deviation of the stock monthly return over the past 3 years. Variables are winsorized at 1%.

	Mean	Std	Min	Max	p25	p50	p75	N
Outcome variables								
New option grants/Total compensation (%)	18.572	17.681	0.000	76.775	0.000	16.868	25.141	7,343
Current CEO vega/Total compensation (%)	0.438	0.503	0.000	2.329	0.000	0.316	0.674	7,343
Total CEO vega/Total compensation (%)	2.347	2.650	0.000	14.673	0.470	1.484	3.326	7,343
Current CEO delta/Total compensation (%)	0.808	0.603	0.000	3.549	0.452	0.706	1.053	7,343
Total CEO delta/Total compensation (%)	6.968	7.916	0.000	32.959	1.970	4.136	8.410	7,343
CEO relative incentive ratio (%)	46.742	93.567	0.000	602.495	0.000	11.116	50.334	7,343
Measures of dual ownership								
# of significant dual holders	1.097	1.383	0.000	9.000	0.000	1.000	2.000	7,343
Total dual equity holding (%)	4.792	6.545	0.000	26.463	0.000	1.144	8.496	7,343
Total dual bond holding (%)	7.963	12.153	0.000	65.517	0.000	2.169	12.159	7,343
Relative bond exposure (%)	7.899	9.839	0.000	38.149	0.823	4.229	10.653	7,343
Bond holdings by any shareholder (%)	15.175	15.757	0.000	67.532	0.000	11.495	26.608	7,343
# of significant non-dual holders	12.159	5.722	0.000	23.000	10.000	13.000	16.000	7,343
Control variables								
Total assets (in millions)	13,985	41,758	52	797,769	1,527	3,733	100,06	7,343
Book-to-market ratio	0.586	0.444	0.031	2.666	0.292	0.473	0.751	7,343
Book leverage	0.293	0.147	0.000	0.705	0.189	0.288	0.375	7,343
Return on assets	0.131	0.073	-0.138	0.341	0.092	0.129	0.170	7,343
R&D/Total assets	0.024	0.042	0.000	0.209	0.000	0.002	0.028	7,343
Sales/Total assets	0.988	0.666	0.163	3.629	0.537	0.819	1.224	7,343
PPE/Total assets	0.280	0.237	0.010	0.899	0.099	0.200	0.402	7,343
Stock past performance	0.036	0.360	-0.708	1.577	-0.177	-0.003	0.185	7,343
Stock return volatility	0.106	0.054	0.037	0.322	0.069	0.093	0.128	7,343
Total institutional equity ownership	62.929	18.140	0.584	100.000	55.663	65.415	74.113	7,343
Total institutional bond ownership	54.178	27.299	0.287	100.000	36.221	51.511	68.630	7,343
Conditional on having at least one significant dual holder								
# of significant dual holders	2.139	1.226	1.000	9.000	1.000	2.000	3.000	3,766
Equity holdings by significant dual holders (%)	9.343	6.402	1.001	26.463	3.988	8.258	13.502	3,766
Bond holdings by significant dual holders (%)	15.526	13.060	0.588	65.517	6.679	11.899	19.726	3,766
Relative bond exposure (%)	10.652	10.264	0.032	38.149	3.276	7.046	14.170	3,766

Table 2. Dual ownership and risk-taking incentives in managerial compensation

This table shows the relation between dual ownership and the risk-taking incentives in managerial compensation. In Columns (1)-(4), the dependent variable is the fair value of option awarded in year t divided by total compensation of that year. In Columns (5)-(8), the dependent variable is the current vega divided by total compensation. In Columns (9)-(12), the dependent variable is the total vega divided by total compensation. *Significant dual holders* are institutional investors which hold at least 1% of the firm's total outstanding equity and at least 1% of the firm's total outstanding bonds. *Relative bond exposure* is defined as the ratio of an institutional investor's value of bond holdings over its total holdings value of the same firm, weighted-averaged across all institutional shareholders of the firm. *Significant non-dual holders* are institutional investors which hold at least 1% of the firm's total outstanding equity and no bonds. Industry fixed effect is defined by 2-digit-SIC. Standard errors are clustered at the firm level and t-statistics are shown in parentheses. ***, **, and * represent result significant at 1%, 5%, and 10% level, respectively.

