The Value of Insider Selling: Trading Flexibility and Managerial Incentive Design

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Abstract

I study whether restrictions on insider selling affect managerial incentive design by exploiting the SEC's 2022 amendment to Rule 10b5-1. Using a difference-in-differences design, I compare firms with greater pre-amendment reliance on short-cooling-off plans with firms relying on longer-cooling-off plans. Following the amendment, the share of compensation awarded as options declines, as do managers' wealth sensitivity to stock-price volatility (vega) and pay-performance sensitivity (delta), while total compensation does not increase. These reductions in option awards, vega, and delta are concentrated among firms that relied most heavily on option-based compensation before the amendment. The findings are consistent with insider selling flexibility complementing option-based incentives and suggest that restrictions on managers' ability to monetize equity can affect the design of executive compensation.

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1 Introduction

Option-based compensation is intended to encourage managers to undertake projects with uncertain but potentially large upside. Yet the effectiveness of such incentives depends not only on the contractual payoff of the option, but also on the manager's exposure to the project's downside. If a risky project succeeds, options allow the manager to participate disproportionately in the increase in firm value. If it fails, however, the options may expire out of the money while the manager simultaneously suffers losses on existing stockholdings, unvested equity, and firm-specific human capital. Two managers receiving identical option grants may therefore face very different effective risk-taking incentives depending on their ability to reduce this preexisting firm-specific exposure before project uncertainty is resolved.

This observation shifts attention from the formal payoff schedule to the trading environment surrounding the contract. Managers generally value equity below its grant-date cost because their wealth and human capital are concentrated in the firm and their ability to monetize that exposure is limited. A predictable route to liquidity can partially protect existing firm-related wealth against unfavorable outcomes while preserving the convex upside provided by outstanding options. Selling flexibility is therefore part of the effective compensation package rather than merely a portfolio decision made after compensation has been awarded. When that flexibility declines, a firm can increase visible pay, allow the manager to bear greater uncompensated exposure, or redesign the mix of stock and options. The first response changes compensation levels; the last changes incentive shape. This paper asks which margin firms use.

Options provide convex exposure to favorable outcomes, but an under-diversified manager bears downside risks that diversified shareholders price differently (Lambert et al., 1991; Hall and Murphy, 2002). Planned selling can narrow this valuation wedge by allowing the manager to diversify accumulated stockholdings, finance option exercise and associated taxes, or reduce linear firm-specific exposure while retaining option upside. In this sense, selling flexibility and option-based compensation can be complementary instruments: planned sales

limit the manager's exposure in unfavorable states, while options preserve participation in favorable states. This mechanism operates through the ex ante ability to arrange liquidity and diversification before uncertainty is resolved; it does not require trading after the manager learns material nonpublic information. If this complementarity is economically important, tighter selling conditions should increase the effective cost of option incentives and lead firms to reduce option intensity and portfolio convexity rather than simply increase total pay.

I study this question using the Securities and Exchange Commission's 2022 amendment to Rule 10b5-1. The rule provides an affirmative-defense framework for trades arranged before execution. Before the amendment, it imposed no minimum delay between plan adoption and the first trade. The amendment introduced 90 day cooling-off periods after the plan adoption and tightened related plan to deter opportunistic use of the previous regime (U.S. Securities and Exchange Commission, 2022). I compare non-CEO managers at firms with high pre-period reliance on plans whose first trade occurred within 89 days of adoption with managers at firms that relied heavily on longer-cooling-off comparison plans. Both groups used planned sales and were exposed to the reform; they differed in prior reliance on the timing flexibility most directly constrained.

The results point to contract composition rather than a broad make-whole response. From the 2012–2019 baseline period to the 2023–2025 post period, short-cooling-off sale value fell by \$212,025 per manager-firm-year at treated firms relative to comparison firms. Option awards fell by 0.645 log points, option-award share fell by 4.1 percentage points, and portfolio vega fell by 0.291 log points. Total compensation, salary, and bonus show no corresponding increase in the preferred specification. The adjustment is concentrated in option intensity and convexity, not in the level of reported pay.

Two results connect the trading and contracting margins. Managers with greater option delta used planned-sale channels more intensively during the pre-period, consistent with planned selling helping managers monetize option-linked wealth. In the post period, the decline in option awards is larger at firms with greater predetermined option-trading depen-

dence. Together, the estimates indicate that planned-sale use and option-related contract outcomes move in the direction implied by complementarity.

The paper's contribution is to treat selling flexibility as an input into incentive design for options. In the standard contracting problem, the firm trades off incentive provision against the private cost borne by an under-diversified manager (Lambert et al., 1991; Hall and Murphy, 2002). The opportunity to monetize exposure changes that private cost. If flexibility has only an additive value, a binding participation constraint predicts higher visible pay when flexibility falls. If flexibility raises the private value of options relative to stock, the same restriction raises the effective cost of option incentives and shifts the compensation mix away from convexity. The evidence is consistent with the second comparative static. This interpretation concerns the composition of incentives and does not imply a welfare ranking.

The analysis uses a 2012–2025 panel of 19,556 manager-firm-year observations, 4,677 manager-firm relationships, and 439 firms. I focus on non-CEO managers because incentive systems extend beyond the unusually visible CEO contract. Treatment is assigned from firm-level stock-sale activity during 2012–2018. Treated firms have a short-cooling-off sale-value share above approximately 19.4 percent; comparison firms have a longer-cooling-off plan share above approximately 21.5 percent and do not qualify for treatment. The preferred specification compares changes within manager-firm relationships and includes fiscal-year and industry-year fixed effects, lagged controls, firm-level entropy weights, and standard errors clustered by firm. The intermediate period is 2020–2022, and the post period is 2023–2025.

The design identifies a differential response between two exposed groups, not the amendment's aggregate effect. Manager-firm fixed effects, industry-year effects, controls, and entropy weights absorb persistent and observed differences, but they do not eliminate mean reversion or time-varying differences correlated with prior plan use. The event-study leads also overlap the exposure-construction period. I therefore interpret the estimates as differential changes associated with pre-period exposure, with the contract evidence resting on

outcomes that do not determine treatment.

The paper contributes first to work connecting trading access and managerial compensation. Theoretical studies show that insider trading can enter the incentive problem and affect project choice, performance measurement, effort, and hedging (Dye, 1984; Bebchuk and Fershtman, 1994; Baiman and Verrecchia, 1995; Noe, 1997; Hu and Noe, 2001; Gao, 2010). Evidence on collars and equity swaps confirms that transactions outside the grant agreement can change effective ownership exposure (Bettis et al., 2001). Empirical studies of trading restrictions emphasize compensation levels or broad incentive strength (Hebner and Kato, 1997; Roulstone, 2003; Denis and Xu, 2013; Brenner, 2011; Henderson, 2011). I identify a different margin: option intensity and portfolio convexity change without a broad increase in reported pay. The direction complements Bourveau et al. (2024), who study how a pay reform affects insider trading; here, a change in trading conditions is associated with the form of pay.

Second, the paper extends the Rule 10b5-1 literature. Insider transactions reveal information in ways that depend on information asymmetry (Seyhun, 1986; Lakonishok and Lee, 2001; Jeng et al., 2003; Aboody and Lev, 2000; Cohen et al., 2012). Research on blackout policies and planned trades shows how plan design, cancellation, and execution timing shape trading opportunities (Bettis et al., 2000; Jagolinzer, 2009; Mavruk and Seyhun, 2016; Lenkey, 2019; Fich et al., 2023; Larcker et al., 2021; Hugon and Lee, 2016). The closest post-amendment studies examine insider behavior, disclosure, grant timing, and market response (Brochet et al., 2025; Ma, 2025; Divakaruni et al., 2026; Ye et al., 2025; Kim et al., 2026). I instead study annual option awards and portfolio vega among non-CEO managers, shifting the outcome from a transaction chosen by the insider to a compensation outcome jointly determined by the firm and manager. Tax-based variation in trading gains provides another reason to view the value of selling as part of the compensation environment (Goldman and Ozel, 2023).

Third, the results connect selling flexibility to the literature on incentive shape. Stock and

options generate different price and volatility sensitivities (Jensen and Murphy, 1990; Guay, 1999; Core and Guay, 2002; Edmans et al., 2012; Edmans, Gabaix, and Jenter, 2017), and option convexity is related to managerial risk choices (Coles et al., 2006; Shue and Townsend, 2017). Vesting and equity incentives are also associated with investment, repurchases, and reporting decisions (Edmans, Fang, and Lewellen, 2017; Ladika and Sautner, 2020; Moore, 2023; Bergstresser and Philippon, 2006; Burns and Kedia, 2006; Cheng and Warfield, 2005), while award timing can reflect managers' information environments (Yermack, 1997). The evidence adds monetization conditions to the formal payoff schedule and recorded holdings through which effective incentives are commonly measured.

The remainder of the paper proceeds as follows. Section 2 describes Rule 10b5-1 and the amendment. Section 3 develops the contracting predictions. Section 4 describes the sample and variables. Section 5 presents the empirical analysis, Section 6 evaluates robustness, and Section 7 concludes.

2 Institutional Background

2.1 Planned sales under Rule 10b5-1

Rule 10b5-1 addresses when trading "on the basis of" material nonpublic information can create liability under the federal securities laws. A person may rely on an affirmative defense when a trade follows a binding contract, instruction, or written plan adopted before the person became aware of such information. A qualifying plan specifies the amount, price, and date of future transactions, provides a formula or algorithm for determining them, or delegates execution without preserving later influence. The economic purpose is to separate the decision to trade from information that may arrive before execution (U.S. Securities and Exchange Commission, 2022).

The defense is conditional rather than an exemption from insider-trading law. Its availability depends on the circumstances of plan adoption, the plan's terms, the trader's subse-

quent conduct, and compliance with the rule. A manager who changes the amount, price, or timing of a trade can be treated as having modified or adopted a new plan. These features make plan design part of the manager's selling arrangement rather than a purely administrative label.

For managers with concentrated firm exposure, the 10b5-1 plan has value even when trades contain no informational advantage. Planned sales can provide liquidity, diversification, tax planning, and a predictable path for monetizing vested equity. Those functions matter because managers commonly hold stock, options, and firm-specific human capital that cannot be diversified as a public shareholder's portfolio can (Lambert et al., 1991). A plan can therefore affect the private value of compensation by changing when and how the manager may convert firm-linked wealth into cash.

Before the 2022 amendment, Rule 10b5-1 imposed no minimum interval between plan adoption and the first trade. Plan users could also retain discretion through cancellation or use plan features that weakened the separation between adoption and execution. Prior evidence documents strategic trading under the rule, the importance of cancellation, and substantial variation in plan design (Jagolinzer, 2009; Mavruk and Seyhun, 2016; Lenkey, 2019; Fich et al., 2023). Cooling-off length is one observable measure of that variation: a longer delay makes it harder to tailor a plan to information expected to remain private at execution.

Empirical work also shows why a planned-sale user is a more informative comparison than an insider who never adopts a plan (Jagolinzer, 2009; Fich et al., 2023). Plan use varies with trading needs, ownership, firm policy, and the manager's information environment. A no-plan firm may differ on all of those dimensions. Comparing two sets of firms with substantial planned sales narrows the institutional contrast to how the plans were used, although it cannot eliminate correlated differences in counsel, governance, or compensation practice.

2.2 The 2022 amendment

The SEC adopted the amendment on December 14, 2022, and the revised affirmative-defense conditions became effective on February 27, 2023. Directors and officers must generally wait 90 days after adopting or modifying a plan, or until two business days after the issuer discloses financial results for the fiscal quarter in which adoption occurred, subject to a 120-day cap. Other persons face a 30-day minimum. Because the paper studies named non-CEO managers who often hold officer positions, the 90-day boundary provides the economically relevant classification (U.S. Securities and Exchange Commission, 2022).

The chronology does not reduce to one date[1]. The SEC proposed the principal amendments in December 2021, adopted the final rule one year later, and made the new defense conditions effective in February 2023. Market participants could change legal advice or plan practice during proposal and adoption, while actual compliance for newly adopted or modified plans followed the effective regime. This sequence motivates separating 2020–2022 from both the earlier baseline and the 2023–2025 post period. It also means that an annual coefficient cannot distinguish informal anticipation from contemporaneous pandemic or market effects without additional variation.

The amendment also added certifications for directors and officers, strengthened the good-faith requirement, restricted overlapping and single-trade plans, and expanded issuer and insider disclosure. These provisions can affect all plan users, including those whose historical plans already had longer delays. They matter for interpreting the comparison group: the reform changed the broader planned-trading environment, not only one narrow category of sales. For officers and directors, the certification concerns the absence of material

[1]Public anticipation of changes to Rule 10b5-1 may have begun well before the SEC's formal proposal. On January 18, 2019, Reuters reported a bipartisan legislative initiative directing the SEC to study Rule 10b5-1 and consider additional restrictions, including mandatory cooling-off periods (Reuters, January 18, 2019). On June 7, 2021, *The Wall Street Journal* reported SEC Chair Gary Gensler's announcement that the Commission was preparing a proposal to tighten the rules governing 10b5-1 plans (The Wall Street Journal, June 7, 2021). These public signals may have prompted firms, insiders, and legal advisers to adjust plan practices before the amendments were formally proposed on December 15, 2021 and adopted on December 14, 2022. I therefore treat 2020–2022 as an intermediate period that may contain anticipation and partial adjustment, rather than as either a clean pre-reform period or the fully effective post-reform regime.

nonpublic information and the plan's good-faith purpose at adoption. The overlapping- and single-trade-plan restrictions constrain arrangements that preserve execution choice, while issuer disclosures add information about adoption, termination, and material terms. Because these provisions do not map cleanly into the transaction data, the empirical design centers on the observed adoption-to-trade interval.

The rule directly changes trading conditions rather than compensation contracts. It does not prescribe salary, grants, ownership targets, or portfolio sensitivities. This separation makes the setting useful for studying whether the opportunity to monetize equity enters the firm's incentive-design problem. If plan usability is an additive private benefit, tighter conditions may induce higher visible pay. If the value of plan access depends on the security being granted, the response can instead appear in the stock-option mix and in portfolio convexity. Compensation can adjust on a different calendar from plan use. Annual grants reflect board and compensation-committee decisions, while outstanding portfolio sensitivities also depend on vesting, exercise, expiration, and stock-price movements. Managers and firms could respond when the amendment was proposed, when it was adopted, or after its conditions became effective. A trading response concentrated after effectiveness can therefore coexist with an earlier or more gradual award response. The empirical design uses a pooled post period for average differences and annual coefficients to keep those timing patterns visible.

2.3 Empirical classification

I classify a planned stock or option transaction as short-cooling-off when the first trade occurs zero to 89 days after plan adoption. The comparison category contains classified Rule 10b5-1 transactions outside that window. The terms describe adoption-to-trade timing only. They do not characterize a transaction as informed, opportunistic, unlawful, or compliant with the amended rule.

Firm exposure is based only on stock-sale value during 2012–2018. A treated firm has

substantial reliance on short-cooling-off stock sales; a comparison firm has substantial reliance on longer-cooling-off planned stock sales and does not meet the treatment criterion. Option transactions do not determine group assignment. This separation is useful because later option outcomes can test the contracting mechanism without mechanically entering the exposure measure.

The non-CEO sample includes managers whose legal status can differ across firms and years. Many chief financial officers, operating officers, and other named executives are officers for securities-law purposes, but the transaction data do not provide a complete date-specific officer-status history. The 0–89-day category should therefore be read as exposure to a plan feature aligned with the officer rule, not as a claim that every retained manager faced the same legal minimum. This measurement choice preserves a consistent economic definition across the panel. The 89-day threshold maps closely to the amendment's 90-day floor for directors and officers, but it is not a legal safe-harbor boundary. The amended delay can extend beyond 90 days because of the earnings-disclosure condition, and the transaction data do not establish whether each manager was legally an officer on every date. The classification therefore measures pre-reform reliance on short adoption-to-trade delays, the plan feature most directly constrained by the new timing rule.

Earlier work uses broader concepts of problematic plan design. For example, Larcker et al. (2021) examine short cooling-off periods, single-trade plans, and plans adopted and first executed before the same quarter's earnings announcement. Other studies emphasize cancellation (Lenkey, 2019). The treatment indicator in this paper includes none of those additional features. Isolating one attribute keeps the empirical contrast transparent and avoids importing a legal or informational interpretation into the label.

Comparison firms remain exposed to the amendment. Their managers use the same planned-sale institution and may respond to the new certification, good-faith, overlapping-plan, single-trade, and disclosure provisions. The design therefore holds fixed revealed demand for planned selling more closely than a no-plan benchmark, while contrasting firms by

the pre-reform timing of that activity. The coefficient measures relative adjustment between two exposed groups.

2.4 Why trading flexibility can affect incentives

The amendment can affect compensation through the manager's private valuation of equity. A manager who expects to monetize exposure through a flexible plan may accept a different mix of stock, options, and cash from a manager who expects that exposure to remain illiquid. The effect need not be uniform across securities. Options preserve convex upside and can create a larger valuation wedge for an undiversified manager than stock. Planned selling can ease the portfolio burden surrounding option-linked wealth even when the plan is used to sell stock after exercise or to finance diversification elsewhere.

Three practical channels connect planned sales to option value. First, an exercised option produces shares and often a tax obligation; predictable sales can finance the exercise and the associated cash need. Second, a manager can sell part of an existing stock position while retaining option upside, thereby reducing linear concentration without eliminating convex exposure. Third, advance planning can coordinate liquidity with vesting, ownership requirements, and personal diversification. These channels do not imply that every sale is caused by an option grant. They imply that the value of an option-heavy package can depend on the broader technology available for converting firm-linked wealth into cash.

