Option-Based Compensation and Post-IPO Performance: Evidence from Young U.S. Firms

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Abstract (English)

Title: Option-Based Compensation and Post-IPO Performance: Evidence from Young U.S. Firms
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This dissertation examines whether the intensity of option-based compensation predicts subsequent performance among young U.S. firms after going public. Using 372 IPO and direct-listing firms listed on NYSE/NASDAQ during 2010–2020, the analysis focuses on the first three full fiscal years after listing (IPO year excluded), yielding 973 firm-year observations. Option intensity is measured as stock option expense scaled by total assets in year *t–1*. Performance is assessed using accounting profitability (ROA, ROE) and market valuation (Tobin's Q). To mitigate the mechanical earnings impact of mandatory stock-based compensation expensing, the study constructs ROAAdjusted and ROEAdjusted by adding back the after-tax value of option expense to net income. Baseline pooled OLS regressions with a standard control set (size, leverage, R&D intensity, tangibility, liquidity, and firm age) and post-IPO year indicators reveal a systematic divergence between accounting and market outcomes. A 1 percentage point increase in option-expense intensity is associated with approximately a 0.85 percentage point decrease in next-year ROAAdjusted, while it predicts an increase in Tobin's Q of about 0.09. The relationship with ROEAdjusted is not robust. Heterogeneity analyses indicate that the positive valuation association is particularly pronounced in Pharmaceuticals & Medical Research, whereas the negative ROAAdjusted association is strongest among smaller firms (<200 employees). Overall, the findings suggest that option-intensive compensation coincides with weaker short-run accounting profitability but is capitalized into higher market valuation, consistent with investors pricing longer-horizon incentive, retention, or growth-signaling benefits.

Keywords: stock options; equity compensation; IPO firms; firm performance; Tobin's q; ROA; ROE; employee incentives; ESOP

Resumo (Português)
Título: Remuneração Baseada em Opções e Desempenho Pós-IPO: Evidências de Empresas Jovens dos EUA
Autor: Vladimir Akva

Esta dissertação analisa a intensidade da remuneração baseada em opções e prevê o desempenho subsequente de empresas jovens dos Estados Unidos após a entrada em bolsa. A amostra inclui 372 empresas que realizaram IPOs ou listagens diretas na NYSE/NASDAQ entre 2010 e 2020, analisadas nos três primeiros exercícios fiscais completos após a admissão à negociação (excluindo o ano do IPO), totalizando 973 observações firma-ano. A intensidade das opções é medida como a despesa com opções sobre ações dividida pelo total de ativos no ano t–1. O desempenho é avaliado através da rentabilidade contabilística (ROA e ROE) e da valorização de mercado (q de Tobin). Para mitigar o impacto mecânico do reconhecimento obrigatório das despesas com remuneração baseada em ações, são construídas medidas ajustadas de rentabilidade. Regressões OLS agregadas, com variáveis de controlo e indicadores do ano pós-IPO, revelam uma divergência sistemática entre resultados contabilísticos e de mercado. Um aumento de 1 ponto percentual na intensidade da despesa com opções está associado a uma redução de cerca de 0,85 pontos percentuais no ROA Ajustado do ano seguinte, enquanto prevê um aumento de aproximadamente 0,09 no q de Tobin. A relação com o ROE Ajustado não é robusta. Os resultados sugerem que a remuneração intensiva em opções está associada a menor rentabilidade contabilística de curto prazo, mas a maior valorização de mercado, consistente com investidores a incorporarem benefícios de incentivos, retenção ou crescimento de longo prazo.

Palavras-chave: opções sobre acções; remuneração em capital próprio; empresas IPO; desempenho da empresa; q de Tobin; ROA; ROE; incentivos aos trabalhadores; ESOP.

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1. Introduction

Innovative start-ups and young high-growth firms are widely viewed as important contributors to productivity growth and economic dynamism (Goswami, Medvedev and Olafsen, 2019). Their contribution depends critically on the ability to attract, retain, and motivate skilled employees, as human capital is often a key input to value creation in young firms. Equity-based compensation, and stock options in particular, has become a prominent instrument in this context. For high-growth firms, options can support recruitment and retention by offering employees participation in the upside while preserving liquidity for investment and scaling (Hall and Murphy, 2003).

From an agency-theoretic perspective, stock options can also mitigate the principal–agent problem by tying employees' and managers' payoffs more closely to firm value, thereby strengthening incentive alignment (Jensen and Meckling, 1976; Dalton, Hitt, Certo and Dalton, 2007). Beyond financing considerations, option-based pay is also intended to improve performance through higher effort, cooperation, and reduced turnover (Jensen and Meckling, 1976; Weitzman and Kruse, 1990; Hochberg and Lindsey, 2010). At the same time, empirical evidence on employee ownership instruments, including stock options, remains heterogeneous across settings and outcome measures (Jones and Kato, 1995; Trébucq, 2004; Meng et al., 2011; Kim and Ouimet, 2014).

A key limitation in much of the Employee stock ownership plans (ESOP) literature is that performance effects are often evaluated at the extensive margin using a binary adoption indicator (ESOP vs. non-ESOP). While informative, this approach can overlook economically meaningful variation in the intensity of option-based compensation among adopting firms. Moreover, relatively little evidence speaks directly to young firms in the years after an IPO, a setting in which equity-based pay is especially common and where both incentives and accounting outcomes can evolve quickly. This thesis therefore takes a different approach and asks: Does a higher intensity of option-based compensation predict subsequent post-IPO performance among young public firms?

To address this question, I use stock option expense scaled by total assets as a continuous proxy for option intensity and relate it to subsequent firm performance. Performance is measured using standard accounting- and market-based outcomes (ROA, ROE, and Tobin's Q). The empirical design controls for firm characteristics commonly used in the literature (size, leverage, R&D intensity, tangibility, and liquidity) and includes year fixed effects. I further assess heterogeneity by estimating the model across subsamples defined by industry, firm size, and firm age. In addition, I construct adjusted accounting profitability measures by adding back stock option expense to net income. This adjustment removes the purely mechanical contemporaneous link between expensed stock-based pay and ROA/ROE, allowing the analysis to focus more directly on the association between option intensity and underlying operating performance. The main specifications relate option intensity in year $t-1$ to performance in year t.

The results point to a systematic divergence between accounting and market outcomes. Higher option expense intensity is associated with lower subsequent asset-based profitability (ROA), even when accounting profitability is measured on an adjusted basis that adds back option expense. In contrast, option intensity is positively related to Tobin's Q, suggesting that investors value option-intensive compensation structures despite weaker short-run accounting returns. The relationship with ROE is not robust in the full sample, which is consistent with ROE being mechanically sensitive to changes in the equity base and capital structure—both of which can fluctuate substantially for young post-IPO firms.

This thesis contributes to the literature by shifting attention from the binary adoption of equity compensation plans to the intensity of stock option use, focusing on young, recently public firms in the post-IPO period where equity-based compensation is particularly salient. It documents that option intensity is associated differently with subsequent accounting profitability and market valuation, highlighting a divergence between internal performance measures and investor perceptions. While the empirical framework follows standard regression approaches in the literature, the analysis introduces an intensity-based measure of option compensation and employs adjusted profitability metrics that add back stock option expense, allowing the separation of economic associations from purely mechanical accounting effects.

The structure of this thesis is as follows. Section 2 reviews the related theoretical and empirical literature on employee ownership and stock options. Section 3 describes the data and variable construction. Section 4 outlines the empirical strategy. Section 5 presents the main results. Section 6 reports robustness and heterogeneity analyses. Section 7 discusses the findings. Section 8 concludes.