	Option/TDC1				Current Vega/TDC1				Total Vega/TDC1			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
# of significant dual holders	-0.754***	-0.498***			-0.021***	-0.016***			-0.110***	-0.060*		
	(-3.29)	(-2.60)			(-2.99)	(-2.75)			(-3.11)	(-1.88)		
Relative bond exposure			-0.126***	-0.074**			-0.004***	-0.001*			-0.022***	-0.007*
			(-3.90)	(-2.52)			(-4.43)	(-1.96)			(-4.66)	(-1.76)
# of significant nondual holders	0.081	-0.068	0.105	-0.044	-0.000	-0.001	0.001	-0.001	0.004	0.003	0.007	0.006
	(1.09)	(-1.15)	(1.47)	(-0.77)	(-0.02)	(-0.89)	(0.33)	(-0.34)	(0.43)	(0.33)	(0.79)	(0.70)
Log(Total asset)	1.374***	-0.002	1.189***	-0.191	0.060***	0.017	0.055***	0.011	0.322***	-0.013	0.299***	-0.035
	(3.52)	(-0.00)	(3.17)	(-0.22)	(5.85)	(0.65)	(5.48)	(0.43)	(6.59)	(-0.09)	(6.16)	(-0.25)
Book-to-market ratio	-3.822***	-3.369***	-3.421***	-3.127***	-0.143***	-0.110***	-0.130***	-0.105***	-0.627***	-0.423***	-0.556***	-0.398***
	(-4.52)	(-4.84)	(-3.99)	(-4.51)	(-6.71)	(-6.34)	(-6.23)	(-6.09)	(-5.06)	(-3.97)	(-4.57)	(-3.72)
Book leverage	8.854***	19.623***	10.384***	20.233***	0.168**	0.336***	0.217***	0.344***	0.016	1.113**	0.309	1.166***
	(3.33)	(5.94)	(3.80)	(6.13)	(2.28)	(3.98)	(2.92)	(4.08)	(0.04)	(2.51)	(0.87)	(2.60)
Return on assets	3.548	-3.955	1.747	-5.305	0.532***	0.128	0.475***	0.101	0.786	-1.067	0.457	-1.201*
	(0.61)	(-0.81)	(0.30)	(-1.09)	(3.57)	(1.11)	(3.21)	(0.88)	(1.06)	(-1.57)	(0.63)	(-1.77)
R&D/Total assets	42.006***	37.752*	40.291***	38.703*	0.422	1.217**	0.368	1.250**	1.520	-3.659	1.214	-3.539
	(2.81)	(1.67)	(2.69)	(1.74)	(1.15)	(1.99)	(1.00)	(2.05)	(0.93)	(-1.10)	(0.75)	(-1.07)
Sales/Total assets	-0.735	0.094	-0.522	0.178	-0.040*	-0.024	-0.033	-0.023	-0.298***	-0.470***	-0.259**	-0.463**
	(-0.94)	(0.06)	(-0.67)	(0.12)	(-1.79)	(-0.71)	(-1.50)	(-0.69)	(-2.90)	(-2.58)	(-2.52)	(-2.54)
PPE/Total assets	-6.810**	4.836	-6.279**	5.043	-0.162**	0.276**	-0.145*	0.280**	-0.871**	0.804	-0.774**	0.825
	(-2.45)	(1.02)	(-2.25)	(1.06)	(-2.03)	(2.24)	(-1.83)	(2.26)	(-2.26)	(1.05)	(-2.02)	(1.07)
Stock past performance	-1.682***	-2.191***	-1.323**	-1.982***	-0.020	-0.007	-0.008	-0.003	-0.653***	-0.464***	-0.587***	-0.444***
	(-2.59)	(-4.15)	(-1.98)	(-3.70)	(-1.27)	(-0.57)	(-0.53)	(-0.27)	(-8.05)	(-6.97)	(-7.27)	(-6.64)
Stock return volatility	-1.821	4.818	-0.174	6.594	-1.416***	-0.383**	-1.365***	-0.351**	-7.128***	-3.257***	-6.840***	-3.085***
	(-0.22)	(0.67)	(-0.02)	(0.91)	(-6.85)	(-2.27)	(-6.61)	(-2.06)	(-6.77)	(-3.70)	(-6.53)	(-3.45)
Total institutional equity ownership	0.031	0.016	0.009	0.001	0.001	0.001*	0.000	0.000	0.002	0.004	-0.002	0.002
	(1.53)	(0.80)	(0.45)	(0.04)	(1.63)	(1.70)	(0.36)	(0.93)	(0.72)	(1.34)	(-0.71)	(0.76)
Total institutional bond ownership	0.008	0.004	0.007	0.004	0.000	0.000	0.000	0.000	-0.003*	-0.001	-0.003*	-0.001
	(0.70)	(0.43)	(0.61)	(0.40)	(0.67)	(1.34)	(0.55)	(1.30)	(-1.78)	(-0.86)	(-1.91)	(-0.88)
Industry FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7,343	7,343	7,343	7,343	7,343	7,343	7,343	7,343	7,343	7,343	7,343	7,343