The relevant contracting response is therefore not necessarily a reimbursement for fewer transactions. A board can leave total compensation unchanged while reducing the share delivered through options, or it can preserve new grants while allowing accumulated vega to decline as older tranches are exercised or expire. Observing awards and portfolio sensitivities separately makes those margins distinguishable. It also keeps the empirical question centered on incentive design rather than on the information content of any particular trade. This channel differs from the information-content question that motivates much of the Rule 10b5-1 literature. Research on strategic plan use asks whether adoption and execution allow

insiders to profit from private information. The present question is whether access to a selling technology changes the private value of formal incentives. The mechanism can operate through ordinary liquidity and exposure management and does not require informed trading.

The timing of the empirical design follows the institutional sequence. The baseline period ends in 2019. Years 2020–2022 form an intermediate period that includes the pandemic, proposal, and adoption but precedes the effective regime. The post period begins in 2023. This convention avoids treating 2020 or 2021 as implementation years, although it cannot separately identify pandemic effects, anticipation, adoption, effectiveness, and compliance. The annual event study displays those dynamics directly. The setting thus provides a common reform with heterogeneous pre-period exposure to short-cooling-off planned sales. The next section formalizes when lower selling flexibility should raise visible pay, reduce option convexity, or produce a larger contract response where option-linked trading had been more important.

3 Theoretical Framework

Formal compensation and the manager's trading environment jointly determine the effective payoff from the job. A change in planned-selling flexibility can enter this payoff in two ways. It can remove an additive private benefit, shifting the participation constraint without changing the relative appeal of stock and options. Or it can change the manager's private value of particular securities. The second channel alters the effective cost of incentive instruments and can reduce option convexity without raising total pay.

This distinction combines three ideas from the contracting literature. Pay-performance sensitivity and portfolio risk are endogenous components of managerial contracts (Jensen and Murphy, 1990; Guay, 1999; Edmans et al., 2012; Edmans, Gabaix, and Jenter, 2017). Risk-averse managers value equity within an under-diversified portfolio and generally value nontradable options below their cost to diversified shareholders (Lambert et al., 1991; Hall

and Murphy, 2002). Trading and hedging opportunities outside the grant agreement can then alter both effective exposure and the contract that implements it (Baiman and Verrecchia, 1995; Noe, 1997; Hu and Noe, 2001; Gao, 2010; Bettis et al., 2001). The framework nests the familiar visible-pay response to tighter trading restrictions (Hebner and Kato, 1997; Roulstone, 2003; Denis and Xu, 2013; Brenner, 2011) and adds an instrument-specific margin.

3.1 Environment and contracting problem

There is one firm and one risk-averse manager. The manager is under-diversified because human capital, unvested awards, and accumulated equity wealth are tied to the firm. The firm chooses cash compensation C, stock exposure S, and option exposure O. Stock provides linear exposure to firm value; options add convexity. Empirically, delta measures price sensitivity and vega measures volatility sensitivity following Core and Guay (2002).

At date 0, the trading environment F and predetermined option-trading dependence D are given. A higher F represents greater flexibility to monetize and manage firm-linked exposure through planned sales. At date 1, the firm offers (C, S, O). The manager accepts and acts at date 2. Payoffs are realized and equity may be monetized subject to F at date 3. The amendment is represented as a decline in F that is larger for firms with greater prior reliance on short-cooling-off plans. The model takes this exposure as given rather than assuming that pre-period plan choice was random.

The manager's certainty equivalent is

$$\mathrm{CE}(C, S, O, e; F, D) = C + q_S(F)S + q_O(F, D)O + r(F) - R(S, O) - \psi(e). \tag{1}$$

The functions $q_S(F)$ and $q_O(F, D)$ are the private values per unit of stock and option exposure attributable to the monetization environment. The term $r(F)$ is an additive trading benefit, $R(S, O)$ is the portfolio cost of concentrated exposure, and $\psi(e)$ is the cost of effort.

Four assumptions organize the analysis.

Under-diversification and convex portfolio costs. The manager is risk averse: $R_S > 0$, $R_O > 0$, and $R(S, O)$ is locally convex. The marginal private cost of concentrated exposure rises with the size and interaction of stock and option positions. This assumption creates a wedge between the firm's resource cost and the manager's certainty-equivalent value. Without that wedge, the opportunity to monetize exposure would have little role in the compensation mix beyond transaction convenience.

Additive and instrument-specific value of flexibility. Flexibility weakly raises the private payoff, so $r'(F) \geq 0$, $q'_S(F) \geq 0$, and $q'_O(F, D) \geq 0$. The additive term captures liquidity or convenience that is independent of the security mix. The instrument-specific terms capture how monetization changes the value of holding stock or options. These gains may reflect diversification, tax planning, or conversion of exercised option wealth into cash; they require no information-based trading.

Relative option complementarity. Flexibility is more valuable at the margin for option exposure than for stock exposure:

$$q'_O(F, D) > q'_S(F). \tag{2}$$

This condition is the central economic assumption. Options preserve upside convexity while the manager remains exposed through stock, human capital, and the option position itself. A manager may value the ability to sell shares after exercise, finance taxes, or diversify the rest of the portfolio while retaining some option upside. Greater monetization flexibility can therefore raise the private value of an option-heavy package more than that of a stock-heavy package. The inequality is an assumption, not a mechanical implication of option convexity, and the empirical results test its relative prediction.

Partial substitutability in incentive provision. Stock and options each contribute to the firm's incentive objective. Let $\mathcal{I}(S, O) \geq \bar{I}(e)$ denote the incentive capacity required to implement the desired action, with $\mathcal{I}_S > 0$ and $\mathcal{I}_O > 0$. Locally, more of one instrument can reduce the amount of the other needed to meet the common incentive requirement. Partial substitutability does not make the instruments equivalent: stock provides linear exposure, whereas options add convexity and can affect risk choice differently.

The firm pays resource costs $p_S S$ and $p_O O$ and solves

$$\begin{aligned} \min_{C,S,O} \quad & C + p_S S + p_O O, \\ \text{subject to} \quad & \mathrm{CE}(C, S, O, e; F, D) \geq \bar{U}, \\ & \mathcal{I}(S, O) \geq \bar{I}(e), \end{aligned} \tag{3}$$

where $\bar{U}$ is the manager's reservation certainty equivalent. When participation binds and cash is an interior margin,

$$C^* = \bar{U} + \psi(e) + R(S, O) - q_S(F)S - q_O(F, D)O - r(F). \tag{4}$$

Substitution gives the effective cost of the equity mix:

$$K(S, O; F, D) = \bar{U} + \psi(e) - r(F) + [p_S - q_S(F)]S + [p_O - q_O(F, D)]O + R(S, O), \tag{5}$$

subject to the incentive requirement. Trading flexibility enters the contract through the resource cost net of the value the manager assigns to each instrument.

Equation (5) makes the contracting margin transparent. The firm pays p_j for an incentive instrument but receives a participation benefit equal to the value q_j that the manager assigns to it. A decline in flexibility lowers q_j and raises the instrument's effective cost. When the change is equal across stock and options, only the level of compensation need adjust. When the decline is larger for options, the cost-minimizing incentive mix shifts even if the total

accounting value of compensation does not rise.

The framework is local and reduced-form. The incentive constraint can summarize effort, risk choice, retention, or other actions. The comparative statics describe contract adjustment around the observed package and do not assign a welfare sign to lower vega. The empirical analysis first requires the reform to change the trading margin represented by F. Firms that historically relied on short delays should experience the largest contraction in such sales once the amended cooling-off conditions take effect.

Hypothesis 1: Trading response. Short-cooling-off planned-sale activity declines more after the amendment at firms with greater predetermined reliance on that plan feature.

This prediction concerns sale values, counts, and shares in Table 3; it does not require the transactions to contain private information.

3.2 Additive benefit and visible-pay benchmark

Suppose flexibility is valuable but separable from the equity mix: $r'(F) > 0$, while $q'_S(F) = q'_O(F, D) = 0$. The relative effective costs of stock and options are then invariant to F. Differentiating equation (4) yields

$$\frac{dC^*}{dF} = -r'(F) < 0. \tag{6}$$

A restriction, $dF < 0$, raises cash compensation when participation binds. Salary, bonus, or broad reported compensation can play the same participation or retention role empirically. This benchmark captures the substitution logic in prior evidence linking trading restrictions to reported pay.

The benchmark is conditional: visible pay need not rise when participation is slack, cash is constrained, or the firm permits the manager's certainty equivalent to change. Empirically, salary and bonus are the clearest cash counterparts to C, while total compensation captures the broader visible-pay response. Higher pay with stable option intensity favors the additive

channel; stable pay with lower option convexity favors instrument-specific complementarity.

3.3 Option complementarity and incentive shape

Under equation (2), a decline in F raises the effective cost of options more than the effective cost of stock. Consider a binding incentive frontier and write stock locally as $S = s(O)$, with $s'(O) < 0$. Normalize the units so that $s'(O) = -1$ at the initial contract, and let $M > 0$ be the second derivative of effective cost along the frontier. Differentiating the first-order condition for O gives

$$\frac{dO^*}{dF} = \frac{q'_O(F, D) - q'_S(F)}{M} > 0. \tag{7}$$

Greater selling flexibility supports more option exposure; tighter flexibility reduces it.

A two-instrument formulation clarifies the stock response. Let the Hessian of reduced contracting cost be

$$H = \begin{pmatrix} h & m \\ m & h \end{pmatrix}, \qquad 0 \leq m < h,$$

where positive m captures local substitution between stock and options. The comparative statics are

$$\frac{dS^*}{dF} = \frac{hq'_S - mq'_O}{h^2 - m^2}, \qquad \frac{dO^*}{dF} = \frac{hq'_O - mq'_S}{h^2 - m^2}. \tag{8}$$

Relative option complementarity implies

$$\frac{dO^*}{dF} - \frac{dS^*}{dF} = \frac{q'_O - q'_S}{h - m} > 0. \tag{9}$$

The signed prediction is relative: reduced flexibility shifts the contract away from options and convexity compared with stock and linear exposure.

The relative prediction has two empirical counterparts. Annual option awards and option-

award share measure whether the flow of newly granted compensation becomes less option intensive. Portfolio vega measures whether that change reaches the manager's accumulated exposure after accounting for current and prior awards. A decline in both objects is more consistent with a persistent change in incentive shape than a decline in one annual grant measure alone. Option delta need not fall with vega because the price and volatility sensitivities of an option portfolio vary differently with moneyness and maturity.

The level of stock exposure remains ambiguous. If the direct value of flexibility for stock is large, both instruments may decline, though options decline more. If direct and substitution effects offset, stock is unchanged. If substitution is strong, stock increases. Even along a binding incentive frontier,

$$dS = -\frac{\mathcal{I}_O}{\mathcal{I}_S} dO. \tag{10}$$

Replacement occurs in incentive units, not dollars or measured sensitivities. Because stock supplies linear wealth-performance sensitivity while options add convexity, less option exposure need not produce one-for-one stock awards or delta.

The stock response can therefore be positive, zero, or negative. The signed prediction concerns option awards, option-award share, and portfolio vega relative to stock-side exposure.

Hypothesis 2: Lower option intensity and convexity. After a reduction in planned-selling flexibility, option exposure falls relative to stock exposure. Option awards, option-award share, and portfolio vega decline, while the theory leaves the level of stock exposure unsigned. A broad increase in visible pay is not required.

Tables 5 and 6 evaluate this prediction using the flow of new option awards and portfolio vega accumulated across outstanding awards. Table 8 examines stock and cash adjustment. Prior evidence connecting option convexity to risk taking motivates the downstream tests (Coles et al., 2006; Shue and Townsend, 2017), but the model imposes no welfare sign.

3.4 Predetermined option-trading dependence

The complementarity mechanism has a cross-sectional implication. Let D measure the manager-firm's pre-period dependence on option-linked trading. Suppose dependence raises the sensitivity of private option value to flexibility:

$$\frac{\partial^2 q_O(F, D)}{\partial F \, \partial D} > 0, \qquad \frac{\partial^2 q_S(F)}{\partial F \, \partial D} = 0. \tag{11}$$

Holding local curvature fixed, differentiation of the option response gives

$$\frac{\partial^2 O^*}{\partial F \, \partial D} = \frac{h}{h^2 - m^2} \frac{\partial^2 q_O(F, D)}{\partial F \, \partial D} > 0. \tag{12}$$

For a negative flexibility shock, option exposure falls more at higher D. If contract curvature also varies with dependence, the cross-partial in private option value must dominate that curvature change.

Hypothesis 3: Option-dependence heterogeneity. The post-amendment decline in option exposure is larger for firms with greater pre-period option-trading dependence.

Predetermining D separates the measure from post-period grants but does not make it exogenous. The proxy may also capture legal advice, governance, compensation practices, or manager preferences. Table 7 tests the prediction.

Dependence is distinct from treatment exposure. Treatment measures reliance on short-cooling-off plans using stock-sale value; dependence measures the historical importance of option-related selling within total insider sales. The triple interaction asks whether the contract response is strongest where short-cooling-off exposure and option-linked monetization coincide.

The same mechanism yields a supporting pre-period implication: managers with more option-generated wealth should use planned-sale channels more intensively when those channels help monetize exposure. This relation need not be confined to short-cooling-off plans,

and it is an association rather than a causal effect of options on trading. Table 4 examines that link.

Firm policies lie farther downstream. A decline in option convexity can change incentives for risky actions, but policy also depends on stock exposure, career concerns, financing constraints, project availability, and concurrent shocks. Prior work links equity incentives and vesting to investment, repurchases, and reporting choices (Edmans, Fang, and Lewellen, 2017; Ladika and Sautner, 2020; Moore, 2023; Bergstresser and Philippon, 2006; Burns and Kedia, 2006; Cheng and Warfield, 2005). Tables 9 and 10 therefore report downstream associations without imposing signed predictions.

The three predictions call for a contraction in short-cooling-off sales, lower option intensity and portfolio vega relative to stock-side exposure, and a stronger option response where option-linked trading had been more important. Total compensation distinguishes incentive redesign from an additive make-whole response. The next section describes the sample and variable construction.

4 Data

The analysis combines SEC insider transactions with executive compensation, outstanding equity awards, market data, accounting information, governance, analyst coverage, and option-grant records. The unit of observation is a title-screened non-CEO manager-firm-year from 2012 through 2025. The final sample contains 19,556 observations, 4,677 manager-firm relationships, and 439 firms. Table 2 reports summary statistics, and Appendix Table A1 defines the variables and source conventions.

4.1 Data sources and manager sample

ExecuComp annual records form the manager-year backbone and provide manager identifiers, titles, total compensation, salary, bonus, and the grant-date fair values of stock and

option awards. The panel is ExecuComp-left: an otherwise eligible manager-year remains in the sample when no insider transaction is assigned to that manager. ExecuComp amounts reported in thousands are converted to dollars.

The transaction data are an all-insider SEC Form 4 panel linked to Compustat firms. I retain sale- and exercise-like stock and derivative transactions, assign them to fiscal years, and aggregate accepted transactions to the manager-firm-year. Because the transaction and compensation sources do not share a person identifier, I match reporting owners to ExecuComp managers within firm-year using normalized names after matching by CIK. The highest-scoring candidate is accepted when the name-similarity score exceeds 70 for within firm matching. Manager-years without an accepted transaction remain in the panel with trading measures equal to zero. Appendix Section A.1 reports the transaction waterfall and matching details. I exclude CEOs and titles containing chief executive, chairman or executive chairman, and president, except for simple vice-president designations. The screen removes some group, regional, and business-unit presidents who are not CEOs; the population is therefore best described as title-screened named executives below the CEO. It includes chief financial officers, operating officers without a screened president title, vice presidents, and other named managers.

The title-filtered panel contains 91,368 manager-firm-years at 2,666 firms. Applying the trading-based exposure definitions yields 26,077 eligible observations at 693 firms. Requiring complete pre-period values for the entropy-balancing variables produces the final 19,556-observation sample: 4,577 observations at 102 treated firms and 14,979 observations at 337 comparison firms. The panel is unbalanced because managers enter and leave coverage, change employers, and have outcome-specific missing values.

Additional sources provide portfolio sensitivities and covariates. ExecuComp records on outstanding awards supply option quantities, exercise prices, vesting status, and maturity. CRSP supplies stock prices and returns; Treasury rates supply the risk-free input to option valuation. Compustat provides accounting variables, BoardEx provides governance

measures, and IBES provides analyst coverage. Grants of Plan-Based Awards supply newly awarded option terms. CRSP, Compustat, and the KPSS patent data provide the downstream firm outcomes.

4.2 Planned sales and treatment exposure

A Rule 10b5-1 stock or option transaction is classified as a short-cooling-off transaction when the first trade occurs zero to 89 calendar days after plan adoption. A comparison-plan transaction is a classified planned transaction outside that window. Other insider sales are retained sale or exercise transactions not classified as Rule 10b5-1 activity. These categories describe adoption-to-trade timing, not motive, information content, legality, or compliance.

Treatment and comparison assignment use stock-sale value during 2012–2018. The short-cooling-off share divides short-cooling-off stock-sale value by total stock-sale value across short-cooling-off, comparison-plan, and other-insider sales. A firm is treated when this share is positive and above approximately 19.4 percent, the top quartile among positive shares. A firm enters the comparison group when its comparison-plan share is positive and above approximately 21.5 percent, the median among positive shares, provided it is not treated. Exact thresholds and formulas appear in Appendix Table A1.

Both groups used planned sales before the amendment. The contrast therefore compares firms by their prior reliance on the 0–89-day feature while holding fixed substantial demand for planned selling. It also selects firms from opposite tails of pre-period category shares. Fixed effects, entropy weights, and annual dynamics address observed and persistent differences but do not eliminate convergence following extreme-share assignment.

Annual trading outcomes are category sale value, transaction count, and sale-value share. Values and counts enter as $\ln(1 + x)$ where indicated; level values are retained for dollar magnitudes. The baseline period is 2012–2019, the intermediate period is 2020–2022, and the post period is 2023–2025. Because treatment uses 2012–2018 activity, the estimated 2015–2018 leads overlap the exposure-construction period rather than forming a holdout

sample.