2. Literature Review

2.1 Incentives and agency theory

Employee stock ownership plans (ESOPs) and stock options are commonly motivated by agency theory, which emphasizes that the separation of ownership and control can generate conflicts of interest between principals and agents. When employee actions are imperfectly observable and objectives are not fully aligned, firms incur agency costs in the form of shirking, suboptimal choices, and monitoring expenditures (Jensen and Meckling, 1976; Fama and Jensen, 1983). Equity-based compensation is one mechanism to reduce these frictions by linking employees' payoffs to firm outcomes. Stock options are particularly salient because their convex payoff structure increases the sensitivity of wealth to firm value, potentially strengthening incentives to exert effort and pursue value-enhancing actions (Jensen and Murphy, 1990). While many of these arguments are developed in the managerial compensation and corporate governance literatures, similar incentive-alignment logic can apply to broad-based plans when employee actions materially affect firm performance (Shleifer and Vishny, 1997). From an optimal contracting perspective, incentive pay should depend on how informative performance measures are and how strongly effort and decision quality translate into firm value (Ross, 1973; Mirrlees, 1976). This suggests that equity-linked pay may be particularly attractive in settings where growth opportunities are high, monitoring is difficult, and longer-horizon incentives help address intertemporal agency problems—features that often characterize young firms around the IPO stage. Beyond direct incentive alignment, the literature highlights several additional channels through which broad-based employee ownership and option programs may affect firm outcomes. Shared ownership can increase motivation and cooperation by strengthening the perceived link between collective performance and individual payoff, although such effects depend strongly on plan design and complementary workplace practices (Weitzman and Kruse, 1990; Kruse, Freeman and Blasi, 2010). Shared ownership has also been linked to measurable labor outcomes: panel evidence from French firms shows that employee share ownership alone is associated with a roughly 14% reduction in absenteeism relative to non-ownership firms (Brown, Fakhfakh and Sessions, 1999). A related channel is psychological ownership: holding an economic stake may increase employees' identification with the firm and willingness to exert discretionary effort, but the strength of this channel varies across ownership structures and communication practices (Pierce, Rubenfeld and Morgan, 1991; Rousseau and Shperling, 2003). Equity participation can also function as a retention device by encouraging employees to remain with the firm until vesting or payout, thereby reducing turnover and preserving firm-specific human capital—an effect supported by matched employer–employee data from the 1998 Workplace Employee Relations Survey, where employee share ownership is significantly negatively related to workplace turnover, with estimates suggesting a 7–10 percentage point reduction in quits in employee-owned workplaces (Sengupta, Whitfield and McNabb, 2007). Finally, while group-based incentives are subject to free-rider problems, peer monitoring and social pressure can partially mitigate shirking when effort is observable within teams, implying that incentive effectiveness depends on organizational scale and monitoring conditions (Kandel and Lazear, 1992). Taken together, these mechanisms suggest that equity-based compensation should, in principle, improve firm performance through stronger incentives, enhanced cooperation, and reduced turnover. This motivates the need for empirical analysis to examine whether such theoretical benefits are reflected in accounting performance and market valuation outcomes.

2.2 Stock options and ESOPs: definitions and design

The term "employee ownership" spans multiple institutional arrangements that differ in financing, risk exposure, and governance implications (Rousseau and Shperling, 2003). A common distinction is between return rights (claims on cash flows) and control rights (participation in decision-making), which vary substantially across plans (Toscano, 1983). As a result, employee ownership may act simultaneously as a compensation instrument, a governance device, and a mechanism for longer-term attachment—depending on design. Within this broad set, two prominent instruments are ESOPs and stock options. ESOPs typically enable employees to acquire shares (directly or via a plan/trust structure), creating a broad-based equity stake with implications for both financial participation and, in some settings, employee involvement (Cin and Smith, 2002). Stock options, in contrast, grant employees the right to purchase shares at a pre-specified exercise price during a defined period, creating value only when the stock price rises above the exercise price. Options are therefore inherently forward-looking and emphasize upside participation rather than symmetric exposure to firm risk (Hall and Murphy, 2002; Hall and Murphy, 2003). Vesting schedules can further strengthen longer-horizon retention and alignment by delaying realizations (IFRS Foundation, 2004; FASB, 2004).

2.3 Empirical evidence on performance and valuation

Although this study focuses on accounting profitability (ROA and ROE) and market valuation (Tobin's Q), it is informative to briefly summarize evidence on IPO underpricing and stock return responses in order to situate these outcomes within the broader literature on the financial performance effects of stock option compensation and to clarify the settings in which such effects are most pronounced. A large strand of research examines how ESOPs and stock options affect capital-market outcomes rather than operating performance, and the evidence is mixed. Event studies generally document positive abnormal returns around ESOP announcements, suggesting that investors interpret adoption as favorable news about incentive alignment or governance. For U.S. firms, Gordon and Pound (1990) report announcement-window abnormal returns of roughly 1–2%, while Beatty (1995) finds cumulative abnormal returns of a similar order of magnitude, concentrated in short event windows. In IPO settings, option-intensive compensation has been linked to higher underpricing, with Taranto (2003) documenting increases in first day returns on the order of 5–10 percentage points for firms with more option-heavy compensation structures, consistent with incentive design interacting with information asymmetry at the offering stage. Evidence on post-event stock performance is less uniform: Kedia and Mozumdar (2002) show that option-based pay does not systematically translate into superior long-run stock returns, and that positive effects—when present—are largely concentrated in settings where options operate through retention or financing-constraint relief rather than pure incentive alignment.

Evidence on accounting profitability (ROA, ROE) and market valuation (Tobin's Q) is also mixed and highly setting-dependent. Cross-sectional studies often report positive correlations but face selection concerns: Trébucq (2004), using a single-year sample of French firms, finds that ESOP firms exhibit ROE roughly five percentage points higher than non-ESOP firms, with more modest and marginal differences in ROA, but the cross-sectional design cannot rule out self-selection. In contrast, designs based on ESOP adoption dummies typically yield weak average effects once controls and fixed effects are included. Meng et al. (2011) summarize evidence across 48 ESOP-effect estimates and show that only one is statistically significant and three are marginally significant, with mixed signs across ROA and ROE, suggesting that extensive-margin indicators often fail to detect stable accounting effects. Valuation responses are generally clearer than profitability effects: Ding and Chea (2021) report economically meaningful increases in Tobin's Q around ESOP-related timing in an event-time framework (e.g., OptDummy: about +1.37 in year 0 and +1.97 in year 2; an intrinsic-value specification yields a much larger year-0 coefficient around +10.54). A key explanation for the dispersion in prior findings is the role of compensation intensity and potential nonlinear effects. Dasilas (2024) shows that ESOP coefficients in firm performance and valuation regressions are negative on average in pooled samples but become positive and statistically significant at low intensity levels ($0\% < \text{ESOP} \leq 1\%$), before turning negative again at higher intensities. This pattern is consistent with a trade-off between incentive benefits at low levels of employee ownership and dilution or free-riding costs as ownership becomes more extensive. Relatedly, Kim and Ouimet (2014) document that small ESOPs are associated with higher industry-adjusted Tobin's Q, whereas large-plan indicators are negative or statistically weak, reinforcing the importance of plan size and organizational scale in shaping valuation effects.