Table 3. Dual ownership and risk-taking incentives in managerial compensation: cross-sectional variations

This table shows how the relation between dual ownership and the compensation risk-taking incentives varies in the cross section. The dependent variable is the value of option-based compensation (Columns (1)-(4)) or total vega (Columns (5)-(8)), both divided by total compensation. In Panel A, firms are sorted into two groups (Low and High) based on their distance to default based on Bharath and Shumway (2008). In Panel B, firms are sorted into two groups (Low and High) based on the ratio between their amount of bond outstanding and total liabilities. In Panel C, firms are sorted into two groups based on whether their CEOs are overconfident, as in Hirshleifer, Low, and Teoh (2012). *Significant dual holders* are institutional investors which hold at least 1% of the firm's total outstanding equity and at least 1% of the firm's total outstanding bonds. *Relative bond exposure* is defined as the ratio of an institutional investor's value of bond holdings over its total holdings value of the same firm, weighted-averaged across all institutional shareholders of the firm. Control variables include *Log(Total assets), Book-to-market ratio, Book leverage, Return on assets, R&D/Total assets, Sales/Total assets, PPE/Total assets, Stock performance, Stock volatility, Institutional equity ownership,* and *Institutional bond ownership.* Industry fixed effect is defined by 2-digit-SIC. Standard errors are clustered at the firm level and t-statistics are shown in parentheses. ***, **, and * represent result significant at 1%, 5%, and 10% level, respectively.

Panel A: Sorted by *Distance to Defacult*

Dependent variable	Option/TDC1				Total Vega/TDC1			
Distance to Default	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# of significant dual holders	-1.161***	-0.316			-0.143***	-0.028		
	(-4.59)	(-0.95)			(-4.22)	(-0.50)		
Relative bond exposure			-0.167***	-0.021			-0.023***	-0.005
			(-4.95)	(-0.34)			(-5.16)	(-0.59)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient difference	-0.845***		-0.146***		-0.115***		-0.018***	
t-test	(-5.19)		(-5.32)		(-3.82)		(-3.75)	

Panel B: Sorted by *Bond Outstanding/Total Liabilities*

Dependent variable	Option/TDC1				Total Vega/TDC1			
Bond outstanding/Total liabilities	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# of significant dual holders	-0.182	-0.998***			-0.038	-0.163***		
	(-0.49)	(-3.46)			(-0.71)	(-3.60)		
Relative bond exposure			-0.064	-0.162***			-0.011	-0.031***
			(-1.30)	(-4.01)			(-1.64)	(-4.84)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient difference	0.816***		0.098***		0.125***		0.020***	
t-test	(3.22)		(2.71)		(3.68)		(5.52)	

Panel C: Sorted by whether CEO is overconfident

Dependent variable	Option/TDC1				Total Vega/TDC1			
Overconfident CEOs	No	Yes	No	Yes	No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# of significant dual holders	-0.734***	-0.397			-0.139***	-0.029		
	(-2.65)	(-0.99)			(-3.29)	(-0.45)		
Relative bond exposure			-0.146***	-0.024			-0.023***	-0.006
			(-4.11)	(-0.36)			(-4.39)	(-0.62)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient difference	-0.337		-0.122***		-0.110**		-0.017**	
t-test	(-0.49)		(-2.78)		(-2.10)		(-2.12)	