4.3 Compensation and incentive measures

Annual compensation measures include total compensation, salary, bonus, and the grant-date fair values of stock awards and option awards. Stock-award share and option-award share scale each award component by total compensation when the denominator is valid. Dollar amounts enter as $\ln(1 + x)$; shares remain in levels. Table 2 shows that option compensation and planned sales are concentrated at zero, motivating the log-one-plus transformations and the parallel use of shares and level outcomes.

Portfolio sensitivities follow Core and Guay (2002) and Coles et al. (2006). Stock delta is the dollar change in stock wealth for a one-percent increase in the stock price. Option delta applies the same price change to outstanding options, and total delta is the sum of stock delta and option delta. Portfolio vega is the dollar change in option wealth for a one-percentage-point increase in stock-return volatility. New-grant measures use grant quantity, exercise price, expiration date, the CRSP price on or before the grant date, return volatility, and the risk-free rate. Annual option awards measure the flow of new option compensation; portfolio delta and portfolio vega reflect accumulated holdings.

Firm controls include log assets, leverage, return on assets, market-to-book, cash relative to assets, sales growth, prior 12-month stock return, return volatility, board independence, board interlock, and log analyst coverage. Continuous constructed variables are winsorized at the first and ninety-ninth percentiles where stated. Downstream outcomes include stock-return volatility, idiosyncratic volatility, R&D and capital expenditures scaled by assets, leverage, net leverage, cash holdings, patent count, and patent economic value.

5 Empirical Analysis

I first estimate how planned selling changes at firms with greater pre-amendment reliance on short-cooling-off plans. I then examine compensation composition, portfolio incentives, cross-sectional variation in pre-amendment option-trading dependence, and downstream firm outcomes. The design compares managers at firms with greater predetermined reliance on short-cooling-off planned sales with managers at firms that relied heavily on longer-cooling-off comparison plans. Both groups were subject to the Rule 10b5-1 amendment. The estimand is therefore a differential response to a common change in trading conditions.

I estimate

$$Y_{mft} = \alpha_{mf} + \gamma_t + \delta_{j(f)t} + \beta_I \left(Treat_f \times Intermediate_t\right) + \beta_P \left(Treat_f \times Post_t\right) + X'_{mft}\theta + \varepsilon_{mft}, \tag{13}$$

where Y_{mft} is an outcome for manager m, firm f, and fiscal year t. Manager-firm fixed effects α_{mf} absorb stable attributes of the employment relationship, fiscal-year effects γ_t absorb aggregate shocks, and industry-year effects $\delta_{j(f)t}$ absorb sector-specific changes. $Treat_f$ identifies firms above the short-cooling-off exposure threshold. $Intermediate_t$ covers 2020–2022, $Post_t$ covers 2023–2025, and 2012–2019 is the omitted period.

The coefficient β_P measures the entropy-weighted change from the baseline to 2023–2025 at high-exposure firms relative to the change at comparison firms. Trading models include lagged size, leverage, profitability, market-to-book, cash, sales growth, return, volatility, and analyst coverage as control variables. Compensation and incentive models add governance variables and the manager-firm exit rate. Standard errors are clustered by firm, the level at which exposure and weights are assigned. The intermediate coefficient β_I is descriptive: 2020–2022 includes pandemic conditions, changes in plan practice, the SEC proposal anticipation, and rule adoption, but predates the effective regime.

Manager-firm fixed effects make the comparison within observed employment relationships, while treatment and weights remain firm-level attributes. The identifying assumption

is that, conditional on fixed effects, controls, and weights, high-exposure and comparison firms would otherwise have experienced the same average changes. Opposite-tail assignment creates a specific threat to this assumption: treated firms are selected for high short-cooling-off shares, and comparison firms are selected for high longer-cooling-off shares. Fixed effects and entropy balancing address persistent levels and observed covariates, but they cannot rule out mean reversion or time-varying differences in legal advice, governance, and compensation policy.

I examine annual dynamics using

$$Y_{mft} = \alpha_{mf} + \gamma_t + \delta_{j(f)t} + \sum_{k \in \mathcal{K}} \beta_k \left(Treat_f \times \mathbf{1}\{t = k\} \right) + X'_{mft}\theta + \varepsilon_{mft}, \tag{14}$$

where $\mathcal{K} = \{2015, 2016, 2017, 2018, 2020, 2021, 2022, 2023, 2024\}$ and 2019 is omitted. The event-study sample contains 14,567 manager-firm-years, 3,868 manager-firm relationships, and 437 firms. Joint tests of the 2015–2018 coefficients yield $p = 0.105$ for option awards and $p = 0.470$ for portfolio vega. The corresponding values are $p = 0.058$ for short-cooling-off sale value and $p = 0.049$ for comparison-plan sale value. Stock delta, baseline-price stock delta, total compensation, and the vega-to-delta ratios reject at the five-percent level. Figure 1 displays the annual estimates, and Appendix Table A8 reports the coefficients and joint tests. Because the leads overlap the years used to construct exposure, they are not a holdout test of parallel trends.

Table 1 describes the treatment contrast. During 2012–2018, the mean short-cooling-off sale-value share is 0.348 at treated firms and 0.023 at comparison firms; the corresponding comparison-plan shares are 0.238 and 0.529. Treated firms also enter the analysis with lower total compensation and stock delta. Entropy weighting aligns the six targeted first moments and yields an effective comparison-firm sample of 275.397, but deliberately leaves the treatment-defining trading shares unbalanced.

5.1 Trading response

Short-cooling-off sales decrease in the intermediate period and contract sharply after the amendment. In the preferred specification, log sale value falls by 2.930 points, and the level estimate implies a $212,025 decline per manager-firm-year. Transaction counts fall by 0.289 log points, and short-cooling-off sales decline by 8.8 percentage points as a share of total insider sale value (Table 3). The level change is large relative to the treated group's baseline mean of approximately $223,000, although the log-one-plus coefficient should not be read as a constant percentage effect because many manager-years contain zero sales in this category.

Comparison-plan activity moves in the opposite direction. Log sale value rises by 2.296 points, the level specification increases by $1.11 million, transaction counts rise by 0.334 log points, and the sale-value share increases by 13.1 percentage points. The opposite movements across values, counts, and shares are consistent with reallocation away from short-cooling-off plans. Manager-year aggregation does not establish that the same manager substituted one type of plan for another, and the comparison-plan pre-trends counsel against interpreting these coefficients as a clean within-manager substitution effect. Other-insider sale value and count show smaller, imprecisely estimated increases of 0.235 and 0.089 log points, respectively (Appendix Table A3). The sharp differential movement is therefore concentrated in the two planned-sale categories. The annual estimates track the institutional sequence. Short-cooling-off sales change little in 2020 and 2021, begin falling in 2022, and contract most in 2023 and 2024. This timing is consistent with adjustment around proposal, adoption, and effectiveness, but the treatment-defining pre-period shares leave mean reversion as an alternative explanation. The result that survives this qualification is a large post-2022 differential contraction in the planned-sale margin most directly affected by the new cooling-off conditions.

5.2 Pre-period incentive exposure and planned selling

Planned selling is positively associated with option-generated price exposure before the amendment. During 2012–2018, a one-unit increase in lagged ln(1 + option delta) is associated with 0.282 additional log points of short-cooling-off sale value and 1.086 additional log points of comparison-plan sale value. Option delta also predicts transaction counts in both categories, whereas stock delta has smaller and less consistent associations (Table 4). Portfolio vega does not display the same positive association. Its coefficients are −0.085 for short-cooling-off sale value and −0.581 for comparison-plan sale value, with only the latter statistically different from zero. The contrast is consistent with planned selling serving the monetization of price exposure rather than volatility sensitivity itself.

These within-manager-firm regressions establish an economic link between vega, delta and planned selling, but they do not identify the direction of causality. Option delta is positively and significantly associated with planned-sale activity in both categories, with a substantially larger association for comparison-plan sales than for short-cooling-off sales. In contrast, portfolio vega is negatively associated with planned-sale value, with the negative relation statistically significant for comparison-plan sales. This pattern is consistent with planned selling being more closely related to the monetization of option-generated price exposure than to volatility sensitivity itself.

5.3 Compensation level and composition

The compensation level estimates provide little support for an additive make-whole response. The treatment-post coefficient for ln(1 + total compensation) is −0.061, and salary and bonus show no positive differential adjustment. Salary plus bonus and the cash share of pay are also nonpositive in the stock-side specifications. The confidence intervals do not establish an exact zero response, but the data contain no broad increase in reported compensation (Table 5).

Compensation composition changes more clearly. Option awards decline by 0.645 log

points, and the option-award share falls by 4.1 percentage points. The share decline exceeds one-quarter of the treated group's baseline mean of 15.5 percent. Stock awards rise by 0.584 log points and the stock-award share rises by 6.0 percentage points, although both estimates are significant only at the ten-percent level. Taken together, these estimates show a relative decline in option intensity more clearly than an offsetting increase in stock compensation.

The award coefficient combines changes in the likelihood of receiving an option grant with changes in positive award values, because many manager-years have no reported option award. The share measure supplies a common scale: lower option awards together with a smaller option-award share and no increase in total compensation locate the adjustment in the option component rather than in a proportional decline across the pay package. Annual estimates show that option awards begin falling in 2020, so the pooled post coefficient is best interpreted as a sustained relative decline with anticipation, not a discrete break at legal effectiveness.

5.4 Portfolio incentive shape

Accumulated portfolio exposure moves in the same direction as new awards. The treatment-post coefficient for ln(1 + portfolio vega) is −0.291, indicating lower recorded volatility sensitivity at treated firms relative to comparison firms (Table 6). The annual coefficients are −0.229 in 2020, −0.215 in 2022, −0.249 in 2023, and −0.353 in 2024. The joint lead test does not reject, but the movement beginning in 2020 again precludes a sharp 2023 interpretation (Figure 1).

Award flows and portfolio stocks need not move one for one. Outstanding options vest and expire over several years, exercises reduce the portfolio, and changes in prices or volatility alter Black–Scholes sensitivities without a new grant. The portfolio-vega estimate therefore shows that the award-composition result extends to measured portfolio convexity; it does not attribute the entire stock adjustment to contemporaneous grant policy. Price sensitivity does not decline comparably. The option-delta coefficient is 0.017 and the total-delta coefficient

is 0.154. Stock delta rises by 0.314 log points, with a similar estimate using baseline prices, but both stock-delta measures have unfavorable pre-trend tests and weaken under extended balance. The relative conclusion is that option convexity declines without a corresponding reduction in linear exposure, not that stock replaces options dollar for dollar.

Portfolio vega divided by total delta falls by 0.165, and portfolio vega divided by option delta falls by 0.267. These ratio estimates use only 4,930 and 4,954 observations with valid positive denominators, and their lead tests reject. Measurement also limits the portfolio estimates: unavailable sensitivity inputs are set to zero in many manager-years, so portfolio vega is a recorded-and-imputed measure. The separate ExecuComp award results reduce reliance on this construction but do not eliminate the coverage concern. The broader incentive-shape measures yield the same compositional pattern. Portfolio vega relative to stock delta, option delta, and total delta falls by 0.605, 0.308, and 0.586 log points, while stock delta's share of total delta rises by 5.6 percentage points and option delta's share falls by the same amount (Appendix Table A6). Within the smaller sample with portfolio-component coverage, portfolio vega falls by 0.530 log points; the decline appears in both exercisable and unvested option vega, at 0.551 and 0.415 log points, respectively (Appendix Table A7).

5.5 Predetermined option-trading dependence

The mechanism predicts a larger option response where option-linked selling mattered more before the amendment. I estimate

$$Y_{mft} = \alpha_{mf} + \gamma_t + \delta_{j(f)t} + \beta\,(Treat_f \times Post_t) + \phi\,(Post_t \times HighDependence_f) + \tau\,(Treat_f \times Post_t \times HighDependence_f) + X'_{mft}\theta + \varepsilon_{mft}. \quad (15)$$

High dependence equals one when the firm's 2012–2018 option-related insider-sale value as a share of total insider-sale value exceeds the positive median. The coefficient τ measures whether the post-period differential is larger among high-dependence firms. Option awards

decline by an additional 0.627 log points at high-dependence firms. Grant option value falls by an additional 1.092 log points, grant option count by 0.500, grant vega by 0.769, grant total delta by 0.852, and grant option delta by 0.793. Stock awards show no comparable interaction. The common direction across award value, quantity, and sensitivities is consistent with complementarity between option incentives and access to planned selling (Table 7). .

5.6 Stock-side adjustment

Lower option incentives are not matched by a broad increase in stock or cash. Stock awards, stock-award share, salary plus bonus, cash share, and unvested stock grants are imprecise in the interacted specification. At high-dependence firms, the interactions are -0.205 for stock awards and -0.019 for stock-award share; the cash-pay interactions are positive but imprecise. Grant total delta declines together with option sensitivities (Table 8). These estimates reject a simple dollar-for-dollar accounting transfer. Stock and options deliver different incentive sensitivities, and a contract can become less convex without replacing the reported value of options with a single alternative instrument. The results concern the composition of recorded incentives; they do not establish that boards maintained, or departed from, any particular optimal incentive level.

5.7 Downstream economic consequences

Firm policies respond to financing constraints, investment opportunities, product-market shocks, and many incentives beyond executive trading conditions. I therefore treat the firm-year outcome tests as descriptive extensions rather than causal estimates of compensation redesign. Average post coefficients for stock-return volatility, idiosyncratic volatility, R&D scaled by assets, and capital expenditures scaled by assets are small and imprecise (Table 9). At high-dependence firms, the interactions are -0.049 for stock-return volatility, -0.033 for idiosyncratic volatility, -0.024 for R&D/assets, and 0.015 for capital expenditures/assets. The first, third, and fourth estimates are significant at the ten-percent level. The opposing

R&D and capital-expenditure signs do not indicate a general contraction in risky investment.

Average changes in leverage, net leverage, cash holdings, patent count, and patent economic value are likewise imprecise (Table 10). High-dependence interactions are -0.088 for leverage and -0.100 for net leverage, while cash and innovation outcomes do not change precisely. Taken together, the downstream estimates are consistent with the changes in compensation composition and incentive shape documented above. The primary compensation results show that firms with greater exposure to the restriction on selling flexibility reduce option awards and option-award shares without increasing total compensation, while the portfolio results show a corresponding decline in vega without a comparable decline in overall price sensitivity. These changes are particularly pronounced among firms with high pre-period option-trading dependence. The firm-level outcomes in this same subsample move in a direction that is broadly consistent with a reduction in incentives for risk taking: stock-return volatility declines, R&D intensity falls, and both leverage and net leverage decrease. At the same time, capital expenditures increase and patent-based innovation measures do not decline significantly.

6 Robustness

Appendix Table A5 compares the preferred estimates across alternative exposure definitions, weights, samples, and fixed effects. The short-cooling-off trading coefficient remains negative in every specification. Option awards, the option-award share, and portfolio vega also retain negative signs across most alternatives, although their precision varies with comparison support and sample construction.

6.1 Dynamics and timing

The event-study diagnostics leave mean reversion unresolved for the treatment-defining outcomes. Joint lead tests yield $p = 0.058$ for short-cooling-off sale value and $p = 0.049$

for comparison-plan sale value; counts and shares produce similar evidence of differential pre-period movement. These paths weaken an interpretation that assigns the entire trading change to the amendment, even though the post-2022 contraction is economically large (Appendix Table A8).

The contract outcomes have more favorable pre-period dynamics. Joint leads yield $p = 0.105$ for option awards, $p = 0.206$ for option-award share, and $p = 0.470$ for portfolio vega. Stock delta, total compensation, and the principal vega-to-delta ratios reject at five percent. All leads overlap the exposure-construction period, however, so they test for differential movement within the selection window rather than in an independent pre-exposure sample.

Timing also differs across outcomes. Short-cooling-off sales change little in 2020 and 2021 and contract most in 2023–2024, whereas option awards and portfolio vega begin declining earlier. The incentive path may reflect pandemic-era changes, anticipatory adjustment, or a preexisting differential trend. The pooled estimates consequently measure a 2023–2025 differential relative to the baseline rather than a discontinuity at legal effectiveness.

6.2 Exposure, weighting, and fixed effects

Alternative exposure definitions preserve the direction of the main estimates. A positive-median treatment definition produces a short-cooling-off coefficient of -2.325, and continuous exposure also yields a negative trading coefficient. Under continuous exposure, the coefficients are -1.765 for option awards and -0.574 for portfolio vega, although the latter is imprecise. These specifications address sensitivity to discretization; because each uses pre-period trading activity, none removes the underlying mean-reversion concern.

Weight concentration does not drive the preferred estimates. The 337 comparison firms have an effective sample size of 275.397, which increases to 285.331 when weights are capped at the 95th percentile. After trimming, the option-award and portfolio-vega coefficients are -0.627 and -0.282, close to the preferred estimates. The matched sample preserves the short-cooling-off contraction and a negative portfolio-vega coefficient, but option awards

lose precision and comparison-plan sales change sign. In the unweighted sample, the trading coefficient remains negative while the option-award and portfolio-vega coefficients are imprecise. The trading response thus has broader comparison support than the compensation estimates.

Adding pre-period delta and vega to the entropy-balancing moments leaves 95 treated and 305 comparison firms. Portfolio vega remains -0.291, with a t-statistic of -1.820, and the option-award share remains negative at -0.046. Stock delta falls to 0.202 and becomes imprecise. These estimates preserve the decline in option intensity while weakening the increase in stock delta (Appendix Table A5).

Changing the fixed effects yields the same distinction. Without industry-year effects, the option-award and portfolio-vega coefficients are -0.226 and -0.131; with firm rather than manager-firm effects, they are -0.472 and -0.223. The coefficients remain negative but are not statistically distinguishable from zero. The short-cooling-off coefficient remains negative throughout the fixed-effect sequence. Stock delta remains positive, but its rejected pre-trend test limits the interpretation of that stability.