2.4 Research implications

Taken together, the literature motivates three core design choices in this thesis. First, existing empirical work largely studies broad samples of public firms, with little focus on the early post-IPO phase, even though incentive mechanisms, informational frictions, and organizational change are likely to be most pronounced among young firms. This thesis therefore concentrates explicitly on young post-IPO companies, rather than the universe of mature public firms. Second, because adoption-dummy effects are often weak and may mask economically relevant heterogeneity, the analysis introduces a continuous measure of option-based compensation intensity and imposes a lagged structure linking option expense intensity to subsequent outcomes, offering a novel empirical approach relative to prior studies. Third, given recurring evidence that incentive effects vary with plan intensity, firm scale, and institutional context, the analysis explicitly examines heterogeneity through targeted robustness and subsample exercises, allowing the estimation of more context-specific and interpretable effects.

3. Data and variable construction

3.1 Sample construction and sources

The dataset was constructed in three steps. First, U.S. firms conducting an IPO or direct listing between 1 January 2010 and 1 January 2020 were identified using Refinitiv Eikon. This period captures the modern IPO wave in which technology and other high-growth issuers increasingly shaped U.S. public markets and equity-based pay practices (Tsui and Vance, 2023; Somaya and You, 2024)

To ensure institutional comparability, the Refinitiv search was restricted to firms listed on NASDAQ or the NYSE and domiciled in the United States. Under these criteria, the raw data contains 1,604 firms that went public on the two main U.S. exchanges during the sample window. Restricting the listing venue is important because NYSE/NASDAQ issuers face comparable SEC disclosure requirements and similar public-market scrutiny, improving the consistency of accounting and compensation-related reporting across observations (Leuz and Wysocki, 2016)

Second, the resulting issuer list was matched to firm-level accounting information in WRDS, using the CRSP/Compustat Merged Fundamentals Annual database. Only offerings of common equity (ordinary/common shares) were retained. SPACs, reverse mergers, preferred stock issues, convertibles, warrants, and units were excluded because they do not represent standard IPO structures and are associated with different disclosure regimes and incentive environments. In addition, firms in sectors with structurally distinct financial reporting and balance sheets—most importantly banking, investment services, investment holding companies, and government-related activities—were excluded to avoid mechanical differences in leverage, liquidity, and valuation measures that are not central to the employee-ownership mechanism.

Third, the core analysis focuses on young firms. Defining "young" in the IPO context is non-trivial, as most firms go public only after reaching a certain level of organizational and operational maturity. At the same time, imposing an overly restrictive age threshold would substantially reduce the available sample and limit statistical power. To balance these considerations, the analysis classifies firms as young if they are no more than eleven years old at the time of the IPO, ensuring that the sample captures relatively early-stage public firms while retaining sufficient observations for empirical analysis. Firm age is measured as the difference between the IPO year and the founding year reported in the data source, a standard approach in the IPO literature (Ritter, 1991; Siev and Qadan, 2022). A limitation of this measure is that for some issuers—particularly those undergoing pre-IPO restructurings—the reported founding year may reflect the incorporation of the IPO holding entity rather than the inception of the underlying business, which can mechanically produce very low ages at listing. This issue is well documented in IPO research and is addressed in robustness checks by re-estimating specifications on a restricted subsample (e.g., firms aged 1 to 5 years and 5–11 years at IPO).

After applying these restrictions and matching to Compustat, the final estimation sample consists of 372 young U.S. issuers with usable post-IPO accounting information. During the

WRDS/Compustat merge, roughly 110 firms could not be matched, most plausibly due to short post-IPO survival (early delisting) and/or incomplete post-IPO filings, and therefore do not enter the panel used for post-IPO outcome analysis.

3.2 Key variables

The main dependent variables are ROA, ROE, and Tobin's Q, which follow standard practice in the ESOP and corporate finance literatures and jointly capture accounting profitability and market valuation. Specifically, ROA (net income/total assets) and ROE (net income/common equity) proxy realized profitability, while Tobin's Q reflects investors' forward-looking valuation and growth expectations and is commonly employed in ESOP-related work (e.g., Trébucq, 2004; Ding and Chea, 2021). The key explanatory variable is stock option expense intensity, measured as stock option expense scaled by total assets. This scaling makes option-related compensation costs comparable across firms of different sizes by expressing them relative to the asset base. The control set is intentionally parsimonious and standard, comprising firm size (log of total assets), leverage (debt-to-assets, with debt-to-equity used as an alternative), R&D intensity (R&D-to-sales), asset tangibility (fixed assets relative to sales), and liquidity (cash relative to revenue and to total assets).

The empirical window is defined relative to the IPO year. For each issuer, I collect accounting data for the IPO year and the subsequent three calendar years; however, because IPOs occur throughout the year and the IPO year often corresponds to a partial reporting period, the IPO-year observation is excluded from the main analysis. Accordingly, the baseline specifications focus on the first three full post-IPO calendar years (years +1 to +3). For example, a firm that goes public in 2019 enters the sample with observations for 2020, 2021, and 2022. Excluding the IPO year also aligns with the empirical design, which relates post-IPO outcomes to stock option expense measured in the preceding year; implementing this lag structure is not feasible for the IPO year because pre-IPO accounting data are not consistently available. More broadly, focusing on years +1 to +3 ensures that performance is measured in comparable post-listing calendar years rather than in the IPO year, which may mechanically differ across issuers due to IPO timing and reporting-period truncation.

3.3 Descriptive statistics

Table I shows that the continuous variables exhibit substantial dispersion and pronounced outliers, a pattern that is typical for young post-IPO firms. In particular, the market valuation measure (Tobin's Q), cash-to-revenue ratios, and R&D-to-sales measures display strong right skewness, reflecting the combination of recent capital inflows, limited revenue bases, and intensive investment activity at early stages of the corporate life cycle.

Table I: Descriptive Statistics (Before Winsorization)

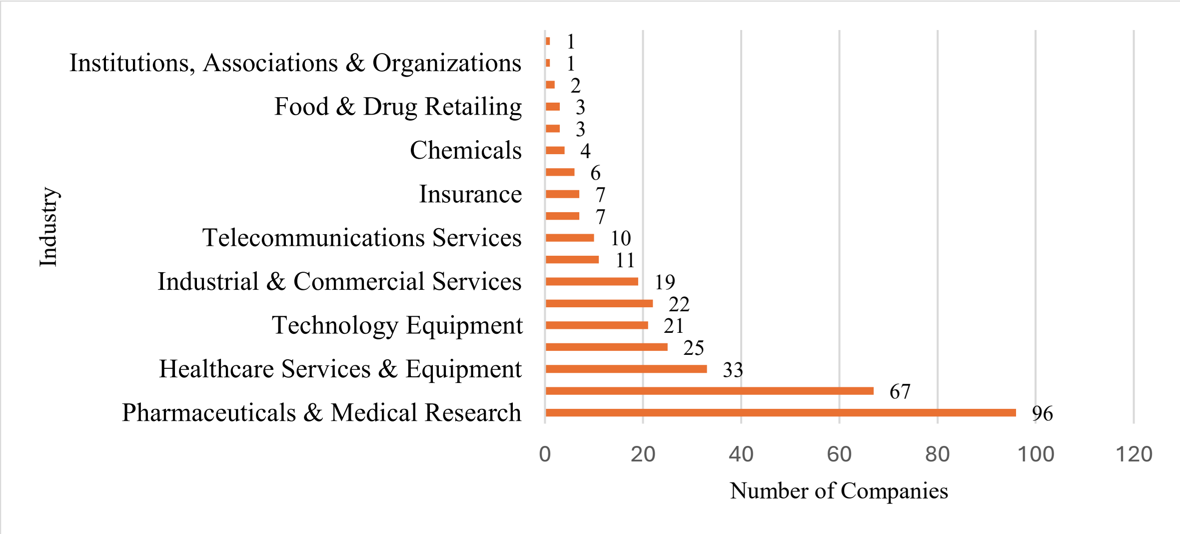
Variable	Mean	P1	P25	Median	P75	P99
ROAAdjusted	-0.195	-1.884	-0.322	-0.062	0.032	0.244
ROEAdjusted	2.403	-7.022	-0.495	-0.098	0.102	11.593
Tobin's Q	3.336	0.425	1.288	2.320	4.134	16.752
SOX intensity	0.050	0.000	0.011	0.033	0.062	0.419
Log(total assets)	5.952	2.042	4.990	5.816	7.021	9.739
Debt-to-assets	0.228	0.000	0.001	0.125	0.377	1.327
Debt-to-equity	0.095	-12.364	0.000	0.127	0.790	9.816
R&D-to-sales	16.810	0.000	0.000	0.208	1.344	362.814
Fixed assets-to-sales	1.512	0.000	0.069	0.176	0.470	25.743
Cash-to-revenue	21.025	0.001	0.118	0.378	1.903	414.631
Cash-to-assets	0.280	0.002	0.083	0.205	0.421	0.947