Table 4. Dual ownership and inside debt

This table shows the relation between dual ownership and the amount of inside debt used in managerial compensation. The dependent variable is the CEO relative incentive ratio, defined as $\Delta CEO\ IDH/\Delta CEO\ EH$, measures how a one-dollar increase in the value of the firm affects the value of the CEO's inside debt relative to inside equity claims. *Significant dual holders* are institutional investors which hold at least 1% of the firm's total outstanding equity and at least 1% of the firm's total outstanding bonds. *Relative bond exposure* is defined as the ratio of an institutional investor's value of bond holdings over its total holdings value of the same firm, weighted-averaged across all institutional shareholders of the firm. *Significant non-dual holders* are institutional investors which hold at least 1% of the firm's total outstanding equity and no bonds. Industry fixed effect is defined by 2-digit-SIC. Standard errors are clustered at the firm level and t-statistics are shown in parentheses. ***, **, and * represent result significant at 1%, 5%, and 10% level, respectively.

	CEO relative incentive ratio			
	(1)	(2)	(3)	(4)
# of significant dual holders	2.972**	2.937**		
	(2.12)	(2.37)		
Relative bond exposure			0.804***	0.462**
			(3.47)	(2.07)
# of significant nondual holders	-0.169	0.217	-0.234	0.079
	(-0.49)	(0.77)	(-0.70)	(0.27)
Log(Total asset)	8.872***	6.699	9.338***	7.826
	(4.97)	(1.03)	(5.59)	(1.20)
Book-to-market ratio	15.360***	30.176***	12.791**	28.680***
	(2.62)	(4.79)	(2.20)	(4.56)
Book leverage	18.490	45.132***	7.115	41.217**
	(1.31)	(2.75)	(0.53)	(2.53)
Return on assets	-57.575**	-81.812**	-45.335*	-73.406**
	(-2.14)	(-2.33)	(-1.68)	(-2.07)
R&D/Total assets	-148.499***	-0.859	-137.392***	-6.384
	(-3.66)	(-0.01)	(-3.45)	(-0.09)
Sales/Total assets	12.767***	15.358	11.332**	14.810
	(2.88)	(1.38)	(2.56)	(1.32)
PPE/Total assets	15.715	59.676*	12.064	58.390*
	(1.08)	(1.75)	(0.82)	(1.71)
Stock past performance	-15.700***	-8.615***	-18.185***	-9.924***
	(-4.92)	(-3.18)	(-5.38)	(-3.47)
Stock return volatility	-55.775	-51.861	-65.944	-62.997
	(-1.14)	(-1.00)	(-1.35)	(-1.21)
Total institutional equity ownership	-0.069	-0.095	0.039	-0.004
	(-0.75)	(-1.02)	(0.43)	(-0.04)
Total institutional bond ownership	-0.015	-0.025	-0.007	-0.023
	(-0.30)	(-0.51)	(-0.14)	(-0.46)
Industry FE	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
N	7,343	7,343	7,343	7,343

Table 5. Distribution of M&A events and treated firms

This table shows the list of M&As, which increase the number of significant dual holders for treated companies, and number of treated firms in the final sample used for the difference-in-differences study. The M&A events are mergers and acquisitions between financial institutions that change a financial institution from pure equity holder or bond holder to a significant dual holder of a firm. The affected firms are our treatment firms. *Significant dual holder* is defined as that the institutional investor holds at least 1% of the firm's total outstanding equity and at least 1% of the firm's total outstanding bonds. # of treated firms indicate the number of treated firms associated with each merger.