6.3 Manager composition and measurement

Continuing manager-firm relationships display a 0.768-log-point decline in option awards and a 4.7-percentage-point decline in the option-award share. Portfolio vega falls by 0.120 log points and becomes imprecise. Direct entry and exit measures show no differential post-period change (Appendix Table A4). Thus, turnover is unlikely to account for the award-composition result, while the portfolio estimate is more sensitive to retaining managers observed on both sides of the amendment.

Portfolio and grant coverage remain important measurement constraints. The portfolio regressions set unavailable delta and vega records to zero, and the unconditional grant regressions combine no-grant years with unmatched or unvalued grants. Among the 1,665 manager-firm-years with an observed option grant, grant option value declines by 0.373 log

points; grant vega, moneyness, and maturity do not change precisely. The grant evidence therefore speaks most clearly to award incidence and measured value, not to a redesign of every observed grant's terms.

Transaction attribution introduces a separate measurement limitation. Manager names are matched within firm-year blocks using fuzzy similarity scores, but the match has no hand-validated benchmark and has not been re-estimated under exact, stricter-threshold, or mutual-best rules. Manager-firm fixed effects absorb persistent match quality but cannot correct treatment misclassification or changing name coverage. Fiscal 2025 coverage is also not established as complete. Annual estimates through 2024 show that the main patterns do not arise solely from the final sample year, although an otherwise identical pooled specification ending in 2024 is unavailable.

7 Conclusion

An equity award is valuable to a manager partly because it can eventually be monetized. This paper examines whether tighter conditions on planned selling are associated with changes in the incentives firms provide. From the 2012–2019 baseline to 2023–2025, firms with high pre-period reliance on short-cooling-off plans experience a $212,025 differential decline in such sales per manager-firm-year. At the same firms, option awards fall by 0.645 log points, option-award share by 4.1 percentage points, and recorded portfolio vega by 0.291 log points. Total compensation, salary, and bonus do not rise.

The joint pattern is consistent with complementarity between selling flexibility and option incentives. An under-diversified manager values options differently from diversified shareholders, and opportunities to monetize concentrated exposure can narrow that valuation wedge. When those opportunities become less flexible, firms may reduce the option intensity and convexity of compensation rather than replace the lost value with more reported pay. The larger option response under the preferred measure of pre-period option-trading

dependence supports this interpretation.

The firm-level outcomes provide complementary evidence on the economic relevance of this adjustment. Among firms with high pre-period option-trading dependence, the decline in option incentives is accompanied by lower stock-return volatility, lower RD intensity, and lower leverage and net leverage. Capital expenditures increase, while patent quantity and patent economic value do not change precisely. The pattern therefore does not suggest a uniform contraction in investment or innovation. Rather, it is consistent with a shift toward a less risky mix of corporate policies in the firms where the reduction in option-based incentives is strongest. These downstream estimates are best interpreted as reinforcing the incentive mechanism rather than as separately identified causal effects of compensation redesign.

The broader implication is that the effective incentive content of equity compensation cannot be inferred from the contractual payoff alone. A manager's exposure to price and volatility also depends on the extent to which firm-specific wealth can be converted into liquidity and rebalanced over time. Two managers receiving identical option grants can therefore face different effective incentives when their opportunities to monetize accumulated equity differ. Trading conditions are consequently part of the economic environment in which compensation contracts are valued.

This perspective also changes how adjustments to executive compensation should be measured. Total reported pay can remain largely unchanged even when firms materially alter incentive provision. In this setting, the economically important response appears in the mix between stock and options and in the convexity of the manager's accumulated portfolio. Examining award flows, portfolio sensitivities, and monetization opportunities jointly therefore provides a more complete view of how formal compensation translates into effective managerial incentives.

The empirical design identifies differential changes between firms with different pre-amendment reliance on planned-selling arrangements, and the timing of some compensation adjustments precedes the rule's formal effective date. These features limit a sharp inter-

pretation of every coefficient as arising mechanically at implementation, but they do not alter the central empirical pattern: the firms most exposed to a reduction in selling flexibility experience a substantial contraction in the affected trading margin together with lower option-based compensation and lower portfolio convexity.

Trading opportunities are therefore not merely an activity that follows compensation design. They help determine the value of the compensation contract itself. More generally, understanding managerial incentives requires considering not only what securities managers receive, but also the conditions under which they can monetize and manage the exposure those securities create.

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Tables and Figures

Tables

Table 1: Sample Construction and Pre-Period Balance

Panel A: Analysis Sample					
Item	Value				
Treatment construction period	2012-2018				
Main DiD sample period	2012-2025				
Treatment firms	102				
Comparison firms	337				
Treated manager-firm-year observations	4,577				
Comparison manager-firm-year observations	14,979				
Manager-firm pairs	4,677				
Effective number of control firms after entropy weighting	275.397				
Panel B: Pre-Period Differences					
Variable	Treated mean	Comparison mean	Difference	t-statistic	SMD
Pre-Period Short-Cooling-Off Sale-Value Share	0.348	0.023	0.325	21.004	2.854
Pre-Period Comparison-Plan Sale-Value Share	0.238	0.529	-0.291	-12.737	-1.386
Pre-Period Option-Trading Share	0.293	0.324	-0.030	-0.746	-0.104
Option-Award Share	0.155	0.126	0.029	1.155	0.142
Stock-Award Share	0.279	0.334	-0.056	-1.899	-0.209
Ln(1 + Option Delta)	3.566	3.810	-0.244	-1.230	-0.170
Ln(1 + Total Delta)	4.039	4.348	-0.310	-1.694	-0.250
Ln(1 + Total Compensation)	14.139	14.441	-0.302	-2.907	-0.314
Ln(1 + Stock Delta)	2.212	2.786	-0.574	-3.066	-0.368
Ln(1 + Portfolio Vega)	3.095	3.401	-0.307	-1.530	-0.213
Panel C: Entropy Balance					
Variable	Treated mean	Raw control mean	Raw SMD	Balanced control mean	Balanced SMD
Ln(Assets)	21.478	21.774	-0.163*	21.478	-0.000
Market-to-Book	1.846	2.144	-0.191	1.846	-0.000
Lagged 12m Return Volatility	0.354	0.341	0.091	0.354	-0.000
Ln(Total Compensation)	14.154	14.420	-0.380***	14.154	-0.000
Board Independence	0.925	0.905	0.117	0.925	-0.000
Ln(Analyst Coverage)	2.233	2.456	-0.372***	2.233	0.000
Panel D: Top Industries by Firm Count					
Industry (SIC)	Firms				
Computer Programming and Data Processing (7370)	26				
Semiconductors and Related Devices (3674)	25				
Real Estate Investment Trusts (6798)	24				
Biological Products, Except Diagnostic Substances (2836)	20				
Prepackaged Software (7372)	16				
Pharmaceutical Preparations (2834)	13				
Apparel and Other Finished Textile Products (2300)	8				
Surgical and Medical Instruments and Apparatus (3841)	8				
Eating Places (5812)	8				
Special Industry Machinery, Not Elsewhere Classified (3559)	7				
Electromedical and Electrotherapeutic Apparatus (3845)	7				

Panel A summarizes construction periods and the 2012–2025 analysis sample. Panel B reports firm-level 2012–2018 pre-period differences. Panel C reports balance before and after weighting comparison firms to match treated firms on the listed first moments. Panel D reports the most represented four-digit SIC industries; all industries tied at seven firms are shown.

SMD is the treated-minus-control mean difference divided by the pooled standard deviation. Raw SMD uses unweighted controls; balanced SMD uses entropy weights. Stars are based on the corresponding difference t-statistic: * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

The unit is manager-firm-year except for firm-level construction and balance statistics. Treatment equals one for firms whose 2012–2018 short-cooling-off stock sale-value share is above the positive top quartile; comparison firms have positive comparison-plan stock sale-value share above the positive median. The effective number of control firms is $(\sum_f w_f)^2 / \sum_f w_f^2$, computed from the 337 unique control-firm weights; 275.397 is not an observation count.

Table 2: Summary Statistics

Variable	N	Mean	SD	P25	Median	P75	Min	Max
Panel A: Treatment and trading variables								
Pre-period short-cooling-off sale-value share	19,556	0.097	0.156	0.000	0.000	0.174	0.000	0.993
Pre-period comparison-plan sale-value share	19,556	0.464	0.247	0.295	0.432	0.634	0.000	1.000
Pre-period option-trading share	15,972	0.264	0.287	0.000	0.186	0.497	0.000	1.000
Short-cooling-off sale-value share	15,972	0.025	0.114	0.000	0.000	0.000	0.000	1.000
Comparison-plan sale-value share	15,972	0.201	0.313	0.000	0.000	0.385	0.000	1.000
Total insider sale value	19,556	4,053,712	9,122,900	64,662	703,007	3,442,406	0	90,566,902
Comparison-plan sale value	19,556	1,268,985	3,777,529	0	0	315,862	0	25,330,849
Short-cooling-off sale value	19,556	68,229	338,232	0	0	0	0	2,263,564
Ln(1 + comparison-plan sale value)	19,556	4.338	6.597	0.000	0.000	12.663	0.000	17.048
Ln(1 + short-cooling-off sale value)	19,556	0.851	3.276	0.000	0.000	0.000	0.000	14.632
Panel B: Compensation and incentive variables								
Ln(1 + total compensation)	18,742	14.589	0.868	14.045	14.590	15.142	11.996	17.007
Ln(1 + stock awards)	18,742	5.990	2.631	5.771	6.752	7.569	0.000	9.658
Ln(1 + option awards)	18,742	2.413	3.079	0.000	0.000	5.792	0.000	8.550
Stock-award share	18,742	0.413	0.255	0.239	0.419	0.601	0.000	1.000
Option-award share	18,742	0.098	0.161	0.000	0.000	0.154	0.000	0.988
Total delta, recorded values	10,058	160.657	363.446	25.903	64.054	158.497	0.003	6,248.404
Portfolio vega, recorded values	10,383	52.165	88.867	8.191	22.645	58.052	0.000	835.743
Ln(1 + total delta), unavailable set to zero	19,556	2.154	2.296	0.000	1.674	4.214	0.000	8.740
Ln(1 + stock delta), unavailable set to zero	19,556	2.492	1.667	1.226	2.633	3.650	0.000	8.329
Ln(1 + option delta), unavailable set to zero	19,556	1.931	2.113	0.000	1.222	3.779	0.000	7.653
Ln(1 + portfolio vega), unavailable set to zero	19,556	1.644	1.853	0.000	0.604	3.257	0.000	6.730
Panel C: Firm and governance variables								
Ln(assets)	19,475	22.061	1.705	20.874	21.936	23.178	17.946	26.607
Market-to-book	18,730	2.163	1.911	0.974	1.516	2.631	0.019	9.201
Lagged 12-month return volatility	19,111	0.373	0.166	0.254	0.335	0.452	0.137	1.071
Board independence	18,175	0.895	0.155	0.833	1.000	1.000	0.000	1.000
Ln(analyst coverage)	15,204	2.523	0.731	2.079	2.565	3.045	0.693	4.344

Notes: Statistics use the 2012–2025 non-CEO manager-firm-year analysis panel after treated and comparison assignment. Dollar values are annual manager-firm amounts. Continuous variables are winsorized at the 1st and 99th percentiles where indicated in the variable construction. Recorded total delta and portfolio vega report only available source values. The log sensitivity measures set unavailable records to zero; those zeros combine economic zeros with missing source records and are not verified no-option years. Appendix Table A1 defines all variables, sources, units, and missing-value conventions.

Table 3: Differential Changes in Planned-Sale Activity

	Ln(1+Short-Cooling-Off) Sale Value	Short-Cooling-Off Sale Value	Ln(1+Short-Cooling-Off) Sale Count	Short-Cooling-Off Share	Ln(1+Comparison-Plan) Sale Value	Comparison-Plan Sale Value	Ln(1+Comparison-Plan) Sale Count	Comparison-Plan Share
Panel A: Univariate Pre/Post Trading Changes								
Treated pre	2.624	222,798.639	0.271	0.098	2.627	471,328.550	0.313	0.117
Treated post	0.277	16,108.928	0.024	0.009	3.521	1,047,341.767	0.467	0.180
Treated change	-2.348***	-206,689.711***	-0.247***	-0.089***	0.894***	576,013.217***	0.153***	0.063***
Treated change t-stat	(-18.090)	(-15.416)	(-17.194)	(-15.196)	(3.924)	(4.821)	(4.508)	(5.049)
Control pre	0.467	31,392.695	0.046	0.012	4.329	971,900.331	0.549	0.233
Control post	0.132	8,353.716	0.011	0.003	3.434	897,864.945	0.440	0.175
Control change	-0.334***	-23,038.980***	-0.035***	-0.009***	-0.895***	-74,035.386	-0.109***	-0.058***
Control change t-stat	(-8.165)	(-6.303)	(-8.315)	(-6.834)	(-6.125)	(-0.988)	(-5.132)	(-7.019)
DiD difference	-2.013***	-183,650.731***	-0.212***	-0.080***	1.789***	650,048.603***	0.262***	0.121***
DiD t-stat	(-14.793)	(-13.215)	(-14.199)	(-13.367)	(6.611)	(4.609)	(6.540)	(8.099)
Panel B: Preferred DiD Regressions								
Treatment × Intermediate	-0.879**	-59,307.511	-0.074	-0.046***	1.511***	448,587.015**	0.214**	0.088***
	(-2.305)	(-1.381)	(-1.603)	(-2.952)	(2.664)	(1.986)	(2.508)	(2.642)
Treatment × Post	-2.930***	-212,024.874***	-0.289***	-0.088***	2.296***	1,110,667.749***	0.334***	0.131***
	(-5.296)	(-3.657)	(-5.105)	(-5.266)	(3.166)	(3.293)	(2.918)	(2.791)
Controls and included terms								
Lag Ln At	-1.066***	-111,591.870***	-0.115***	-0.035***	-0.566	149,908.039	-0.039	-0.010
	(-3.534)	(-2.754)	(-3.361)	(-3.113)	(-1.361)	(0.566)	(-0.652)	(-0.512)
Lag Leverage	-0.436	-153,842.271*	-0.046	-0.032	2.861***	595,854.215	0.399**	0.100*
	(-0.564)	(-1.795)	(-0.428)	(-1.180)	(2.723)	(0.836)	(2.352)	(1.846)
Lag Roa	0.333	77,441.676	0.118	0.015	3.318**	2,126,327.282**	0.552**	0.176**
	(0.365)	(0.715)	(0.974)	(0.392)	(2.300)	(2.308)	(2.487)	(2.315)
Lag Market To Book	-0.114	-15,800.055	-0.017*	-0.004	-0.014	140,455.564**	0.029*	0.003
	(-1.609)	(-1.471)	(-1.646)	(-1.544)	(-0.133)	(2.041)	(1.769)	(0.512)
Lag Cash Ratio	-1.401*	-202,873.336*	-0.037	-0.042	1.025	-4,517.678	0.241	0.057
	(-1.813)	(-1.891)	(-0.427)	(-1.236)	(0.863)	(-0.007)	(1.383)	(0.949)
Lag Sales Growth Yoy	0.048	37,128.804	0.002	0.003	-0.223	-112,456.576	-0.086*	-0.023
	(0.226)	(1.292)	(0.071)	(0.295)	(-0.863)	(-0.574)	(-1.871)	(-1.425)
Lag Return 12M	0.251	38,070.992**	0.048***	0.003	-0.199	33,281.815	-0.024	-0.017*
	(1.643)	(2.474)	(2.805)	(0.530)	(-0.952)	(0.278)	(-0.865)	(-1.728)
Lag Return Volatility 12M	0.745	105,945.875*	0.122**	0.037*	-0.981	-13,822.370	-0.141	-0.044
	(1.422)	(1.890)	(2.077)	(1.699)	(-1.313)	(-0.031)	(-1.398)	(-1.192)
Ln(Analyst Coverage)	0.769*	125,126.463***	0.089**	0.025**	1.719***	337,983.610	0.180**	0.035
	(1.748)	(2.888)	(2.246)	(2.360)	(3.271)	(1.227)	(2.265)	(1.080)
Observations	11,166	11,166	11,166	10,093	11,166	11,166	11,166	10,093
Manager-firm FE groups	2,464	2,464	2,464	2,287	2,464	2,464	2,464	2,287
R^2	0.018	0.016	0.016	0.014	0.011	0.009	0.013	0.010
Manager-firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel A reports entropy-weighted means for 2012–2019 and 2023–2025, the corresponding changes, and t-statistics; 2020–2022 is excluded from these comparisons. Panel B reports the preferred DiD regressions. Sale-value shares equal annual category sale value divided by annual total insider sale value across short-cooling-off, comparison-plan, and other-insider trades.

The sample is the 2012–2025 non-CEO manager-firm-year panel. Treatment is defined from the 2012–2018 short-cooling-off stock sale-value share; comparison firms are defined from the comparison-plan stock sale-value share. Intermediate covers 2020–2022 and Post covers 2023–2025. Regressions include manager-firm, fiscal-year, and industry-year fixed effects, the nine displayed trading controls, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics. The expanded-control preferred row in Table A5 differs slightly because it adds governance and composition controls.