Notes: This table reports the mean and selected percentile values (P1–P99) of the dependent and independent variables **before winsorization**, based on 973 firm-year observations for 372 firms. All variables are expressed as ratios or in logarithmic form and therefore unit-free. The reported statistics reveal substantial dispersion and right-skewness across several variables, particularly at the upper percentiles.

The interquartile ranges reported in Table I indicate, however, that the majority of firms are considerably less extreme. For example, R&D intensity equals zero at the 25th percentile and is approximately 1.34 at the 75th percentile, while the cash-to-revenue ratio ranges from about 0.12 at the 25th percentile to 1.90 at the 75th percentile. Profitability measures are likewise skewed and centered below zero: both ROA and ROE have negative medians, consistent with many young issuers operating in a loss-making growth phase. ROE is additionally sensitive to small or volatile equity bases, which can amplify outliers. By contrast, Tobin's Q is comparatively high (median ≈ 2.32), indicating substantial growth expectations embedded in market valuations. To mitigate the influence of a small number of extreme observations, all continuous variables are winsorized at the 1st and 99th percentiles. This adjustment is most consequential for variables with heavy right tails. For instance, mean R&D intensity declines from 16.8 to 10.0, and the average cash-to-revenue ratio falls from 21.0 to 11.9 after winsorization. Post-winsorization summary statistics are reported in Appendix I.

Industry affiliations are obtained from Refinitiv Eikon and follow the Refinitiv Business Classification (TRBC), a market-oriented taxonomy designed to facilitate peer comparison and benchmarking (LSEG, 2025). Figure I summarizes the industry composition of the sample at the firm level, while Appendix II reports the distribution of firm-year observations by post-IPO year.

Figure I: Industry Distribution of Sample Firms



Notes: This figure shows the distribution of sample firms across industries. The horizontal bars report the number of companies in each industry classification. Pharmaceuticals & Medical Research and Healthcare Services & Equipment account for the largest shares of firms in the sample, while several other industries are represented by smaller numbers of observations.

Pharmaceuticals & Medical Research constitutes the largest industry group, comprising 96 firms and 301 firm-year observations (31.0%), followed by Software & IT Services with 67 firms and 176 observations (18.1%), and Healthcare Services & Equipment with 33 firms and 93 observations (9.6%). The remaining 142 firms account for 403 firm-year observations (41.4%) and are distributed across the other TRBC industries represented in the sample. Overall, the final panel consists of 973 firm-year observations for 372 firms, covering the first three full post-IPO fiscal years (year +1: 338 observations; year +2: 318; year +3: 317). Consistent with the literature reviewed above, this industry concentration suggests that the effects of option-based compensation may be heterogeneous across settings; in particular, the fact that nearly half of the sample is drawn from two industries motivates robustness checks and subsample analyses by industry.

4. Empirical strategy

4.1 Baseline specification

A substantial share of the ESOP literature evaluates effects using a binary treatment indicator (e.g., an ESOP dummy) that compares firms with and without such plans. This strategy captures the extensive margin of adoption (i.e., whether a firm adopts an ESOP at all) but abstracts from economically meaningful variation in the intensity of equity-based compensation (i.e., how large the plan is conditional on adoption). Moreover, when intensity is studied, it is often related to contemporaneous outcomes, which complicates dynamic interpretation and weakens causal content. This thesis therefore shifts attention from adoption to cross-sectional variation in the economic magnitude of equity-based compensation among young post-IPO firms by employing a continuous measure of option intensity: stock option expense. Specifically, the empirical design enforces intertemporal ordering by relating lagged option-expense intensity—recognized in the prior fiscal year—to next-year performance, thereby moving beyond (i) simple adoption effects and (ii) same-year correlations. Conceptually, the analysis asks whether firms that rely more intensively on option-based compensation subsequently experience changes in profitability and valuation.

The baseline empirical approach follows established practice in the compensation literature by estimating a pooled OLS model with widely used performance outcomes (ROA, ROE, and Tobin's Q), a conventional set of balance-sheet and operating controls, and fixed effects (Trébucq, 2004; Meng et al., 2011; Ding and Chea, 2021; Dasilas, 2024). The baseline pooled OLS specification is:

$$Yi,t = \beta SOXi,t - 1 + \Gamma' Xi,t - 1 + \delta\tau + \varepsilon i,t,$$

where $Y_{i,t}$denotes firm i's post-IPO performance in year t, measured alternatively by ROA, ROE, or Tobin's Q. The main explanatory variable is defined as

$$SOX_{i,t-1} = \frac{\text{Stock option expense}_{i,t-1}}{\text{Total assets}_{i,t-1}},$$

i.e., stock option expense scaled by total assets to ensure comparability across firms. The coefficient βcaptures the association between option-expense intensity and subsequent-year outcomes. The control vector $X_{i,t-1}$includes standard determinants of corporate performance and compensation policy, comprising firm size (log total assets), leverage (debt-to-assets; debt-to-equity is used as an alternative), R&D intensity (R&D-to-sales), asset tangibility (fixed-assets intensity), liquidity (cash-to-revenue and cash-to-assets), and firm age at IPO. The term $\delta_\tau$denotes post-IPO year dummies, which capture systematic differences across the first three full post-IPO fiscal years included in the sample. The baseline results are complemented by two sets of robustness checks. First, I augment the specification with calendar year fixed effects to absorb common macroeconomic shocks and time-specific conditions (e.g., 2010, 2011, …).

Second, I re-estimate the model on economically relevant subsamples, splitting firms by industry affiliation, IPO-age group, and size (measured by number of employees), to assess whether the estimated associations are concentrated in particular segments of the post-IPO population.

Importantly, while the outcome measures, controls, and pooled OLS framework align with common empirical strategies in the compensation literature, the thesis makes two contributions: i) it operationalizes option-based compensation intensity using stock option expense (scaled by assets) as a continuous, accounting-based proxy—an approach that, to the best of my knowledge, has not been used as the central intensity measure in this strand of compensation research—and (ii) it focuses explicitly on young post-IPO firms, whereas prior studies typically examine broad samples of public firms without distinguishing firms by post-IPO age.