Year	Acquiror	Target	# of treated firms
2006	BlackRock	Merrill Lynch Investment Managers	5
2006	Lincoln National	Jefferson-Pilot	7
2007	Principal Financial Group	WM Advisors	2
2007	Great-West Lifeco Inc	Putnam Investments	8
2008	JPMorgan Chase	Bear Stearns	1
2009	BPCE	Natixis	8
2009	BlackRock	Barclays Global Investors	36
2010	Ameriprise Financial	Columbia Management Group	44
2010	Nuveen Investments	FAF Advisors	21
2010	Bank of Montreal	Marshall & Ilsley	3
2010	Guggenheim	Deutsche Bank Asset Management	14
2011	Affiliated Managers	Yacktman Asset Management	5
2012	TIAA-CREF	Nuveen Investments	2
2012	Bank of New York Mellon	Cutwater Holdings	2
2012	Guggenheim	Security Benefit	7
2014	TriState Capital	Chartwell Investment	1
2014	Natixis	McDonnell Investment Management	1
2015	BNP Paribas	Fortis Banque France	1
			168

Table 6. Difference-in-differences regressions with financial institution mergers

This table shows the results from difference-in-differences regressions around the mergers of financial conglomerates, which increase the number of significant dual holders for treated companies. *Treated* is a dummy for firms that gain significant dual holder(s) following the mergers of their shareholders and bondholders. Control firms are matched with treatment firms on size, book-to-market, and past stock returns. *Post* is a dummy that equals one for treatment firms for the years after the M&A takes place, and zero otherwise. For control firms, $post_{i,t}$ is also set to one after the treatment firm it matches with experiences the M&A. Common ownership is defined as the equity ownership held by financial institutions that cross-hold at least 5% equity in focal firm and another firm in the same industry (He and Huang 2017). Industry fixed effect is by 2-digit SIC. Standard errors are clustered at the firm level and t-statistics are shown in parentheses.. ***, **, and * represent result significant at 1%, 5%, and 10% level, respectively.

Dependent variable	Option/TDC1		Current Vega/TDC1	
	(1)	(2)	(3)	(4)
Treat x Post	-1.778***	-1.947***	-0.141***	-0.132***
	(-4.15)	(-4.57)	(-4.09)	(-3.96)
Treat	0.445		0.079**	
	(0.92)		(2.09)	
Log(Total assets)	0.114	-0.103	0.018	-0.013
	(0.80)	(-0.28)	(1.20)	(-0.56)
Book-to-market ratio	-1.651***	-1.188***	-0.116***	-0.058**
	(-4.90)	(-3.05)	(-3.99)	(-2.38)
Common ownership	-0.022	-0.017	-0.001	0.001
	(-0.70)	(-0.51)	(-0.42)	(0.32)
Book leverage	2.081*	2.956*	0.132	0.156
	(1.83)	(1.83)	(1.36)	(1.60)
Return on assets	0.755	2.038	0.166	0.401***
	(0.39)	(0.97)	(0.87)	(2.98)
R&D/Total assets	4.861	-0.550	0.087	1.482*
	(0.84)	(-0.06)	(0.13)	(1.89)
Sales/Total assets	-0.081	0.862*	-0.060**	-0.036
	(-0.31)	(1.70)	(-2.02)	(-0.99)
PPE/Total assets	-0.187	-1.473	-0.044	0.293*
	(-0.19)	(-0.76)	(-0.42)	(1.92)
Stock past performance	-0.594**	-0.549*	-0.025	0.007
	(-2.11)	(-1.93)	(-1.30)	(0.43)
Stock return volatility	-7.737**	-4.560	-1.130***	0.179
	(-2.08)	(-1.11)	(-3.62)	(0.69)
Total institutional equity ownership	0.009	-0.004	0.000	-0.000
	(1.33)	(-0.56)	(0.19)	(-0.30)
Total institutional bond ownership	0.007	0.008	0.000	-0.000
	(0.84)	(1.01)	(0.31)	(-0.69)
Industry FE	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes
Cohort–by–Year FE	Yes	Yes	Yes	Yes
N	3,674	3,674	3,674	3,674