Joint lead tests are mixed: $p = 0.058$ for short-cooling-off sale value, $p = 0.040$ for short-cooling-off count, $p = 0.051$ for short-cooling-off share, $p = 0.049$ for comparison-plan sale value, $p = 0.093$ for comparison-plan count, and $p = 0.041$ for comparison-plan share; see Table A8. Nonnegative values and counts are log-one-plus transformed where indicated. Continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table 4: Pre-Period Incentive Exposure and Planned-Sale Activity

	Ln(1 + Short-Cooling-Off Sale Value)	Ln(1 + Short-Cooling-Off Sale Count)	Ln(1 + Comparison-Plan Sale Value)	Ln(1 + Comparison-Plan Sale Count)
Lag Ln(1 + Option Delta)	0.282**	0.031*	1.086***	0.193***
	(1.975)	(1.930)	(4.630)	(5.279)
Lag Ln(1 + Stock Delta)	0.158*	0.014	0.058	-0.013
	(1.737)	(1.482)	(0.405)	(-0.718)
Lag Ln(1 + Portfolio Vega)	-0.085	-0.002	-0.581**	-0.103***
	(-0.692)	(-0.178)	(-2.277)	(-2.793)
Controls and included terms				
Lag Ln At	-0.069	0.007	-0.773	-0.087
	(-0.220)	(0.162)	(-1.449)	(-1.132)
Lag Leverage	0.110	0.044	0.964	0.091
	(0.142)	(0.446)	(0.661)	(0.428)
Lag Roa	-0.691	-0.001	-0.750	-0.026
	(-0.700)	(-0.011)	(-0.446)	(-0.116)
Lag Market To Book	0.027	0.006	-0.259	-0.018
	(0.221)	(0.406)	(-1.360)	(-0.635)
Lag Cash Ratio	-2.450**	-0.174	2.177	0.521**
	(-2.101)	(-1.313)	(1.371)	(2.295)
Lag Sales Growth Yoy	-0.036	0.001	0.191	-0.027
	(-0.151)	(0.029)	(0.536)	(-0.597)
Lag Return 12M	-0.075	0.010	-0.006	-0.006
	(-0.367)	(0.393)	(-0.024)	(-0.180)
Lag Return Volatility 12M	1.626**	0.065	0.172	-0.048
	(2.160)	(0.750)	(0.150)	(-0.299)
Ln(Analyst Coverage)	0.326	0.046*	0.050	-0.044
	(1.352)	(1.931)	(0.170)	(-0.963)
Board Independence	0.762	0.017	-1.938*	-0.334*
	(1.138)	(0.227)	(-1.843)	(-1.861)
Normalized Board Interlock	0.086	-0.006	-0.892	-0.027
	(0.267)	(-0.149)	(-1.628)	(-0.346)
Observations	6,240	6,240	6,240	6,240
Manager-firm FE groups	2,203	2,203	2,203	2,203
R^2	0.009	0.007	0.014	0.023
Manager-firm FE	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Entropy weights	No	No	No	No
SE clustered by firm	Yes	Yes	Yes	Yes

The table relates planned-sale activity to lagged accumulated incentive exposure during 2012–2018. Nonnegative sale and incentive variables are log-one-plus transformed.

The unweighted sample is the full non-CEO manager-firm-year pre-period panel, rather than only the treated-versus-comparison analysis sample. All models include manager-firm, fiscal-year, and industry-year fixed effects and the displayed controls; standard errors are clustered by firm. Coefficients are followed by firm-clustered t-statistics. The estimates are within-manager-firm associations and do not identify a causal effect of incentive exposure on sales. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table 5: Compensation Composition

	Ln(1 + Total Compensation)	Ln(1 + Salary)	Ln(1 + Bonus)	Ln(1 + Stock Awards)	Ln(1 + Option Awards)	Option-Award Share	Stock-Award Share
	-0.064	-0.204	-0.208	0.548*	-0.667**	-0.031**	0.046*
Treatment × Intermediate	(-1.171)	(-1.380)	(-0.616)	(1.903)	(-2.350)	(-1.987)	(1.819)
	-0.061	-0.338	-0.498	0.584*	-0.645**	-0.041***	0.060*
Treatment × Post	(-0.808)	(-1.619)	(-1.154)	(1.839)	(-2.150)	(-2.585)	(1.864)
Controls and included terms							
	0.164***	-0.010	0.041	0.409**	0.260	0.013	0.040**
Lag Ln At	(4.134)	(-0.225)	(0.123)	(2.133)	(1.487)	(1.334)	(2.268)
	-0.058	-0.129*	-0.473	-0.112	-0.415	-0.019	0.013
Lag Leverage	(-0.538)	(-1.787)	(-0.519)	(-0.215)	(-1.006)	(-0.709)	(0.292)
	0.111	-0.080	-0.117	-0.276	-0.090	0.039	0.059
Lag Roa	(0.912)	(-0.867)	(-0.149)	(-0.441)	(-0.158)	(0.967)	(1.040)
	0.033***	0.000	0.051	0.066*	0.077*	0.004	0.008**
Lag Market To Book	(3.614)	(0.033)	(0.677)	(1.697)	(1.820)	(1.435)	(2.146)
	0.105	0.147	1.008	-0.695	0.925*	0.071**	-0.074
Lag Cash Ratio	(0.988)	(1.324)	(1.083)	(-1.504)	(1.876)	(2.359)	(-1.629)
	-0.074***	-0.035	-0.349*	-0.312**	0.124*	0.008	-0.020*
Lag Sales Growth Yoy	(-2.753)	(-0.419)	(-1.765)	(-2.323)	(1.724)	(1.181)	(-1.652)
	-0.012	-0.011	-0.255	0.017	0.164**	0.020***	-0.008
Lag Return 12M	(-0.588)	(-0.617)	(-1.599)	(0.185)	(2.080)	(3.668)	(-0.856)
	0.133	0.151	-1.216	0.921	0.471	0.021	0.139**
Board Independence	(0.878)	(0.690)	(-1.059)	(1.383)	(0.801)	(0.813)	(2.010)
	-0.019	-0.007	-0.075	-0.144	-0.043	-0.004	0.004
Normalized Board Interlock	(-0.314)	(-0.059)	(-0.175)	(-0.598)	(-0.178)	(-0.272)	(0.193)
	-0.269***	-0.345***	-0.146	-0.815***	-0.012	0.010	-0.042*
Manager-Firm Panel Exit Rate	(-5.871)	(-6.605)	(-0.391)	(-3.448)	(-0.061)	(0.760)	(-1.951)
	0.067	-0.196	-1.372**	-0.062	0.827***	0.058***	-0.001
Ln(Analyst Coverage)	(1.468)	(-1.339)	(-2.472)	(-0.260)	(3.464)	(3.447)	(-0.071)
Observations	9,287	9,755	9,755	9,287	9,287	9,287	9,287
Manager-firm FE groups	2,148	2,227	2,227	2,148	2,148	2,148	2,148
R^2	0.028	0.024	0.012	0.016	0.033	0.050	0.015
Manager-firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Compensation levels are log-one-plus transformed. Award shares scale stock or option awards by total compensation.

The sample is the 2012–2025 non-CEO manager-firm-year panel. Intermediate covers 2020–2022 and Post covers 2023–2025. All models include manager-firm, fiscal-year, and industry-year fixed effects, the displayed controls including manager-firm panel exit rate, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics.

Joint lead tests are mixed: $p = 0.023$ for total compensation, $p = 0.116$ for stock awards, $p = 0.105$ for option awards, $p = 0.206$ for option-award share, and $p = 0.066$ for stock-award share; see Table A8. The total-compensation estimate therefore does not establish a zero effect. Continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table 6: Portfolio Incentive Sensitivities

	Ln(1 + Total Delta)	Ln(1 + Stock Delta)	Ln(1 + Stock Delta, Baseline Price)	Ln(1 + Option Delta)	Ln(1 + Portfolio Vega)	Portfolio Vega / Total Delta	Portfolio Vega / Option Delta
	0.046	0.090	0.092	-0.046	-0.206*	-0.014	-0.020
Treatment × Intermediate	(0.290)	(1.077)	(1.434)	(-0.333)	(-1.956)	(-0.365)	(-0.272)
	0.154	0.314**	0.323***	0.017	-0.291**	-0.165***	-0.267***
Treatment × Post	(0.741)	(2.525)	(3.006)	(0.099)	(-2.159)	(-3.939)	(-2.859)
Controls and included terms							
	-0.256**	-0.076	-0.105*	-0.228**	-0.083	0.129***	0.110**
Lag Ln At	(-2.472)	(-1.161)	(-1.668)	(-2.432)	(-1.068)	(3.644)	(2.412)
	-0.026	0.152	0.286**	0.002	-0.252	-0.167***	-0.197*
Lag Leverage	(-0.092)	(0.957)	(2.071)	(0.007)	(-1.218)	(-2.619)	(-1.926)
	0.205	0.075	-0.231	0.163	-0.170	-0.192**	-0.319*
Lag Roa	(0.546)	(0.315)	(-1.174)	(0.488)	(-0.646)	(-2.169)	(-1.909)
	-0.003	0.055***	0.019	-0.010	-0.013	-0.003	0.002
Lag Market To Book	(-0.092)	(3.144)	(1.119)	(-0.405)	(-0.646)	(-0.537)	(0.248)
	-0.786***	-0.041	-0.065	-0.575***	-0.316*	0.174***	0.261***
Lag Cash Ratio	(-2.930)	(-0.219)	(-0.411)	(-2.705)	(-1.907)	(2.599)	(3.593)
	0.040	0.036	0.022	0.046	0.049	0.003	-0.017
Lag Sales Growth Yoy	(0.449)	(0.819)	(0.523)	(0.580)	(0.839)	(0.175)	(-0.816)
	0.067	0.056	0.047	0.067	0.009	-0.024	-0.013
Lag Return 12M	(1.169)	(1.484)	(1.352)	(1.262)	(0.222)	(-1.583)	(-0.557)
	0.280*	-0.145*	-0.141	0.254**	0.204*	-0.061	-0.139**
Lag Return Volatility 12M	(1.887)	(-1.817)	(-1.630)	(2.023)	(1.840)	(-1.175)	(-2.457)
	-0.362	0.190	0.051	-0.055	0.441	0.058	-0.006
Board Independence	(-0.822)	(0.855)	(0.247)	(-0.140)	(1.361)	(0.569)	(-0.028)
	0.229	0.006	-0.067	0.124	0.081	-0.093*	-0.122
Normalized Board Interlock	(1.364)	(0.058)	(-0.778)	(0.839)	(0.675)	(-1.888)	(-1.589)
	-0.595***	-0.650***	-0.452***	-0.564***	-0.472***	0.013	0.092
Manager-Firm Panel Exit Rate	(-4.440)	(-7.174)	(-6.223)	(-4.985)	(-5.051)	(0.350)	(1.458)
	0.245*	0.175**	-0.043	0.377***	0.407***	0.027	-0.061
Ln(Analyst Coverage)	(1.799)	(1.975)	(-0.633)	(2.925)	(3.906)	(0.634)	(-1.044)
Observations	9,755	9,755	7,511	9,755	9,755	4,930	4,954
Manager-firm FE groups	2,227	2,227	1,528	2,227	2,227	1,255	1,259
R^2	0.011	0.029	0.021	0.013	0.017	0.050	0.038
Manager-firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Delta and vega are log-one-plus transformed. Unavailable sensitivity records are set to zero in the delta and vega columns. These values combine economic zeros with missing source records and must not be interpreted as true no-option years. Ratio columns use observations with the required recorded denominators.

The sample is the 2012–2025 non-CEO manager-firm-year panel. Intermediate covers 2020–2022 and Post covers 2023–2025. All models include manager-firm, fiscal-year, and industry-year fixed effects, the displayed controls including manager-firm panel exit rate, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics.

Joint lead tests are mixed: $p = 0.041$ for stock delta, $p = 0.021$ for baseline-price stock delta, $p = 0.153$ for option delta, $p = 0.470$ for portfolio vega, $p = 0.010$ for portfolio vega relative to total delta, and $p < 0.001$ for portfolio vega relative to option delta; see Table A8. Continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table 7: Heterogeneity by Pre-Period Option-Trading Dependence

	Ln(1 + Option Awards)	Ln(1 + Stock Awards)	Ln(1 + Grant Option Value)	Ln(1 + Grant Option Count)	Ln(1 + Grant Vega)	Ln(1 + Grant Total Delta)	Ln(1 + Grant Option Delta)
	0.139	0.234	0.278	0.157	0.193	0.284	0.210
Treatment × Post	(0.647)	(0.731)	(1.030)	(1.076)	(1.016)	(1.502)	(1.118)
	-0.627**	-0.205	-1.092**	-0.500**	-0.769**	-0.852***	-0.793**
Treatment × Post × High Option-Trading Dependence	(-2.042)	(-0.418)	(-2.199)	(-2.201)	(-2.205)	(-2.791)	(-2.280)
Controls and included terms							
	0.134	0.596**	0.420	0.060	0.284	0.371**	0.289
Post × High Option-Trading Dependence	(0.592)	(2.161)	(1.489)	(0.457)	(1.442)	(2.028)	(1.467)
	0.287*	0.383**	0.339	0.130	0.238	0.420*	0.249
Lag Ln At	(1.654)	(1.963)	(0.886)	(1.303)	(0.890)	(1.914)	(0.945)
	-0.575	-0.007	-0.158	-0.155	-0.186	0.042	-0.134
Lag Leverage	(-1.412)	(-0.014)	(-0.295)	(-0.632)	(-0.503)	(0.110)	(-0.365)
	-0.003	-0.295	-0.669	-0.542*	-0.498	-0.476	-0.443
Lag Roa	(-0.006)	(-0.477)	(-0.570)	(-1.652)	(-0.614)	(-0.727)	(-0.553)
	0.080*	0.070*	-0.006	0.025	0.001	0.056	0.001
Lag Market To Book	(1.884)	(1.765)	(-0.094)	(1.154)	(0.033)	(1.470)	(0.029)
	0.920*	-0.702	0.736	0.583**	0.568	0.196	0.530
Lag Cash Ratio	(1.848)	(-1.494)	(1.074)	(2.274)	(1.223)	(0.495)	(1.134)
	0.141*	-0.318**	0.258	0.129***	0.179	-0.005	0.175
Lag Sales Growth Yoy	(1.845)	(-2.308)	(1.492)	(2.830)	(1.492)	(-0.038)	(1.460)
	0.155**	0.018	0.126	0.002	0.087	0.057	0.089
Lag Return 12M	(1.987)	(0.190)	(0.998)	(0.052)	(0.987)	(0.694)	(1.024)
	0.279	-0.176	0.251	0.254**	0.078	0.093	0.129
Lag Return Volatility 12M	(1.613)	(-0.713)	(0.763)	(2.013)	(0.361)	(0.448)	(0.570)
	0.542	0.852	0.819	0.362	0.620	0.671	0.600
Board Independence	(0.863)	(1.234)	(1.087)	(0.903)	(1.165)	(1.392)	(1.139)
	-0.069	-0.133	-0.132	-0.172	-0.112	-0.049	-0.100
Normalized Board Interlock	(-0.286)	(-0.539)	(-0.346)	(-1.238)	(-0.426)	(-0.211)	(-0.379)
	-0.043	-0.789***	-0.116	0.051	-0.074	-0.371**	-0.086
Manager-Firm Panel Exit Rate	(-0.214)	(-3.344)	(-0.396)	(0.429)	(-0.365)	(-2.022)	(-0.426)
	0.840***	-0.082	0.152	0.272**	0.155	0.049	0.104
Ln(Analyst Coverage)	(3.542)	(-0.337)	(0.558)	(2.213)	(0.814)	(0.283)	(0.550)
Observations	9,287	9,287	9,755	9,755	9,755	9,755	9,755
Manager-firm FE groups	2,148	2,148	2,227	2,227	2,227	2,227	2,227
R^2	0.029	0.015	0.004	0.015	0.004	0.008	0.004
Manager-firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes

High Option-Trading Dependence equals one when the firm's 2012–2018 total option-related insider sale value divided by total insider sale value is above the positive median. Unavailable grant option value, count, and sensitivity records are set to zero. Those values combine economic no-grant years with unmatched or unvalued grants and must not be interpreted as verified no-grant years.

The sample is the 2012–2025 non-CEO manager-firm-year panel. All models include the estimable lower-order terms, manager-firm, fiscal-year, and industry-year fixed effects, the displayed controls, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics.