4.2 Adjusted profitability measures

A central measurement issue arises because stock-based compensation is expensed in the income statement. Under both U.S. GAAP (ASC 718) and IFRS (IFRS 2), stock-based compensation must be recognized as an operating expense, mechanically reducing reported earnings (PwC, 2022; KPMG, 2023). As a result, standard accounting profitability measures such as ROA and ROE are affected by construction, even though option grants do not involve immediate cash outflows. This accounting treatment can materially influence reported profitability without necessarily reflecting proportional changes in underlying economic performance. To mitigate this mechanical link between the regressor (option expense) and accounting-based outcomes, the analysis constructs adjusted profitability measures, ROAAdjusted and ROEAdjusted, by adding back the after-tax value of stock option expense to net income. Formally,

$$NetIncomeAdjusted_{i,t} = NetIncome_{i,t} + (1 - \tau) \cdot StockOptionExpense_{i,t},$$

The tax rate is set to $\tau = 25\%$ as a standardized benchmark. While effective tax rates vary across firms and time, using a constant rate facilitates comparability across observations and limits additional measurement noise (Tax Policy Center, 2024). Although effective tax rates vary across firms and time, applying a uniform rate ensures a transparent and consistent adjustment across observations, improving comparability while avoiding additional noise from heterogeneous tax environments. No corresponding adjustment is required for Tobin's Q. As a market-based valuation measure, Tobin's Q reflects investors' expectations about future cash flows and growth opportunities rather than contemporaneous accounting earnings and is therefore not mechanically affected by the expensing of stock-based compensation.

While prior studies in the compensation literature commonly rely on ROA, ROE, and Tobin's Q as outcome variables, they typically abstract from adjusting accounting-based profitability measures for the mechanical earnings effects induced by option expensing. In contrast, this thesis explicitly addresses this accounting channel by constructing adjusted profitability measures, thereby disentangling reporting effects from changes in underlying economic performance.

5. Results

5.1 Baseline results

The baseline results reported in Table II indicate that stock option expense intensity is negatively associated with subsequent accounting-based profitability and positively associated with subsequent market valuation. Specifically, the coefficient of −0.852 implies that a one percentage point increase in stock option expense relative to total assets is associated with a 0.85 percentage point decrease in ROAAdjusted in the subsequent year. For ROEAdjusted, the estimated coefficient is also negative (−1.015), but statistically insignificant, indicating no robust association between option intensity and equity-based profitability. In contrast, the coefficient of 9.230 for Tobin's Q implies that a one percentage point increase in stock option expense intensity is associated with an increase in Tobin's Q of approximately 0.09 in the subsequent year.

Table II: Baseline Pooled OLS Regression Results

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity (t−1)	-0.852***	-1.015	9.230***
	(0.136)	(0.873)	(1.610)
Debt-to-assets	-0.214***	0.404**	0.962***
	(0.031)	(0.199)	(0.367)
Debt-to-equity	-0.004	-0.334***	-0.118***
	(0.003)	(0.021)	(0.038)
R&D-to-sales	-0.002***	-0.006*	0.008
	(0.000)	(0.003)	(0.006)
Fixed assets-to-sales	-0.014***	-0.032	-0.102**
	(0.004)	(0.023)	(0.043)

Cash-to-revenue	0.002***	0.004*	-0.003
	(0.000)	(0.002)	(0.005)
Cash-to-assets	-0.323***	-0.915***	2.538***
	(0.038)	(0.244)	(0.451)
Log(total assets)	0.120***	0.098**	0.195***
	(0.006)	(0.038)	(0.070)
Age at IPO	0.009***	0.022	0.154***
	(0.003)	(0.016)	(0.030)
Post-IPO year 1 dummy	0.033*	0.005	0.531**
	(0.019)	(0.122)	(0.224)
Post-IPO year 2 dummy	0.003	0.043	0.218
	(0.019)	(0.123)	(0.226)
Constant	-0.774***	-0.511*	-0.239
	(0.046)	(0.298)	(0.550)
Observations	973	973	973
F- Statistic	106.96	29.87	13.25
Adj. R^2	0.545	0.246	0.122

Notes: This table reports pooled OLS estimates of post-IPO performance on lagged stock option expense intensity and lagged controls. SOX intensity is stock option expense divided by total assets. The sample contains 372 firms and 973 firm-year observations (post-IPO years +1 to +3; IPO year excluded). All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are reported in parentheses. The post-IPO year 3 dummy is omitted due to collinearity. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

5.2 Economic magnitudes

The weak or negative accounting-profitability associations are consistent with the broader ESOP and compensation literature, which documents mixed profitability responses once standard controls are included. Meng et al. (2011), for example, show that across a wide range of ESOP-effect estimates, stable accounting performance effects are rare and often sensitive to specification. Similarly, Dasilas (2024) reports negative ROA and ROE coefficients in the full sample of Chinese listed firms and finds that positive profitability effects emerge only in low-intensity ESOP subsamples, consistent with a trade-off between incentive benefits and dilution or free-riding costs at higher intensity levels. Because the present dataset does not observe employee ownership shares or ESOP adoption thresholds, the analysis cannot directly replicate ownership-based cutoff tests. Instead, the robustness section evaluates a related implication by examining whether restricting attention to smaller firms—where incentive dilution and coordination frictions are plausibly weaker—yields stronger or more positive associations for ROAAdjusted and ROEAdjusted.

By contrast, the positive valuation association aligns with studies suggesting that equity-based incentive schemes are often interpreted favorably by capital markets. Ding and Chea (2021) document increases in Tobin's Q around ESOP-related events, with effects that are strongest around the event window and tend to weaken over time. The present thesis differs in design by examining firms in the post-IPO period after option grants have already entered the financial statements through vesting and expensing and by relating lagged option-expense intensity to next-year outcomes. The persistence of a positive Tobin's Q association in this post-recognition setting suggests that investors value not only ESOP-related announcements but also firms' continued reliance on option-based compensation as part of the incentive structure. This interpretation is consistent with early cross-sectional evidence in Trébucq (2004), who reports broadly positive associations between ESOP presence and valuation in a French setting, while also noting that cross-sectional designs cannot establish causal direction. In contrast, the present analysis exploits panel variation and an explicit lag structure, which reduces concerns about contemporaneous mechanical links and attenuates (though does not eliminate) reverse-causality concerns. Taken together, the evidence points to a nuanced pattern in which option-based compensation intensity is negatively associated with short-run adjusted accounting performance but positively associated with market valuation. Consistent with arguments that valuation effects may depend on organizational scale and the scope for free riding (Kim and Ouimet, 2014), the robustness analysis further examines whether the Tobin's Q association is more pronounced among smaller firms.

5.3 Control variables

Overall, the control-variable patterns in Table II are economically sensible and broadly consistent with prior evidence that accounting profitability and market valuation need not move in lockstep in settings with equity-based incentives (e.g., Meng et al., 2011; Dasilas, 2024; Ding and Chea, 2021; Kim and Ouimet, 2014; Trébucq, 2004). In what follows, I summarize the main patterns; statistical significance and standard errors are reported directly in Table II.

Firm size, measured by the log of total assets, is positively associated with both accounting performance and market valuation in this young post-IPO sample. The coefficient on firm size is positive in the ROAAdjusted regression (0.120) and also positive in the Tobin's Q specification (0.195). This pattern suggests that larger newly public firms benefit from scale, credibility, and lower perceived risk, which can support operating performance while also being capitalized into valuation.

Leverage exhibits differential associations across outcomes. Debt-to-assets is negatively related to ROAAdjusted (−0.214), indicating that higher leverage burdens operating profitability when returns are scaled by total assets. In contrast, debt-to-assets is positively related to ROEAdjusted (0.404), reflecting the mechanical amplification of equity returns when profitability is scaled by equity. Debt-to-equity is negatively associated with ROEAdjusted (−0.334) and Tobin's Q (−0.118), suggesting that leverage relative to the equity base is penalized both in accounting performance and in market valuation, particularly among young post-IPO firms where balance-sheet risk may be more salient.