Table 7. Financial institution mergers: Dynamic treatment effects

This table shows the results from difference-in-differences regressions around the mergers of financial conglomerates, which increase the number of significant dual holders for treated companies. *Treated* is a dummy for firms that gain significant dual holder(s) following the mergers of their shareholders and bondholders. Control firms are matched with treatment firms on size, book-to-market, and past stock returns. $Year(t-3)$, $Year(t-2)$ $Year(t-1)$ are dummies indicating three, two, and one year prior to the merger event. $Year(t)$ is a dummy indicating the year of the merger event. $Year(t+1)$ and $Year(t+2)$ are dummies indicating one year and two years after the merger event, respectively. $Year(t >= 3)$ is a dummy indicating three years after the merger event and all years afterwards. Additional control variables include *Log(Total assets), Book-to-market ratio, Common ownership, Book leverage, Return on assets, R&D/Total assets, Sales/Total assets, PPE/Total assets, Stock performance, Stock return volatility, Institutional equity ownership,* and *Institutional bond ownership.* Industry fixed effect is by 2-digit SIC. Standard errors are clustered at the firm level and t-statistics are shown in parentheses.. ***, **, and * represent result significant at 1%, 5%, and 10% level, respectively.

Dependent variable	Option/TDC1		Current Vega/TDC1	
	(1)	(2)	(3)	(4)
Treat x Year(t-3)	-0.044	-0.416	0.024	-0.000
	(-0.16)	(-1.11)	(0.45)	(-0.00)
Treat x Year(t-2)	-0.238	-0.668*	0.040	0.008
	(-0.79)	(-1.73)	(0.74)	(0.18)
Treat x Year(t-1)	0.226	-0.030	0.019	-0.001
	(0.78)	(-0.08)	(0.33)	(-0.02)
Treat x Year(t)	0.264	-0.266	-0.014	-0.071
	(0.16)	(-0.16)	(-0.22)	(-1.15)
Treat x Year(t+1)	-0.978***	-1.445***	-0.117**	-0.132***
	(-3.13)	(-3.46)	(-2.08)	(-2.64)
Treat x Year(t+2)	-1.626***	-2.164***	-0.119**	-0.151***
	(-4.46)	(-4.74)	(-2.07)	(-2.86)
Treat x Year(t≥3)	-1.974***	-2.557***	-0.134**	-0.152***
	(-4.18)	(-4.85)	(-2.26)	(-2.78)
Treat	0.394		0.067	
	(1.19)		(1.20)	
Additional Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes
Cohort–by–Year FE	Yes	Yes	Yes	Yes
N	3,674	3,674	3,674	3,674

Table 8. Difference-in-differences regressions with partial asset sales of financial institutions

This table shows the results from difference-in-differences regressions around the partial asset sales of financial institutions, which reduce the number of significant dual holders for treated companies. *Treated* is a dummy for firms that lost significant dual holder(s) following the asset sales. Control firms are matched with treatment firms on size, book-to-market, and past stock returns. *Post* is a dummy that equals one for treatment firms for the years after the acquisition takes place, and zero otherwise. For control firms, $post_{i,t}$ is also set to one after the treatment firm it matches with experiences the asset sales. Common ownership is defined as the equity ownership held by financial institutions that cross-hold at least 5% equity in focal firm and another firm in the same industry (He and Huang 2017). Industry fixed effect is by 2-digit SIC. Standard errors are clustered at the firm level and t-statistics are shown in parentheses.. ***, **, and * represent result significant at 1%, 5%, and 10% level, respectively.

Dependent variable	Option/TDC1		Current Vega/TDC1	
	(1)	(2)	(3)	(4)
Treat x Post	3.846	4.539**	0.112	0.140**
	(1.56)	(2.35)	(1.51)	(2.00)
Treat	-0.829		-0.055	
	(-0.30)		(-0.62)	
Log(Total assets)	-0.329	0.468	0.015	0.066
	(-0.40)	(0.26)	(0.50)	(0.99)
Book-to-market ratio	-3.471	-2.058	-0.218***	-0.145**
	(-1.32)	(-1.02)	(-2.79)	(-2.50)
Common ownership	-0.029	-0.093	-0.001	0.000
	(-0.21)	(-0.76)	(-0.18)	(0.00)
Book leverage	-9.662	-2.740	-0.277	-0.160
	(-1.29)	(-0.36)	(-1.08)	(-0.59)
Return on assets	-32.327*	-15.097**	0.337	-0.030
	(-1.81)	(-2.04)	(0.78)	(-0.12)
R&D/Total assets	34.759	1.811	-0.929	2.447
	(0.84)	(0.03)	(-0.74)	(1.26)
Sales/Total assets	2.202	-1.074	-0.028	0.057
	(0.66)	(-0.46)	(-0.28)	(0.77)
PPE/Total assets	-7.215	1.952	-0.180	0.801**
	(-1.18)	(0.24)	(-0.98)	(2.13)
Stock past performance	-0.779	-1.091	-0.060	-0.019
	(-0.54)	(-1.04)	(-1.13)	(-0.43)
Stock return volatility	-25.622	4.608	-1.465**	-0.178
	(-1.27)	(0.29)	(-2.30)	(-0.34)
Total institutional equity ownership	0.017	0.017	-0.001	-0.000
	(0.41)	(0.51)	(-0.39)	(-0.30)
Total institutional bond ownership	0.027	0.059***	0.000	0.001
	(0.91)	(2.76)	(0.02)	(1.58)
Industry FE	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes
Cohort–by–Year FE	Yes	Yes	Yes	Yes
N	1,005	1,005	1,005	1,005