No triple-interaction event study is available, so the table does not establish parallel pre-period dynamics across treatment-by-dependence cells. Nonnegative outcomes are log-one-plus transformed and continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table 8: Stock-Side Alignment and Non-Replacement

	Ln(1 + Stock Awards)	Stock-Award Share	Ln(1 + Salary + Bonus)	Cash Share	Ln(1 + Unvested Stock Grants)	Ln(1 + Stock Delta)	Ln(1 + Stock Delta, Baseline Price)	Ln(1 + Grant Total Delta)
Treatment × Post	0.234	0.031	-0.239*	-0.028	0.273	0.309**	0.412***	0.284
	(0.731)	(0.891)	(-1.731)	(-1.409)	(1.446)	(1.984)	(3.380)	(1.502)
Post × High Option-Trading Dependence	0.596**	0.060*	-0.108	-0.036**	0.338**	0.112	0.013	0.371**
	(2.161)	(1.867)	(-1.179)	(-2.100)	(2.237)	(1.052)	(0.111)	(2.028)
Treatment × Post × High Option-Trading Dependence	-0.205	-0.019	0.201	0.039	-0.394	-0.139	-0.317*	-0.852***
	(-0.418)	(-0.394)	(1.331)	(1.328)	(-1.491)	(-0.701)	(-1.826)	(-2.791)
Controls and included terms								
Lag Ln At	0.383**	0.038**	0.016	-0.025**	-0.023	-0.080	-0.108*	0.420*
	(1.963)	(2.088)	(0.317)	(-2.278)	(-0.222)	(-1.235)	(-1.724)	(1.914)
Lag Leverage	-0.007	0.024	-0.163**	-0.020	-0.033	0.152	0.267*	0.042
	(-0.014)	(0.543)	(-2.091)	(-0.710)	(-0.111)	(0.981)	(1.958)	(0.110)
Lag Roa	-0.295	0.057	-0.096	-0.048	-0.445	0.073	-0.240	-0.476
	(-0.477)	(1.008)	(-1.188)	(-1.229)	(-1.383)	(0.305)	(-1.226)	(-0.727)
Lag Market To Book	0.070*	0.008**	0.002	-0.004	-0.061***	0.056***	0.017	0.056
	(1.765)	(2.215)	(0.325)	(-1.488)	(-2.750)	(3.164)	(1.043)	(1.470)
Lag Cash Ratio	-0.702	-0.073	0.205*	-0.013	-0.512**	-0.044	-0.065	0.196
	(-1.494)	(-1.591)	(1.784)	(-0.375)	(-2.401)	(-0.237)	(-0.411)	(0.495)
Lag Sales Growth Yoy	-0.318**	-0.022*	-0.028	0.016**	0.017	0.038	0.024	-0.005
	(-2.308)	(-1.732)	(-0.420)	(2.011)	(0.233)	(0.862)	(0.591)	(-0.038)
Lag Return 12M	0.018	-0.008	-0.007	-0.005	-0.033	0.055	0.049	0.057
	(0.190)	(-0.852)	(-0.378)	(-0.866)	(-0.655)	(1.455)	(1.444)	(0.694)
Lag Return Volatility 12M	-0.176	-0.026	0.109	0.012	0.051	-0.151*	-0.159*	0.093
	(-0.713)	(-1.149)	(1.125)	(0.634)	(0.388)	(-1.909)	(-1.876)	(0.448)
Board Independence	0.852	0.133*	-0.001	-0.066	-0.673	0.175	0.023	0.671
	(1.234)	(1.862)	(-0.006)	(-1.588)	(-1.551)	(0.788)	(0.115)	(1.392)
Normalized Board Interlock	-0.133	0.005	-0.067	0.013	-0.342**	0.009	-0.057	-0.049
	(-0.539)	(0.225)	(-0.894)	(0.773)	(-2.412)	(0.081)	(-0.664)	(-0.211)
Manager-Firm Panel Exit Rate	-0.789***	-0.039*	-0.364***	0.012	-1.038***	-0.650***	-0.460***	-0.371**
	(-3.344)	(-1.837)	(-5.954)	(0.916)	(-8.220)	(-7.281)	(-6.423)	(-2.022)
Ln(Analyst Coverage)	-0.082	-0.003	-0.190*	-0.037**	-0.191*	0.174*	-0.034	0.049
	(-0.337)	(-0.167)	(-1.677)	(-2.256)	(-1.717)	(1.952)	(-0.488)	(0.283)
Observations	9,287	9,287	9,755	9,287	9,287	9,755	7,511	9,755
Manager-firm FE groups	2,148	2,148	2,227	2,148	2,148	2,227	1,528	2,227
R^2	0.015	0.016	0.025	0.015	0.036	0.029	0.022	0.008
Manager-firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

High Option-Trading Dependence is the positive-median 2012–2018 firm-level measure used in Table 7. Cash compensation is salary plus bonus, and Cash Share scales that amount by total compensation. Unvested stock grants use the first reliable unvested-stock count or value source available in the panel.

The sample is the 2012–2025 non-CEO manager-firm-year panel. All models include the estimable lower-order terms, manager-firm, fiscal-year, and industry-year fixed effects, the displayed controls, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics.

The table tests whether option-related changes are matched by stock or cash compensation; it does not assume one-for-one replacement. Unavailable stock-delta and grant-delta source records are set to zero. Those values combine economic zeros with missing source records and are not verified no-stock or no-grant years. Nonnegative outcomes are log-one-plus transformed and continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table 9: Differential Changes in Firm Risk and Investment

	Stock Return Volatility	Idiosyncratic Volatility	R&D / Assets	CAPEX / Assets
Panel A: Average differential changes				
Treatment × Intermediate	-0.008	-0.008	-0.001	-0.001
	(-0.668)	(-0.641)	(-0.116)	(-0.304)
Treatment × Post	0.004	-0.002	-0.007	-0.000
	(0.261)	(-0.104)	(-0.869)	(-0.002)
Observations	2,764	2,764	1,970	2,943
Firms	342	342	232	342
R^2	0.040	0.038	0.122	0.073
Panel B: Heterogeneity by pre-period option-trading dependence				
Treatment × Post	0.035**	0.021	0.004	-0.008
	(1.988)	(1.248)	(0.527)	(-1.264)
Post × High dependence	-0.017	-0.019	0.010	0.002
	(-1.026)	(-1.258)	(1.276)	(0.599)
Treatment × Post × High dependence	-0.049*	-0.033	-0.024*	0.015*
	(-1.683)	(-1.209)	(-1.717)	(1.749)
Observations	2,764	2,764	1,970	2,943
Firms	342	342	232	342
R^2	0.053	0.047	0.126	0.092
Firm FE	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes

Notes: The regressions use the 2012–2025 firm-year panel. Panel A estimates average differential changes; Panel B interacts the post differential with the positive-median 2012–2018 total option-trading-share indicator used in Table 7. Stock-return and idiosyncratic volatility are constructed from CRSP daily returns; R&D and CAPEX are from Compustat and scaled by assets. Controls are lagged log assets, leverage, return on assets, market-to-book, cash, sales growth, stock return, return volatility where applicable, board independence, board interlock, and analyst coverage. Models include firm, fiscal-year, and industry-year fixed effects, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics. The outcomes belong to a family of nine downstream tests reported across Tables 9 and 10; no family-wise or false-discovery-rate adjustment is applied. The estimates do not identify welfare effects or a causal effect of compensation redesign on firm policy. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table 10: Differential Changes in Financing and Innovation

	Leverage	Net Leverage	Cash Holdings	Ln(1 + Patents)	Ln(1 + Patent Economic Value)
Panel A: Average differential changes					
Treatment × Intermediate	0.011	0.027	-0.017*	-0.015	0.057
	(0.810)	(1.584)	(-1.713)	(-0.189)	(0.505)
Treatment × Post	-0.000	0.018	-0.013	0.088	0.129
	(-0.011)	(0.822)	(-1.138)	(0.673)	(0.504)
Observations	2,947	2,947	2,947	2,484	2,484
Firms	342	342	342	342	342
R^2	0.076	0.080	0.034	0.028	0.033
Panel B: Heterogeneity by pre-period option-trading dependence					
Treatment × Post	0.040**	0.055*	0.000	-0.046	-0.117
	(2.028)	(1.834)	(0.018)	(-0.274)	(-0.375)
Post × High dependence	0.019	0.038*	-0.016	-0.247**	-0.388*
	(1.041)	(1.710)	(-1.418)	(-2.115)	(-1.746)
Treatment × Post × High dependence	-0.088***	-0.100**	-0.008	0.312	0.487
	(-2.815)	(-2.156)	(-0.436)	(1.365)	(1.089)
Observations	2,947	2,947	2,947	2,484	2,484
Firms	342	342	342	342	342
R^2	0.088	0.085	0.035	0.033	0.035
Firm FE	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes

Notes: The regressions use the 2012–2025 firm-year panel. Panel A estimates average differential changes; Panel B interacts the post differential with the positive-median 2012–2018 total option-trading-share indicator used in Table 7. Leverage, net leverage, and cash are from Compustat; patent count and economic value are from KPSS 2024 and assigned to fiscal years by filing date. Controls are lagged log assets, leverage where applicable, return on assets, market-to-book, cash where applicable, sales growth, stock return, return volatility, board independence, board interlock, and analyst coverage. Models include firm, fiscal-year, and industry-year fixed effects, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics. Patent data do not extend through fiscal 2025. The outcomes belong to a family of nine downstream tests reported across Tables 9 and 10; no family-wise or false-discovery-rate adjustment is applied. The estimates do not identify welfare effects or a causal effect of compensation redesign on firm policy. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

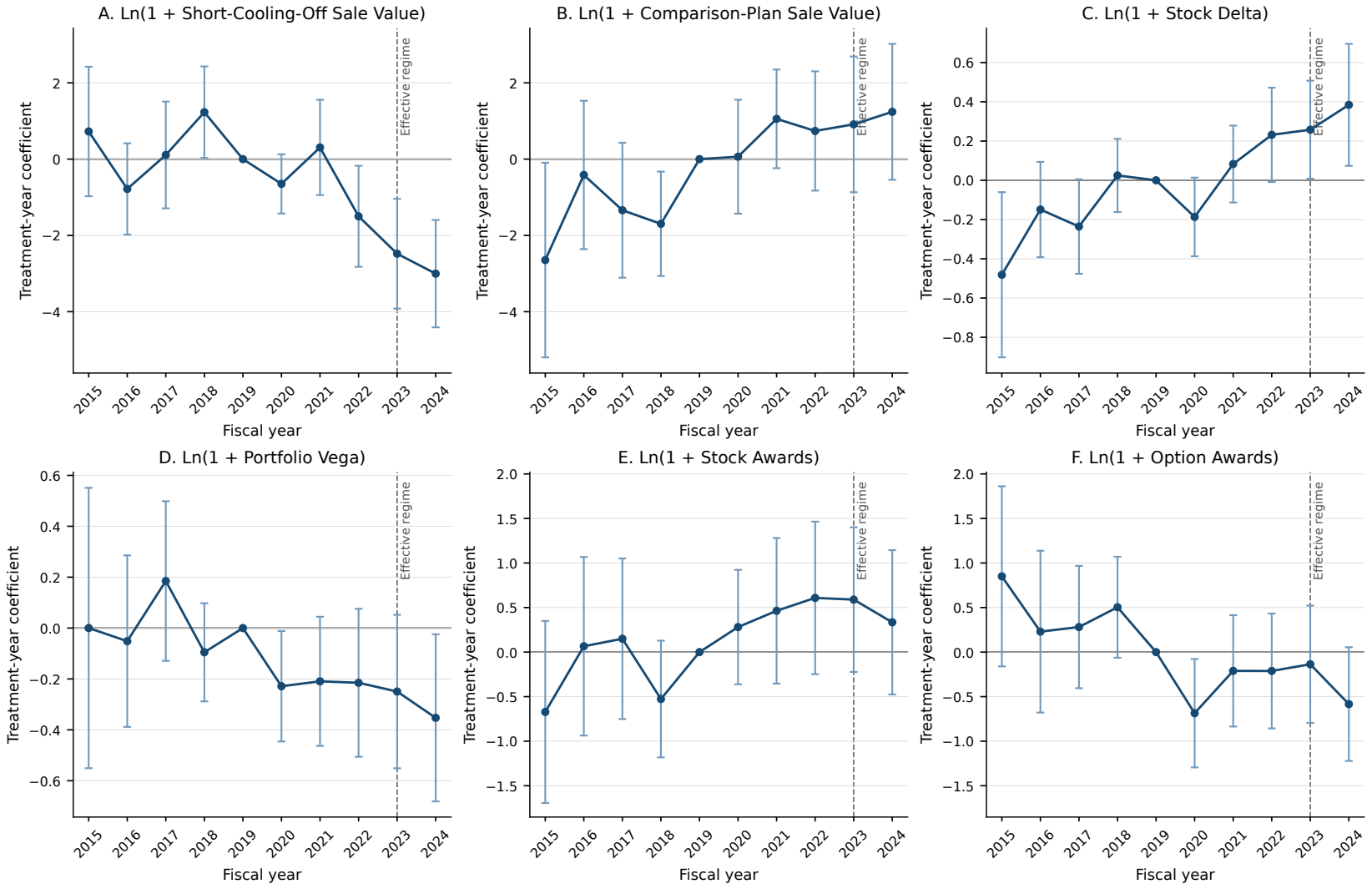


Figure 1: Event-Study Evidence on Trading and Incentive Design

Notes: The figure plots treatment-year coefficients and firm-clustered 95 percent confidence intervals for 14,567 manager-firm-year observations, 3,868 manager-firm groups, and 437 firms from 2015–2024. Treated firms have a 2012–2018 short-cooling-off stock-sale-value share above the positive top quartile. Comparison firms have a positive comparison-plan stock-sale-value share above the positive median and do not qualify for treatment. All models include manager-firm, fiscal-year, and industry-year fixed effects, outcome-specific controls, and firm-level entropy weights. The omitted year is 2019. The dashed vertical line identifies 2023, the first year in the amendment's effective regime. The 2015–2018 leads overlap the window used to construct treatment, so they are specification diagnostics rather than clean pretreatment balance tests. Panels A, B, E, and F use the transformations stated in their headings. Panels C and D set unavailable sensitivity records to zero; those values combine economic zeros with missing source records. Appendix Table A8 reports the underlying coefficients and joint tests of the 2015–2018 leads.

A Additional Diagnostics and Sensitivity Tests

A.1 Sample Construction and Matching Details

The upstream transaction file contains 2,830,413 SEC reporting-owner transaction rows. Retaining sale- and exercise-like stock and derivative transactions leaves 2,804,691 rows. Removing 453 transactions with negative adoption-to-trade delays leaves 2,804,238 rows; restricting to ExecuComp-linked firms leaves 1,878,938. Fiscal-year assignment produces 1,636,896 transaction-year rows. The manager-name procedure accepts 950,657 rows, or 58.08 percent, and these transactions aggregate to 110,306 manager-firm-years with at least one matched stock or option transaction. The analysis remains ExecuComp-left, so manager-years without an accepted transaction are retained with trading outcomes set to zero.

Manager names are matched within firm and fiscal year. Names are normalized before scoring, and the procedure combines weighted-ratio and token-sort similarity. The highest-scoring candidate is accepted only when the score is strictly greater than 70. Rejected and ambiguous transaction rows do not enter manager-level trading aggregates.

The sample builder contains 38,152 CEO manager-firm-years and 111,402 initially non-CEO manager-firm-years. The additional title screen removes 20,034 observations from the latter group: 2,235 for chief-executive titles, 2,747 for chairman or executive-chairman titles, and 15,052 for president titles other than vice president. This screen yields 91,368 title-filtered manager-firm-years.

The pre-selection file contains 2,523 firms. The short-cooling-off rule identifies 159 treated firms, and the comparison-plan rule identifies 607 potential comparison firms. Treatment takes precedence for the 73 firms that satisfy both rules, leaving 534 nonoverlapping comparison firms. Joining these firms to the title-screened manager panel produces 26,077 observations at 693 firms. Requiring complete pre-period values for the six entropy-balancing covariates yields 19,556 observations at 439 firms: 4,577 manager-firm-years at 102 treated firms and 14,979 manager-firm-years at 337 comparison firms.

Table A1: Variable Definitions and Construction Details

Variable	Construction / Formula	Source	Units
Panel A: Exposure, periods, and planned-sale outcomes			
Treated firm	Indicator equals one when the firm's 2012–2018 short-cooling-off stock sale-value share is positive and exceeds 0.194, the positive-sample top quartile. Treatment takes precedence over comparison status.	SEC Form 4 and plan dates	Firm indicator
Comparison firm	Indicator equals one when the 2012–2018 comparison-plan stock sale-value share is positive and exceeds 0.214, the positive-sample median, and the firm is not treated.	SEC Form 4 and plan dates	Firm indicator
Short-cooling-off transaction	Rule 10b5-1 stock or derivative transaction whose first trade occurs 0–89 calendar days after plan adoption.	SEC Form 4 and plan dates	Transaction classification
Comparison-plan transaction	Classified Rule 10b5-1 stock or derivative transaction whose first trade occurs outside 0–89 days after adoption.	SEC Form 4 and plan dates	Transaction classification
Category sale value	Sum of transaction sale value within short-cooling-off, comparison-plan, or other-insider category.	SEC Form 4	Dollars; levels and $\ln(1+x)$
Category sale count	Count of accepted transaction records within category and manager-firm-year.	SEC Form 4	Count; $\ln(1+x)$
Category sale-value share	Category sale value divided by total insider sale value across short-cooling-off, comparison-plan, and other-insider sales.	SEC Form 4	Fraction in $[0,1]$
Total insider sale value	Sum of short-cooling-off, comparison-plan, and other-insider sale value.	SEC Form 4	Dollars
Pre-period option-trading share	Firm-level 2012–2018 option-related insider-sale value divided by total insider-sale value.	SEC Form 4	Fraction in $[0,1]$
High option-trading dependence	Equals one when the firm's positive pre-period option-trading share exceeds the positive-sample median.	SEC Form 4	Firm indicator
Alternative dependence	Median split of a pre-period composite built from total option-trading share, option-award share, option vega, and option delta.	SEC Form 4; ExecuComp	Firm indicator
Baseline period	Fiscal years 2012–2019.	Constructed	Indicator set
Intermediate period	Indicator equals one in fiscal years 2020–2022.	Constructed	Indicator
Post period	Indicator equals one in fiscal years 2023–2025.	Constructed	Indicator
Panel B: Compensation and award composition			
Total compensation	TDC1 multiplied by 1,000 to convert reported thousands to dollars.	ExecuComp annual	Dollars; $\ln(1+x)$
Salary	Salary multiplied by 1,000.	ExecuComp annual	Dollars; $\ln(1+x)$
Bonus	Bonus multiplied by 1,000.	ExecuComp annual	Dollars; $\ln(1+x)$
Stock awards	Grant-date fair-value measure, with the retained historical award-field fallback when required, multiplied by 1,000.	ExecuComp annual	Dollars; $\ln(1+x)$
Option awards	Grant-date fair-value measure, with the retained historical award-field fallback when required, multiplied by 1,000.	ExecuComp annual	Dollars; $\ln(1+x)$
Stock-award share	Stock-award dollars divided by TDC1 dollars when TDC1 is valid.	ExecuComp annual	Fraction; level
Option-award share	Option-award dollars divided by TDC1 dollars when TDC1 is valid.	ExecuComp annual	Fraction; level
Salary plus bonus	Salary dollars plus bonus dollars.	ExecuComp annual	Dollars; $\ln(1+x)$
Cash share	Salary plus bonus divided by TDC1 dollars when TDC1 is valid.	ExecuComp annual	Fraction; level
Unvested stock grants	First reliable unvested-stock count or value field available in the source records.	ExecuComp outstanding awards	$\ln(1+x)$
Panel C: Portfolio incentives and new option grants			
Stock delta	Shares held times stock price times 0.01, under the retained Core–Guay construction.	ExecuComp; CRSP	\$000; $\ln(1+x)$