R&D intensity is negatively associated with accounting-based profitability, both for ROAAdjusted (−0.002) and ROEAdjusted (−0.006). This pattern reflects the expensing of R&D, which depresses short-run earnings despite potentially supporting future growth. In contrast, the association between R&D intensity and Tobin's Q is small and positive (0.008), indicating that markets may partially abstract from near-term earnings pressure when pricing growth-oriented investment, especially in young firms.

Liquidity measures display a split pattern across outcomes. Cash-to-revenue is positively associated with accounting profitability (ROAAdjusted: 0.002; ROEAdjusted: 0.004), consistent with financially flexible firms being better positioned to support operations. By contrast, cash-to-assets is negatively associated with accounting profitability (ROAAdjusted: −0.323; ROEAdjusted: −0.915) but strongly positively associated with market valuation (Tobin's Q: 2.538). From an accounting perspective, large cash holdings increase the asset base without immediately raising operating income, mechanically lowering asset-based returns. From a valuation perspective, however, cash provides financial flexibility and insurance against funding risk, which investors may value positively in young public firms.

The post-IPO year indicators capture differences across the early years following listing. In the ROAAdjusted regression, the first post-IPO year dummy enters positively (0.033), while the second-year dummy is close to zero (0.003). A similar pattern appears for ROEAdjusted (Year 1: 0.005; Year 2: 0.043). For Tobin's Q, valuation is higher in the first post-IPO year (0.531) and lower thereafter (0.218), indicating that valuation premia are concentrated early in the post-IPO period, while profitability adjusts more gradually.

6. Robustness and heterogeneity

6.1 Calendar-year fixed effects

The robustness exercises re-estimate the baseline pooled OLS specification with additional fixed effects. Appendix III reports the full-sample results including calendar year fixed effects; coefficients, standard errors, and significance levels are provided there.

The baseline model is given by:

$$Y_{i,t} = \beta \, SOX_{i,t-1} + \Gamma' X_{i,t-1} + \delta_\tau + \varepsilon_{i,t}.$$

In the first robustness step, the specification is augmented with calendar year fixed effects to absorb common macro-financial shocks:

$$Y_{i,t} = \beta \, SOX_{i,t-1} + \Gamma' X_{i,t-1} + \delta_\tau + \theta_t + \varepsilon_{i,t},$$

where $\theta_t$denotes fiscal-year fixed effects. All subsequent subsample regressions (industry, firm size, and IPO-age splits) retain this specification with fiscal-year fixed effects to ensure comparability across robustness exercises.

Although the dataset has a panel structure, firm fixed effects are not well suited in this setting. Identification would rely exclusively on within-firm variation, but the post-IPO window is short (typically up to three full fiscal years, and fewer for some firms), and stock option expense intensity exhibits limited within-firm movement over that horizon. A firm–fixed-effects specification would therefore absorb most economically relevant cross-sectional variation and substantially reduce statistical power. Instead, calendar fiscal-year fixed effects control for macro-financial regimes—such as IPO cycles, discount-rate environments, and shifts in market risk appetite—that may jointly affect valuation and compensation policies, consistent with standard practice in the equity-compensation literature (Kim and Ouimet, 2014; Dasilas, 2024).

Under this specification, the core coefficient patterns remain stable. For Tobin's Q, fiscal-year effects are economically large—particularly during the COVID-era years—yet the option-expense coefficient remains positive (8.455), indicating that the SOX–valuation relationship is not driven solely by time-specific valuation regimes. For the accounting-based outcomes, fiscal-year effects are comparatively small, and the main option-expense relationships are unchanged: SOX remains negative for ROAAdjusted (−0.852) and weak for ROEAdjusted (−1.015).

Overall, introducing fiscal-year fixed effects strengthens the baseline interpretation by restricting identification to within-year cross-firm differences under a common macro environment. Under this stricter control set, the principal pattern remains intact: option-expense intensity is associated with lower subsequent asset-based profitability, is not robustly related to equity-based profitability, and is positively associated with market valuation.

6.2 Industry heterogeneity

To assess whether the baseline results are disproportionately driven by a small set of sectors, the model is re-estimated on industry subsamples while retaining the same structure as in the calendar-year robustness specification (lagged SOX intensity, full control set, and calendar fiscal-year fixed effects). Appendix IV–VI report the full regression outputs for the industry splits, including standard errors and significance levels.

This exercise is motivated by the fact that firms within the same industry tend to share operating risk, profitability profiles, and growth opportunities. Estimating the model within industry groups therefore provides a sharper "like-for-like" comparison and reduces concerns that the main coefficient is capturing cross-industry differences in business models or growth prospects (Pukthuanthong, Roll, and Walker, 2007). The subsample choice is also economically motivated. Pharmaceuticals & Medical Research is the largest sector in the sample and is highly regulated, with distinct development and commercialization cycles, making it important to analyze separately. Software & IT Services is the second-largest sector and, as discussed in the literature review, equity incentives may operate differently in industries characterized by frequent liquidity events and clearer employee expectations about realizable equity value; in such settings, option-based compensation could, in theory, translate more strongly into performance or valuation. The remaining TRBC industries are comparatively small in firm counts and are therefore combined into a residual group. Table III indicates that the accounting-based associations (ROAAdjusted and ROEAdjusted) remain negative or economically weak across sectors, consistent with the baseline findings and not driven by a single industry. In contrast, the positive Tobin's Q association is concentrated in Pharmaceuticals & Medical Research; outside this sector, valuation effects are small and statistically imprecise.

Table III: Industry Heterogeneity in the Effect of Stock Option Expense Intensity

Industry	**ROAAdjusted**	**ROEAdjusted**	**Tobin's Q**
Pharmaceuticals & Medical Res.	−0.600***	2.784***	9.985***
Software & IT Services	−0.647***	−2.796**	−3.395
Residual industries	−1.026**	−2.664**	2.767

Notes: This table summarizes the estimated coefficients on lagged stock option expense intensity (SOX) from pooled OLS regressions with calendar year fixed effects. The full regression outputs are reported in Appendix IV (Pharmaceuticals & Medical Research), Appendix V (Software & IT Services), and Appendix VI (Residual industries).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

6.3 Firm size heterogeneity

Prior evidence suggests that the incentive strength of broad-based equity plans can be economically small because individual employees capture only a tiny fraction of firm-value changes (Chang and Mayers, 1992; Jones and Kato, 1995; Cin and Smith, 2002). In larger organizations, equity incentives may further be weakened by free-rider problems and dilution, as individual effort has a negligible impact on firm outcomes and rewards are spread across many employees. Kim and Ouimet (2014) similarly argue that incentive and valuation effects tend to be most visible when free riding is limited. Motivated by these mechanisms, the model is re-estimated across firm-size subsamples based on employee counts, while retaining the same specification as in the year fixed-effects robustness model. Appendix VII–IX report the full regression outputs (coefficients, standard errors, and significance levels). Taken together, the size-based split reported in Table IV suggests that the negative association between option-expense intensity and asset-based profitability is concentrated among smaller firms (fewer than 200 employees). By contrast, the results for equity-based profitability and market valuation do not vary systematically with firm size and remain broadly in line with the baseline findings, indicating that the ROEAdjusted and Tobin's Q relationships are not fundamentally dependent on firm scale.