Table 9. Mutual funds voting pattern on compensation proposals

This table shows the pattern of mutual fund voting with regard to managerial compensation proposals. The dependent variable is a binary variable *vote_yes* indicating that a mutual fund votes in favor of a compensation proposal. Proposals are categorized into three groups: option-increasing, option-decreasing, and option-neutral. A proposal is option-increasing if the average $option/tdc1$ between year $t+1$ to $t+3$ is at least 110% of the average $option/tdc1$ between year $t-3$ and $t-1$. A proposal is option-decreasing if the average $option/tdc1$ between year $t+1$ to $t+3$ is less than or equal to 90% of the average $option/tdc1$ between year $t-3$ and $t-1$. The rest of the proposals are categorized as option-neutral. *Significant dual holder* is a dummy indicating that a mutual fund belongs to a financial conglomerate that is a significant dual holder of the company. *Relative bond exposure* is the ratio between an institutional investor's value of bond holdings and its total holdings value of the same firm. D(Top 10% in investor's portfolio) is an indicator for investor-firm pairs where an investor's holding value of the firm is in the top 10% in the investor's portfolio. D(Big 3 passive family) is an indicator for funds from Vanguard, BlackRock, or State Street. Standard errors are clustered at the financial institution level and t-statistics are shown in parentheses. ***, **, and * represent result significant at 1%, 5%, and 10% level, respectively.

Panel A						
Dependent variable: $Dummy(vote_yes)$						
Subsample of proposals	Option-increasing		Option-decreasing		Option-neutral	
	(1)	(2)	(3)	(4)	(5)	(6)
D(Significant dual holder)	-0.028**		0.019**		-0.003	
	(-2.35)		(2.17)		(-0.40)	
Relative bond exposure		-0.020**		0.017**		0.003
		(-2.01)		(2.11)		(0.34)
Family equity ownership	0.010***	0.009***	0.016***	0.016***	0.010***	0.010***
	(3.26)	(2.81)	(3.05)	(3.13)	(3.34)	(3.45)
Proposal FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
N	85,310	85,310	92,919	92,919	72,084	72,084
Panel B						
Dependent variable: $Dummy(vote_yes)$						
Subsample of proposals	Option-increasing		Option-decreasing		Option-neutral	
	(1)	(2)	(3)	(4)	(5)	(6)
D(Significant dual holder)	-0.001	-0.038**	0.018**	0.026**	-0.002	-0.007
	(-0.14)	(-2.34)	(2.12)	(2.38)	(-0.23)	(-1.31)
D(Significant dual holder)*D(Top 10% in portfolio)	-0.041**		0.050**		-0.001	
	(-2.17)		(2.02)		(-0.08)	
D(Significant dual holder)*D(Big 3 passive family)		0.034**		-0.028**		0.013
		(2.06)		(-2.02)		(0.58)
D(Top 10% in portfolio)	0.003		0.002		-0.009	
	(0.22)		(0.10)		(-0.63)	
Family equity ownership	0.009***	0.011***	0.016***	0.015***	0.010***	0.010***
	(2.98)	(3.52)	(3.05)	(3.01)	(3.32)	(3.45)
Proposal FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
N	85,310	85,310	92,919	92,919	72,084	72,084