Continued on next page

Appendix Table A1 continued

Variable	Construction / Formula	Source	Units
Option delta	Black–Scholes delta times option quantity and stock price times 0.01, aggregated across outstanding tranches.	ExecuComp; CRSP; Treasury rates	\$000; $\ln(1+x)$
Total delta	Stock delta plus option delta.	ExecuComp; CRSP	\$000; $\ln(1+x)$
Portfolio vega	Black–Scholes vega times option quantity, scaled to a 0.01 volatility change and aggregated across tranches.	ExecuComp; CRSP; Treasury rates	\$000; $\ln(1+x)$
Baseline-price stock delta	Recomputes stock delta using the first available 2012–2018 price for the manager-firm relationship when available.	ExecuComp; CRSP	\$000; $\ln(1+x)$
Vega-to-delta ratios	Portfolio vega divided by total delta or option delta.	Constructed	Level ratio
Grant option value	Black–Scholes value using grant quantity, exercise price, grant-date stock price, volatility, risk-free rate, and remaining maturity.	Grants of Plan-Based Awards; CRSP; Treasury rates	Dollars; $\ln(1+x)$
Grant option count	Sum of option quantity across valid new grants in the fiscal year.	Grants of Plan-Based Awards	Count; $\ln(1+x)$
Grant vega	Black–Scholes vega times grant quantity, scaled to a one-percentage-point volatility change.	Grants of Plan-Based Awards; CRSP; Treasury rates	Dollars; $\ln(1+x)$
Grant total delta	Grant option delta plus grant stock delta where both components are constructed.	Grants of Plan-Based Awards; ExecuComp; CRSP	Dollars; $\ln(1+x)$
Grant option delta	Black–Scholes delta times grant quantity and stock price times 0.01.	Grants of Plan-Based Awards; CRSP; Treasury rates	Dollars; $\ln(1+x)$
Grant moneyness	Exercise price divided by the CRSP price on or before the grant date; log moneyness is its natural logarithm.	Grants of Plan-Based Awards; CRSP	Ratio; level or log
Grant maturity	Expiration date minus grant date, divided by 365.25.	Grants of Plan-Based Awards	Years
Unconditional grant set	Valid grant measures enter at constructed values; all other manager-years enter zero before $\ln(1+x)$.	Constructed	$\ln(1+x)$ or level
Panel D: Firm, governance, and analyst controls			
Log assets	Natural logarithm of Compustat assets in the fiscal-year control panel.	Compustat	Natural log
Leverage	Retained Compustat leverage measure based on short- and long-term debt scaled by assets.	Compustat	Ratio
Return on assets	Retained fiscal-year profitability measure scaled by assets.	Compustat	Ratio
Market-to-book	Fiscal-year measure constructed from final-quarter balance-sheet and trailing-twelve-month inputs.	Compustat; CRSP	Ratio
Cash ratio	Cash and short-term investments divided by assets in the retained fiscal-year panel.	Compustat	Ratio
Sales growth	Year-over-year change in trailing-twelve-month sales relative to prior sales.	Compustat	Ratio
Stock return	Buy-and-hold return over the 252 trading days ending before fiscal-year end.	CRSP daily	Decimal return
Return volatility	Annualized standard deviation of daily returns over the 252 trading days ending before fiscal-year end.	CRSP daily	Annualized decimal
Board independence	Independent directors divided by covered directors.	BoardEx	Fraction
Board interlock	Normalized measure of directors' interlocking board relationships.	BoardEx	Normalized level
Analyst coverage	Natural logarithm of the retained IBES analyst-count measure.	IBES	Natural log
Manager exit rate	Share of covered managers absent from the firm's next observed year.	ExecuComp panel	Fraction
Panel E: Robustness and sample indicators			
Continuing manager	Indicator used to retain continuing manager-firm relationships in Appendix Table A4.	ExecuComp panel	Indicator
Manager entry	Indicator for first manager appearance relative to the preceding observed firm-year.	ExecuComp panel	Indicator or firm-year rate

Continued on next page

Appendix Table A1 continued

Variable	Construction / Formula	Source	Units
Manager exit	Indicator for manager absence in the next observed firm-year.	ExecuComp panel	Indicator or firm-year rate
Positive-median treatment	Treated when the positive 2012–2018 short-cooling-off share exceeds its positive-sample median.	SEC Form 4	Firm indicator
Continuous exposure	Firm's 2012–2018 short-cooling-off stock sale-value share interacted with Post.	SEC Form 4	Fraction
Entropy weight	Positive firm weights reproduce treated means of log assets, market-to-book, return volatility, total compensation, board independence, and analyst coverage; treated firms receive weight one.	Constructed	Firm weight
Trimmed entropy weight	Comparison-firm entropy weights capped at 0.570, the 95th percentile of positive comparison weights.	Constructed	Firm weight
Matched sample	Retained matched treated and comparison firms from the propensity-score specification.	Constructed	Sample indicator
Panel F: Downstream firm outcomes			
Stock-return volatility	Standard deviation of CRSP daily stock returns within the fiscal-year window.	CRSP daily	Decimal volatility
Idiosyncratic volatility	Standard deviation of residuals from a daily market model using CRSP value-weighted market returns; demeaned raw-return fallback when the market return is unavailable.	CRSP daily	Decimal volatility
R&D/assets	Annual R&D expense divided by lagged assets, with current assets used only when lagged assets are unavailable.	Compustat annual	Ratio
CAPEX/assets	Annual capital expenditures divided by lagged assets, with current assets used only when lagged assets are unavailable.	Compustat annual	Ratio
Leverage outcome	Short- plus long-term debt divided by assets.	Compustat annual	Ratio
Net leverage	$(\mathrm{DLTT}+\mathrm{DLC}-\mathrm{CHE})/\mathrm{AT}$; missing debt and cash components are set to zero when assets are valid.	Compustat annual	Ratio
Cash holdings	CHE/AT.	Compustat annual	Ratio
Patent count	Count of KPSS patents assigned by filing date, with issue date used when filing date is missing.	KPSS 2024	$\ln(1+x)$ in regressions
Patent economic value	Sum of KPSS real patent value (`xi_real`) assigned by filing date, with issue-date fallback.	KPSS 2024	$\ln(1+x)$ in regressions

Notes: Continuous constructed variables are winsorized at the 1st and 99th percentiles where indicated. Unavailable portfolio sensitivities and unmatched grant records are set to zero before the log-one-plus transformation; these values are not verified economic zeros. Appendix Section A.1 describes the sample construction.

Table A2: Entropy Balance and Weight/Overlap Diagnostics

Variable	Treated mean	Raw control mean	Raw SMD	Weighted control mean	Weighted SMD
Panel A: Balance on targeted pre-period first moments					
Ln(assets)	21.478	21.774	-0.163	21.478	-0.000
Market-to-book	1.846	2.144	-0.191	1.846	-0.000
Lagged 12-month return volatility	0.354	0.341	0.091	0.354	-0.000
Ln(total compensation)	14.154	14.420	-0.380	14.154	-0.000
Board independence	0.925	0.905	0.117	0.925	-0.000
Ln(analyst coverage)	2.233	2.456	-0.372	2.233	0.000
Panel B: Overall firm-weight concentration					
Nominal treated firms					102
Nominal control firms					337
Maximum control-firm weight					0.977
95th percentile control-firm weight					0.570
Control firms above 95th percentile					17
Effective number of control firms					275.397
Effective number after 95th-percentile trimming					285.331

Notes: Balance uses firm-level means from 2012–2018. SMD is the treated-minus-control mean difference divided by the pooled standard deviation. Entropy weights align the six listed control-firm first moments with those of treated firms. The effective number of control firms is $(\sum_f w_f)^2 / \sum_f w_f^2$ over unique control firms. The 95th-percentile sensitivity caps positive control-firm weights at 0.570; its regression estimates appear in Table A5.

Table A3: Full Trading First Stage: Red-Flag and Other-Insider Trading

	Ln(1 + Red-Flag Sale Value)	Ln(1 + Red-Flag Sale Count)	Red-Flag Sale-Value Share	Ln(1 + Other-Insider Sale Value)	Ln(1 + Other-Insider Sale Count)
Treatment × Intermediate	-0.879**	-0.074	-0.046***	-0.230	-0.022
	(-2.305)	(-1.603)	(-2.952)	(-0.505)	(-0.259)
Treatment × Post	-2.930***	-0.289***	-0.088***	0.235	0.089
	(-5.296)	(-5.105)	(-5.266)	(0.402)	(0.898)
Controls and included terms					
Lag Ln(assets)	-1.066***	-0.115***	-0.035***	-0.241	-0.062
	(-3.534)	(-3.361)	(-3.113)	(-0.771)	(-1.185)
Lag leverage	-0.436	-0.046	-0.032	0.628	0.358**
	(-0.564)	(-0.428)	(-1.180)	(0.677)	(2.447)
Lag return on assets	0.333	0.118	0.015	0.801	0.005
	(0.365)	(0.974)	(0.392)	(0.827)	(0.032)
Lag market-to-book	-0.114	-0.017*	-0.004	-0.037	-0.016
	(-1.609)	(-1.646)	(-1.544)	(-0.377)	(-1.094)
Lag cash ratio	-1.401*	-0.037	-0.042	-0.606	-0.006
	(-1.813)	(-0.427)	(-1.236)	(-0.661)	(-0.039)
Lag sales growth	0.048	0.002	0.003	0.599	0.097*
	(0.226)	(0.071)	(0.295)	(1.639)	(1.893)
Lag stock return	0.251	0.048***	0.003	0.436***	0.061**
	(1.643)	(2.805)	(0.530)	(2.865)	(2.401)
Lag return volatility	0.745	0.122**	0.037*	-0.664	-0.147**
	(1.422)	(2.077)	(1.699)	(-1.251)	(-2.051)
Ln(analyst coverage)	0.769*	0.089**	0.025**	1.510***	0.196***
	(1.748)	(2.246)	(2.360)	(3.635)	(3.161)
Observations	11,166	11,166	10,093	11,166	11,166
Manager-firm groups	2,464	2,464	2,287	2,464	2,464
R^2	0.018	0.016	0.014	0.011	0.012
Manager-firm FE	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes

Notes: Red-flag trading is the short-cooling-off category used in the main text. The sample is the 2012–2025 non-CEO manager-firm-year panel. Treatment is defined from firms' 2012–2018 red-flag stock sale-value share, and comparison firms have a positive comparison-plan stock sale-value share above the positive median. All models include manager-firm, fiscal-year, and industry-year fixed effects, the displayed controls, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics. Nonnegative outcomes are log-one-plus transformed, and continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table A4: Continuing-Manager and Turnover Tests

	Ln(1 + Short-Cooling-Off Sale Value)	Ln(1 + Comparison-Plan Sale Value)	Ln(1 + Option Awards)	Ln(1 + Portfolio Vega)
Panel A: Continuing-manager sample				
Treatment × Post	-2.542***	2.510***	-0.768**	-0.120
	(-3.969)	(3.361)	(-2.368)	(-0.813)
Observations	7,756	7,756	7,317	7,756
Firms	428	428	425	428
Manager-firm groups	1,797	1,797	1,700	1,797
Panel B: Turnover and panel composition				
	Exit rate	Any exit	Entry rate	
Treatment × Intermediate	0.006	0.034	0.026	
	(0.265)	(0.556)	(1.335)	
Treatment × Post	0.008	0.013	0.004	
	(0.305)	(0.171)	(0.180)	
Observations	9,755	9,755	10,979	
Manager-firm groups	2,227	2,227	2,424	
Manager-firm FE		Yes, all reported models		
Fiscal-year FE		Yes, all reported models		
Industry-year FE		Yes, all reported models		
Controls		Yes, all reported models		
Entropy weights		Yes, all reported models		
SE clustered by firm		Yes, all reported models		

Notes: Panel A restricts the 2012–2025 non-CEO manager-firm-year panel to continuing manager-firm relationships. Panel B defines exit from the manager's absence in the next observed firm-year, any exit as a firm-year indicator, and entry from first appearance relative to the preceding firm-year. Models include manager-firm, fiscal-year, and industry-year fixed effects, outcome-specific controls, firm-level entropy weights, and firm-clustered standard errors. Coefficients are followed by firm-clustered t-statistics. The portfolio-vega outcome sets unavailable source records to zero, which does not identify true no-option years. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table A5: Full Robustness Map: Alternative Treatment, Weighting, Sample, and Fixed Effects

Specification	Ln(1 + Short-Cooling-Off Sale Value)	Ln(1 + Comparison-Plan Sale Value)	Ln(1 + Option Awards)	Ln(1 + Stock Delta)
Panel A: Trading, option awards, and stock delta				
	-2.885***	2.103***	-0.645**	0.314**
Preferred entropy-balanced model	(-5.100)	(2.874)	(-2.150)	(2.525)
Obs.; firms	9,755; 431	9,755; 431	9,287; 430	9,755; 431
	-3.491***	1.600**	-0.551	0.202
Extended entropy balance	(-6.074)	(2.093)	(-1.638)	(1.422)
Obs.; firms	8,926; 393	8,926; 393	8,478; 392	8,926; 393
	-2.886***	2.001***	-0.627**	0.319**
95th-percentile trimmed weights	(-5.106)	(2.841)	(-2.098)	(2.547)
Obs.; firms	9,755; 431	9,755; 431	9,287; 430	9,755; 431
	-2.154***	-0.235	-0.532	0.541***
Propensity-score matched	(-2.738)	(-0.279)	(-1.202)	(3.608)
Obs.; firms	4,012; 180	4,012; 180	3,822; 180	4,012; 180
	-2.476***	1.641**	-0.462	0.298**
Unweighted	(-4.718)	(2.471)	(-1.479)	(2.471)
Obs.; firms	10,087; 464	10,087; 464	9,602; 463	10,087; 464
	-2.542***	2.510***	-0.768**	0.319***
Continuing managers	(-3.969)	(3.361)	(-2.368)	(2.895)
Obs.; firms	7,756; 428	7,756; 428	7,317; 425	7,756; 428
	-2.325***	2.451***	-0.389	0.233**
Positive-median treatment	(-7.406)	(3.985)	(-1.459)	(2.140)
Obs.; firms	11,058; 488	11,058; 488	10,542; 486	11,058; 488
	-8.448***	8.005***	-1.765**	0.788**
Continuous short-cooling-off exposure	(-6.113)	(4.307)	(-1.964)	(2.461)
Obs.; firms	9,755; 431	9,755; 431	9,287; 430	9,755; 431
	-1.996***	1.727***	-0.226	0.252**
No industry-year FE	(-4.442)	(2.782)	(-0.843)	(2.383)
Obs.; firms	9,870; 433	9,870; 433	9,423; 433	9,870; 433
	-2.990***	2.276***	-0.472	0.280**
Firm FE instead of manager-firm FE	(-6.962)	(3.506)	(-1.633)	(2.259)
Obs.; firms	10,479; 437	10,479; 437	10,076; 436	10,479; 437

Notes: Coefficient rows report the post-period treatment estimate followed by its firm-clustered t-statistic. The next row reports observations and firms. The continuous-exposure row reports the 2012–2018 short-cooling-off sale-value share interacted with Post.

Table A5: Full Robustness Map: Alternative Treatment, Weighting, Sample, and Fixed Effects (continued)

Specification	Ln(1 + Portfolio Vega)	Portfolio Vega / Total Delta	Option-Award Share	Stock-Award Share
Panel B: Convexity and award composition				
Preferred entropy-balanced model	-0.291**	-0.165***	-0.041***	0.060*
	(-2.159)	(-3.939)	(-2.585)	(1.865)
Obs.; firms	9,755; 431	4,930; 335	9,287; 430	9,287; 430
Extended entropy balance	-0.291*	-0.157***	-0.046**	0.039
	(-1.820)	(-3.753)	(-2.265)	(1.356)
Obs.; firms	8,926; 393	4,928; 334	8,478; 392	8,478; 392
95th-percentile trimmed weights	-0.282**	-0.167***	-0.041**	0.054*
	(-2.092)	(-3.994)	(-2.562)	(1.806)
Obs.; firms	9,755; 431	4,930; 335	9,287; 430	9,287; 430
Propensity-score matched	-0.374**	-0.099*	-0.031	0.022
	(-2.156)	(-1.880)	(-1.424)	(0.635)
Obs.; firms	4,012; 180	2,018; 137	3,822; 180	3,822; 180
Unweighted	-0.120	-0.137***	-0.030*	0.048*
	(-0.908)	(-2.815)	(-1.822)	(1.806)
Obs.; firms	10,087; 464	5,082; 355	9,602; 463	9,602; 463
Continuing managers	-0.120	-0.122***	-0.047***	0.058*
	(-0.813)	(-2.833)	(-2.627)	(1.860)
Obs.; firms	7,756; 428	3,957; 320	7,317; 425	7,317; 425
Positive-median treatment	-0.227*	-0.025	-0.011	0.054**
	(-1.905)	(-0.442)	(-0.843)	(2.038)
Obs.; firms	11,058; 488	5,733; 380	10,542; 486	10,542; 486
Continuous short-cooling-off exposure	-0.574	-0.217	-0.121**	0.191**
	(-1.507)	(-1.578)	(-2.310)	(1.961)
Obs.; firms	9,755; 431	4,930; 335	9,287; 430	9,287; 430
No industry-year FE	-0.131	-0.140***	-0.014	0.006
	(-0.916)	(-2.749)	(-1.001)	(0.245)
Obs.; firms	9,870; 433	5,168; 355	9,423; 433	9,423; 433
Firm FE instead of manager-firm FE	-0.223	-0.187***	-0.029*	0.057*
	(-1.303)	(-4.402)	(-1.924)	(1.927)
Obs.; firms	10,479; 437	5,471; 352	10,076; 436	10,076; 436