Table IV: Heterogeneity by Firm Size (Employees)

Firm size (employees)	ROAAdjusted	ROEAdjusted	Tobin's Q
<200 employees	−0.827**	0.076	4.723
200–1,000 employees	−0.116	−3.707*	4.785
≥1,000 employees	−0.074	−3.310*	3.091

Notes: This table summarizes the estimated coefficients on lagged stock option expense intensity (SOX) from pooled OLS regressions with calendar year fixed effects, estimated separately by firm size (employees). Full regression outputs are reported in Appendix VII (<200 employees), Appendix VIII (200–1,000 employees), and Appendix IX (≥1,000 employees). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

6.4 Firm age at IPO heterogeneity

This robustness split serves two purposes. First, it addresses a measurement limitation in the construction of firm age. Firm age is measured as the difference between the IPO year and the founding year reported in the data source, which is standard in the IPO literature (Ritter, 1991; Siev and Qadan, 2022). However, for some issuers—particularly those undergoing pre-IPO restructurings—the recorded founding year may reflect the incorporation of the IPO holding entity rather than the inception of the underlying business, mechanically producing very low ages at listing. Estimating the model within age bands therefore reduces the risk that results are driven by miscoded "young" firms. Second, the age-based split improves comparability with the broader compensation literature, which typically studies mature public firms rather than explicitly focusing on young post-IPO cohorts (e.g., Trébucq, 2004; Meng et al., 2011; Ding and Chea, 2021; Dasilas, 2024). Appendix X–XI report the full regression outputs for the age-split subsamples (including standard errors and significance levels).

The sample is split into firms younger than five years at IPO and firms five years or older at IPO. As shown in Table V, across both age bands the core accounting-based pattern remains unchanged: option-expense intensity is negatively related to ROAAdjusted, while the ROEAdjusted relationship is not robust. Importantly, this conclusion is not sensitive to potential mismeasurement of founding year. Even when the analysis is restricted to very young issuers (e.g., firms listed within one to three years of the reported founding year), the coefficient patterns remain in line with the baseline results, indicating that the main findings are unlikely to be driven by miscoded "young" firms resulting from pre-IPO restructuring or holding-company incorporation dates.

The valuation results, by contrast, display clearer age dependence. As shown in Table V, the Tobin's Q association is a bit more robust among firms that are older at IPO (≥ five years), consistent with incentive-intensity signals being easier for investors to price when issuers have longer operating histories and lower informational frictions.

Table V: Heterogeneity by Firm Age at IPO

Firm age at IPO	**ROAAdjusted**	**ROEAdjusted**	**Tobin's Q**
< 5 years at IPO	−0.813***	−0.358	5.372*
≥ 5 years at IPO	−0.723***	−0.964	7.034**

Notes: This table summarizes the estimated coefficients on lagged stock option expense intensity (SOX) from pooled OLS regressions with calendar year fixed effects, estimated separately by firm age at IPO. Full regression outputs are reported in Appendix X (<5 years at IPO) and Appendix XI (≥5 years at IPO).
*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

7. Discussion

This section assesses the robustness of the baseline findings and clarifies the limitations that remain. The central empirical result is that lagged stock option expense intensity is negatively associated with subsequent ROAAdjusted, not robustly related to ROEAdjusted, and positively associated with Tobin's Q. The robustness exercises are designed as targeted responses to three recurring concerns in the post-IPO compensation setting—calendar-time confounding, industry composition, and heterogeneity in incentive effectiveness related to organizational scale and informational frictions—asking whether the baseline divergence between accounting profitability and market valuation persists once each concern is addressed.

A first concern is that the baseline valuation relationship may be driven by calendar-time regimes rather than compensation intensity itself, as periods of elevated market valuations may coincide with greater use of equity-based pay. Introducing calendar year fixed effects directly addresses this issue by absorbing macro-financial shocks common to all firms, such as shifts in discount rates and market risk appetite. Under this stricter identification—based on within-year cross-firm variation—the main qualitative pattern remains intact: option-expense intensity continues to be negatively associated with ROAAdjusted, weakly related to ROEAdjusted, and positively associated with Tobin's Q. While year effects are economically important for valuation levels, they do not account for the core SOX–outcome relationships, suggesting that the results are not simply an artefact of "hot market" periods.

A second concern is that pooled estimates may reflect cross-industry composition rather than within-industry relationships, given structural differences in profitability, growth opportunities, and the interpretation of equity-based compensation across sectors. Estimating the model within industry groups sharpens "like-for-like" comparisons. These splits show that the negative association between option-expense intensity and ROAAdjusted is broadly stable across industries, whereas the valuation effect is more context-dependent. In particular, the positive Tobin's Q association is concentrated in Pharmaceuticals & Medical Research and is weak or imprecisely estimated in other sectors. Accordingly, the pooled Tobin's Q coefficient should be interpreted as an average effect that masks meaningful heterogeneity rather than as a uniform market response across all young IPO firms.

Third, the analysis addresses the concern that broad-based equity incentives may be attenuated by dilution and free-riding, implying that the same measured intensity can translate into different incentive strength depending on organizational scale. Firm-size splits are consistent with this mechanism: the negative association between option-expense intensity and ROAAdjusted is strongest among smaller firms and attenuates as firm size increases. By contrast, the absence of a robust relationship with ROEAdjusted is stable across size categories, and the valuation association remains directionally positive but is estimated less precisely in subsamples. These patterns suggest that incentive salience and coordination frictions matter for accounting outcomes, while valuation effects are easier to detect in pooled samples than within narrowly defined size groups.

The age-at-IPO split targets a related limitation: measurement error in founding-year data and differences in informational opacity. Because pre-IPO restructurings can mechanically compress recorded firm age, re-estimating the model within age bands reduces the risk that results are driven by miscoded "young" firms and probes whether markets price compensation intensity differently when issuers have longer operating histories. The negative association between option-expense intensity and ROAAdjusted persists in both younger and older IPO cohorts, supporting the baseline accounting result. The Tobin's Q association, however, is a bit more pronounced among firms that are older at IPO, consistent with valuation effects being easier to identify when disclosure histories are richer and informational frictions lower.

Despite the robustness checks, the primary limitation remains endogeneity. Lagging option-expense intensity mitigates contemporaneous reverse causality but does not eliminate bias from persistent unobserved firm characteristics—such as managerial quality, business model strength, or long-run strategic orientation—that may jointly influence compensation policy and subsequent outcomes. Hochberg and Lindsey (2007) directly address this concern in a large U.S. panel by employing an IV/GMM strategy based on labor-market instruments and documenting economically meaningful positive performance effects on the accounting variables after correcting for endogeneity. Another key feature of their approach is also the use of much richer compensation data: they measure incentive strength through the portfolio delta of non-executive employee options, constructed from detailed plan characteristics such as option quantities, strike prices, and vesting schedules. In contrast, the present thesis relies on accounting expense intensity, which captures recognized compensation cost rather than the contractual features that determine incentive power. As a result, important plan dimensions—such as vesting terms, strike prices, repricing provisions, plan breadth, and the allocation of options across employee groups—cannot be observed. Given the absence of such detailed ESOP data, the present analysis cannot implement comparable identification strategies and should therefore be interpreted as documenting robust conditional associations rather than causal effects.

In sum, this thesis addresses the most immediate threats to interpretation—calendar-time regimes, industry composition, and heterogeneity consistent with free-riding and informational frictions—using the strongest tools available given the data. The empirical design combines a novel accounting-based measure of option intensity, an explicit lag structure, adjusted profitability outcomes that remove mechanical earnings effects, and a focused sample of young post-IPO firms. Within these constraints, the results are robust across a wide range of specifications and subsamples. At the same time, causal interpretation remains limited by endogeneity and by the fact that an expense-based proxy cannot fully capture the incentive-strength and interaction mechanisms emphasized in the post-IPO equity-compensation literature.