Notes: The sample period is 2012–2025 and the unit is manager-firm-year. Except where the row states otherwise, models include manager-firm, fiscal-year, and industry-year fixed effects, expanded trading, governance, analyst-coverage, and composition controls, firm-level entropy weights, and firm-clustered standard errors. Extended balance adds pre-period total delta and portfolio vega; the trimmed row caps comparison-firm weights at 0.570; the matched row uses the matched sample; the unweighted row omits weights; and the firm-FE row replaces manager-firm fixed effects. Unavailable stock-delta and portfolio-vega source records are set to zero and are not verified no-exposure years. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table A6: Full Incentive-Shape Measures

	Ln(1 + Total Delta)	Ln(1 + Stock Delta)	Ln(1 + Option Delta)	Ln(1 + Portfolio Vega)	Ln(1 + Vega) − Ln(1 + Stock Delta)	Ln(1 + Vega) − Ln(1 + Option Delta)	Ln(1 + Vega) − Ln(1 + Total Delta)	Portfolio Vega / Total Delta	Portfolio Vega / Option Delta	Portfolio Vega / Stock Delta	Stock Delta / Total Delta	Option Delta / Total Delta
Treatment × Intermediate	0.046	0.090	-0.046	-0.206*	-0.296**	-0.160**	-0.163	-0.014	-0.020	-24.725	0.038*	-0.038*
	(0.290)	(1.077)	(-0.333)	(-1.956)	(-2.268)	(-2.066)	(-1.379)	(-0.365)	(-0.272)	(-0.979)	(1.778)	(-1.778)
Treatment × Post	0.154	0.314**	0.017	-0.291**	-0.605***	-0.308***	-0.586***	-0.165***	-0.267***	-15.203	0.056*	-0.056*
	(0.741)	(2.525)	(0.099)	(-2.159)	(-3.365)	(-3.269)	(-3.604)	(-3.939)	(-2.859)	(-0.733)	(1.893)	(-1.893)
Controls and included terms												
Lag Ln At	-0.256**	-0.076	-0.228**	-0.083	-0.007	0.145***	0.135*	0.129***	0.110**	4.028	-0.027	0.027
	(-2.472)	(-1.161)	(-2.432)	(-1.068)	(-0.065)	(3.135)	(1.709)	(3.644)	(2.412)	(1.483)	(-1.522)	(1.522)
Lag Leverage	-0.026	0.152	0.002	-0.252	-0.404	-0.253**	-0.439***	-0.167***	-0.197*	-0.095	0.013	-0.013
	(-0.092)	(0.957)	(0.007)	(-1.218)	(-1.611)	(-2.284)	(-2.614)	(-2.619)	(-1.926)	(-0.019)	(0.424)	(-0.424)
Lag Roa	0.205	0.075	0.163	-0.170	-0.245	-0.332**	-0.582***	-0.192**	-0.319*	-15.834	-0.016	0.016
	(0.546)	(0.315)	(0.488)	(-0.646)	(-0.675)	(-2.080)	(-2.667)	(-2.169)	(-1.909)	(-1.340)	(-0.349)	(0.349)
Lag Market To Book	-0.003	0.055***	-0.010	-0.013	-0.068**	-0.003	-0.045**	-0.003	0.002	0.810	0.005	-0.005
	(-0.092)	(3.144)	(-0.405)	(-0.646)	(-2.383)	(-0.251)	(-2.390)	(-0.537)	(0.248)	(1.081)	(1.159)	(-1.159)
Lag Cash Ratio	-0.786***	-0.041	-0.575***	-0.316*	-0.275	0.259**	0.387**	0.174***	0.261***	11.551	-0.033	0.033
	(-2.930)	(-0.219)	(-2.705)	(-1.907)	(-1.212)	(2.298)	(2.492)	(2.599)	(3.593)	(1.387)	(-0.797)	(0.797)
Lag Sales Growth Yoy	0.040	0.036	0.046	0.049	0.013	0.004	0.023	0.003	-0.017	0.895	-0.004	0.004
	(0.449)	(0.819)	(0.580)	(0.839)	(0.230)	(0.125)	(0.630)	(0.175)	(-0.816)	(0.607)	(-0.468)	(0.468)
Lag Return 12M	0.067	0.056	0.067	0.009	-0.047	-0.058**	-0.095***	-0.024	-0.013	1.473	0.018***	-0.018***
	(1.169)	(1.484)	(1.262)	(0.222)	(-1.015)	(-2.537)	(-2.850)	(-1.583)	(-0.557)	(0.542)	(2.765)	(-2.765)
Lag Return Volatility 12M	0.280*	-0.145*	0.254**	0.204*	0.349***	-0.050	-0.108	-0.061	-0.139**	14.576	-0.031	0.031
	(1.887)	(-1.817)	(2.023)	(1.840)	(2.660)	(-0.793)	(-1.095)	(-1.175)	(-2.457)	(1.032)	(-1.566)	(1.566)
Board Independence	-0.362	0.190	-0.055	0.441	0.251	0.495***	0.659*	0.058	-0.006	0.983	-0.038	0.038
	(-0.822)	(0.855)	(-0.140)	(1.361)	(0.689)	(3.355)	(1.705)	(0.569)	(-0.028)	(0.072)	(-0.556)	(0.556)
Normalized Board Interlock	0.229	0.006	0.124	0.081	0.075	-0.044	-0.050	-0.093*	-0.122	10.097	0.003	-0.003
	(1.364)	(0.058)	(0.839)	(0.675)	(0.471)	(-0.541)	(-0.348)	(-1.888)	(-1.589)	(0.794)	(0.106)	(-0.106)
Manager-Firm Panel Exit Rate	-0.595***	-0.650***	-0.564***	-0.472***	0.177*	0.092*	0.009	0.013	0.092	-3.125	0.025	-0.025
	(-4.440)	(-7.174)	(-4.985)	(-5.051)	(1.717)	(1.661)	(0.102)	(0.350)	(1.458)	(-0.670)	(1.395)	(-1.395)
Ln(Analyst Coverage)	0.245*	0.175**	0.377***	0.407***	0.232*	0.029	0.086	0.027	-0.061	-12.668	-0.034*	0.034*
	(1.799)	(1.975)	(2.925)	(3.906)	(1.707)	(0.432)	(0.742)	(0.634)	(-1.044)	(-1.123)	(-1.696)	(1.696)
Observations	9,755	9,755	9,755	9,755	9,755	9,755	4,930	4,930	4,954	4,696	4,930	4,930
Manager-firm FE groups	2,227	2,227	2,227	2,227	2,227	2,227	1,255	1,255	1,259	1,202	1,255	1,255
R^2	0.011	0.029	0.013	0.017	0.013	0.021	0.055	0.050	0.038	0.003	0.017	0.017
Manager-firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample is the 2012–2025 non-CEO manager-firm-year panel. Intermediate covers 2020–2022 and Post covers 2023–2025. All models include manager-firm, fiscal-year, and industry-year fixed effects, the displayed controls, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics. Nonnegative sensitivity measures use log-one-plus transformations; ratios and portfolio shares are in levels. Unavailable portfolio-sensitivity records are set to zero in the log measures but do not identify verified no-option years. Continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table A7: Vega Portfolio Decomposition

	Ln(1 + Portfolio Vega)	Ln(1 + Exercisable Option Vega)	Ln(1 + Unvested Option Vega)	Ln(1 + Unearned Option Vega)	Ln(1 + Total Options Held)	Ln(1 + Exercisable Options)	Ln(1 + Unvested Options)	Average Unvested Option Maturity
Treatment × Intermediate	-0.384***	-0.379***	-0.669***	0.136	-0.042	-0.035	-0.254**	-0.726***
	(-4.113)	(-2.977)	(-5.384)	(1.220)	(-0.558)	(-0.271)	(-2.064)	(-2.671)
Treatment × Post	-0.530***	-0.551***	-0.415**	-0.071	-0.358**	-0.303*	-0.496*	-1.270***
	(-3.124)	(-2.722)	(-2.072)	(-0.621)	(-2.517)	(-1.660)	(-1.926)	(-3.223)
Controls and included terms								
Lag Ln At	0.056	0.083	0.201*	0.046	-0.124*	-0.081	0.068	0.004
	(0.736)	(0.836)	(1.930)	(0.878)	(-1.833)	(-0.757)	(0.763)	(0.036)
Lag Leverage	-0.173	0.035	-0.260	-0.226**	0.167	0.388**	-0.053	-0.541**
	(-1.127)	(0.183)	(-1.189)	(-2.082)	(1.441)	(2.080)	(-0.251)	(-2.134)
Lag Roa	0.366*	0.440*	0.400	-0.054	0.044	0.351	-0.169	-0.732**
	(1.780)	(1.736)	(1.530)	(-0.564)	(0.323)	(1.461)	(-0.894)	(-2.466)
Lag Market To Book	0.014	-0.003	0.070***	0.007	-0.011	-0.015	0.022	0.002
	(0.889)	(-0.151)	(2.898)	(0.779)	(-0.705)	(-0.696)	(0.903)	(0.081)
Lag Cash Ratio	0.374**	0.384**	0.409	0.241**	0.195	0.334	0.395	0.532**
	(2.311)	(2.005)	(1.556)	(2.147)	(1.515)	(1.587)	(1.643)	(1.974)
Lag Sales Growth Yoy	0.022	0.016	0.045	0.026	-0.012	-0.059	0.033	0.182***
	(0.595)	(0.343)	(0.953)	(1.266)	(-0.375)	(-1.177)	(0.708)	(3.291)
Lag Return 12M	-0.051	-0.104***	-0.000	-0.014	-0.043	-0.033	-0.045	0.026
	(-1.447)	(-2.910)	(-0.007)	(-0.923)	(-1.566)	(-1.038)	(-0.696)	(0.448)
Lag Return Volatility 12M	0.180*	0.279**	0.194*	0.055	0.094	0.108	0.187	0.378**
	(1.848)	(2.254)	(1.685)	(1.045)	(1.247)	(0.919)	(1.590)	(2.418)
Board Independence	1.242***	1.646***	-0.571	-0.168	1.039***	1.552***	0.134	0.486
	(3.092)	(3.654)	(-1.444)	(-1.116)	(2.735)	(3.408)	(0.331)	(1.152)
Normalized Board Interlock	0.132	-0.006	0.179	-0.026	-0.031	-0.041	-0.032	0.012
	(1.125)	(-0.047)	(0.942)	(-0.344)	(-0.317)	(-0.324)	(-0.221)	(0.043)
Manager-Firm Panel Exit Rate	-0.195**	-0.119	-0.257**	-0.037	-0.103*	-0.059	0.079	0.144
	(-2.434)	(-1.372)	(-2.386)	(-0.794)	(-1.682)	(-0.680)	(0.837)	(1.259)
Ln(Analyst Coverage)	0.304***	0.254**	0.421***	-0.007	0.043	0.009	0.156	0.211
	(2.862)	(2.292)	(2.680)	(-0.192)	(0.661)	(0.095)	(1.400)	(1.397)
Observations	4,954	4,714	4,901	5,080	5,038	4,788	4,274	4,023
Manager-firm FE groups	1,259	1,208	1,245	1,272	1,266	1,214	1,143	1,064
R^2	0.062	0.050	0.069	0.016	0.027	0.020	0.018	0.047
Manager-firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy weights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample is the 2012–2025 non-CEO manager-firm-year panel with valid portfolio-component coverage for each outcome. Intermediate covers 2020–2022 and Post covers 2023–2025. All models include manager-firm, fiscal-year, and industry-year fixed effects, the displayed controls, firm-level entropy weights, and standard errors clustered by firm. Coefficients are followed by firm-clustered t-statistics. Option-vega and option-count outcomes use log-one-plus transformations; average unvested option maturity is measured in years. Continuous outcomes are winsorized at the 1st and 99th percentiles where indicated. ***, **, and * denote significance at the 1, 5, and 10 percent levels.

Table A8: Formal Event-Study Lead Coefficients and Joint Pre-Trend Tests

Outcome	2015	2016	2017	2018	Joint p-value
Ln(1 + short-cooling-off sale value)	0.725 [-0.973, 2.423]	-0.782 [-1.979, 0.415]	0.109 [-1.291, 1.508]	1.231** [0.031, 2.430]	0.058
Ln(1 + comparison-plan sale value)	-2.646** [-5.198, -0.094]	-0.415 [-2.359, 1.529]	-1.340 [-3.110, 0.431]	-1.697** [-3.066, -0.327]	0.049
Ln(1 + short-cooling-off sale count)	0.009 [-0.182, 0.200]	-0.063 [-0.196, 0.070]	0.022 [-0.151, 0.195]	0.176** [0.038, 0.314]	0.040
Ln(1 + comparison-plan sale count)	-0.355** [-0.689, -0.021]	-0.126 [-0.435, 0.182]	-0.266** [-0.526, -0.005]	-0.170* [-0.356, 0.015]	0.093
Short-cooling-off sale-value share	0.004 [-0.055, 0.063]	-0.019 [-0.074, 0.036]	0.028 [-0.030, 0.087]	0.049* [-0.001, 0.100]	0.051
Comparison-Plan sale-value share	-0.204** [-0.383, -0.025]	-0.044 [-0.165, 0.076]	-0.102** [-0.192, -0.013]	-0.081** [-0.155, -0.008]	0.041
Ln(1 + total compensation)	-0.293*** [-0.471, -0.116]	-0.079 [-0.210, 0.053]	0.005 [-0.113, 0.122]	0.012 [-0.085, 0.108]	0.023
Ln(1 + salary)	-0.097 [-0.343, 0.149]	-0.071 [-0.287, 0.144]	-0.087 [-0.285, 0.111]	-0.115 [-0.317, 0.087]	0.730
Ln(1 + bonus)	-0.791 [-2.049, 0.467]	-0.990* [-2.024, 0.043]	-0.504 [-1.408, 0.399]	0.003 [-0.812, 0.818]	0.418
Ln(1 + stock awards)	-0.672 [-1.694, 0.350]	0.065 [-0.937, 1.068]	0.150 [-0.751, 1.051]	-0.527 [-1.182, 0.128]	0.116
Ln(1 + option awards)	0.850* [-0.161, 1.862]	0.230 [-0.678, 1.138]	0.281 [-0.405, 0.968]	0.504* [-0.063, 1.070]	0.105
Stock-award share	-0.090* [-0.184, 0.004]	-0.019 [-0.101, 0.062]	-0.011 [-0.078, 0.056]	-0.056* [-0.117, 0.004]	0.066
Option-award share	-0.016 [-0.067, 0.036]	-0.038 [-0.102, 0.025]	-0.026 [-0.071, 0.020]	0.019 [-0.024, 0.063]	0.206
Ln(1 + total delta)	-0.534 [-1.190, 0.121]	-0.352 [-0.785, 0.080]	0.058 [-0.342, 0.458]	-0.180 [-0.460, 0.100]	0.171
Ln(1 + stock delta)	-0.481** [-0.902, -0.060]	-0.149 [-0.392, 0.094]	-0.235* [-0.476, 0.005]	0.025 [-0.162, 0.212]	0.041
Ln(1 + stock delta, baseline price)	-0.484** [-0.872, -0.097]	-0.259** [-0.476, -0.041]	-0.247** [-0.466, -0.029]	-0.030 [-0.194, 0.134]	0.021
Ln(1 + option delta)	-0.412 [-1.016, 0.191]	-0.249 [-0.627, 0.129]	0.181 [-0.173, 0.536]	-0.072 [-0.322, 0.178]	0.153
Ln(1 + portfolio vega)	0.000 [-0.551, 0.551]	-0.052 [-0.388, 0.285]	0.185 [-0.129, 0.499]	-0.095 [-0.288, 0.098]	0.470
Ln(1 + vega) − Ln(1 + total delta)	0.534*** [0.184, 0.885]	0.301** [0.058, 0.544]	0.127 [-0.079, 0.332]	0.085 [-0.078, 0.248]	0.046
Total vega / total delta	0.218*** [0.100, 0.336]	0.097** [0.014, 0.180]	0.063 [-0.018, 0.143]	-0.008 [-0.070, 0.054]	0.010
Total vega / option delta	0.236*** [0.065, 0.406]	0.001 [-0.138, 0.141]	0.015 [-0.148, 0.179]	-0.117 [-0.289, 0.054]	< 0.001
Ln(1 + grant option value)	0.892 [-0.280, 2.065]	-0.455 [-1.357, 0.447]	-0.367 [-1.086, 0.352]	-0.053 [-0.550, 0.443]	0.239
Ln(1 + grant option count)	0.602** [0.001, 1.204]	0.225 [-0.296, 0.745]	0.294 [-0.118, 0.706]	0.255* [-0.019, 0.530]	0.095
Ln(1 + grant vega)	0.669 [-0.177, 1.515]	-0.288 [-0.923, 0.347]	-0.327 [-0.828, 0.173]	0.008 [-0.347, 0.364]	0.155
Ln(1 + grant total delta)	0.117 [-0.580, 0.814]	-0.378 [-0.983, 0.228]	-0.270 [-0.741, 0.201]	-0.278 [-0.646, 0.091]	0.440
Ln(1 + grant option delta)	0.601 [-0.222, 1.425]	-0.332 [-0.955, 0.291]	-0.249 [-0.743, 0.245]	-0.036 [-0.380, 0.309]	0.248

Notes: Cells report treatment-year coefficients with firm-clustered 95 percent confidence intervals in brackets. The event-study window is 2015–2024; 2019 is omitted. The sample contains 14,567 manager-firm-years, 3,868 manager-firm groups, and 437 firms. Models include manager-firm, fiscal-year, and industry-year fixed effects, outcome-specific controls, firm-level entropy weights, and standard errors clustered by firm. Joint p-values test that the 2015–2018 coefficients equal zero. These leads overlap the 2012–2018 treatment-construction period and therefore do not constitute a holdout pretrend test. Unavailable sensitivity and grant records are set to zero for the affected outcomes and are not verified no-option or no-grant years. ***, **, and * denote significance at the 1, 5, and 10 percent levels.