8. Conclusion

This thesis examines whether the intensity of option-based compensation is associated with subsequent profitability and valuation among young U.S. firms that went public via IPO or direct listing between 2010 and 2020. The final sample comprises 372 NYSE/NASDAQ issuers matched from Refinitiv to Compustat, yielding 973 firm-year observations over the first three full post-IPO years (IPO year excluded). Methodologically, this thesis makes a distinct contribution to the post-IPO compensation literature. To the best of my knowledge, it is the first study to operationalize option-based compensation intensity using an accounting-based proxy—stock option expense scaled by total assets—rather than relying on binary adoption indicators or plan-level ownership measures. The empirical design further introduces an explicit lag structure by linking option-expense intensity in year t−1 to firm outcomes in year t, thereby establishing a clear timing relationship between compensation and performance. In addition, the thesis constructs adjusted profitability measures (ROAAdjusted and ROEAdjusted) that add back the after-tax value of option expense, reducing the mechanical link between mandatory expensing and reported accounting performance. Together, these choices allow the analysis to isolate economic associations beyond pure accounting effects and to examine equity-based compensation in a way that has not been implemented in prior post-IPO studies.

The baseline pooled OLS results indicate a divergence between accounting profitability and market valuation. A one percentage point increase in stock option expense intensity (relative to total assets) is associated with a 0.85 percentage point decrease in ROAAdjusted in the subsequent year, while the relationship with ROEAdjusted is not robust. In contrast, the Tobin's Q coefficient implies that a one percentage point increase in option-expense intensity is associated with an increase in Tobin's Q of approximately 0.09 in the subsequent year. Robustness exercises that introduce calendar year fixed effects and re-estimate the model across targeted subsamples confirm the core sign pattern, while also showing that the effects are context-dependent: the Tobin's Q association is largely driven by Pharmaceuticals & Medical Research, and the negative ROAAdjusted association is most pronounced among smaller firms (below 200 employees). These findings suggest that, in the early post-IPO years, more intensive option-based compensation can coincide with weaker subsequent asset-based profitability while being priced favorably by public markets. More broadly, the results align with the empirical ESOP and compensation literature, which often finds mixed performance effects despite strong theoretical arguments for equity incentives: even under a new measurement approach and a lagged design, the evidence here points to a trade-off between accounting profitability and market valuation in young post-IPO firms. Causal interpretation of the results is subject to several limitations. Most importantly, endogeneity cannot be fully ruled out: although lagging option-expense intensity reduces contemporaneous reverse causality, persistent unobserved firm characteristics—such as managerial quality, business model strength, or long-run strategic orientation—may still jointly shape compensation policy and subsequent outcomes. In addition, the analysis relies on an accounting-based measure of option intensity, which captures recognized compensation cost but not the contractual features that determine incentive strength, including strike prices, vesting schedules, forfeiture provisions, plan breadth, or option delta. The available data also do not allow a separation between executive and non-executive option incentives, even though incentive and retention effects may differ across organizational levels.

Future research could address these limitations by extending data coverage both backward and inward. Observing firms during the pre-IPO private phase would allow compensation policy to be tracked over a longer horizon and would make within-firm designs—such as firm fixed effects—feasible. Access to richer, grant-level data on option design and employee-group allocation would enable a more precise measurement of incentive intensity and improve identification of incentive-related effects. At the same time, continuing to focus on young firms would be valuable, as the early post-IPO period is precisely when incentive design, retention concerns, and informational frictions are likely to be most pronounced.

Overall, the evidence presented in this thesis is consistent with the broader empirical literature on equity-based compensation, which has found it difficult to identify strong and uniform performance effects despite clear theoretical predictions. Using a new accounting-based intensity measure, a lagged empirical design, and adjusted profitability outcomes, this thesis provides novel evidence from the post-IPO setting: among young public firms, higher option-expense intensity is robustly associated with lower subsequent adjusted ROA and higher market valuation.

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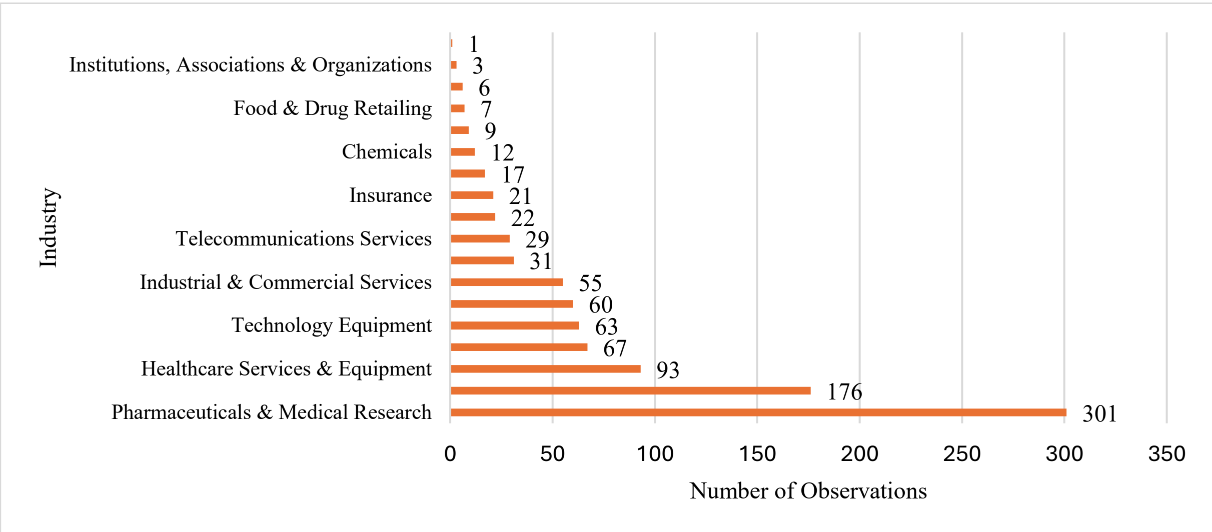
10. Appendix

Appendix I: Descriptive Statistics After Winsorization

Variable	Mean	P1	P25	Median	P75	P99
ROAAdjusted	-0.189	-1.884	-0.322	-0.062	0.032	0.244
ROEAdjusted	-0.187	-7.022	-0.495	-0.098	0.102	11.593
Tobin's Q	3.296	0.425	1.288	2.320	4.134	16.752
SOX intensity (t−1)	0.048	0.000	0.011	0.033	0.062	0.419
Log(total assets)	5.953	2.042	4.990	5.816	7.021	9.739
Debt-to-assets	0.221	0.000	0.001	0.125	0.377	1.327
Debt-to-equity	0.426	-12.364	0.000	0.127	0.790	9.816
R&D-to-sales	10.018	0.000	0.000	0.208	1.344	362.814
Fixed assets-to-sales	1.088	0.000	0.069	0.176	0.470	25.743
Cash-to-revenue	11.875	0.001	0.118	0.378	1.903	414.631
Cash-to-assets	0.280	0.002	0.083	0.205	0.421	0.947

Notes: This table reports the mean and selected percentile values (P1–P99) of the variables after winsorization. Winsorization caps observations below the 1st percentile and above the 99th percentile at those thresholds, based on 973 firm-year observations for 372 firms. All variables are expressed as ratios or in logarithmic form and therefore unit-free.

Appendix II: Industry Distribution of Observations



Notes: This figure displays the distribution of observations across industries in the sample. The horizontal bars indicate the number of firm-year observations in each industry classification.

Appendix III: Pooled OLS regressions with calendar-year fixed effects and firm-clustered standard errors.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-0.809**	-0.862	8.455***
	(0.193)	(0.883)	(2.197)
Debt-to-assets	-0.208**	0.461	0.797
	(0.064)	(0.368)	(0.659)
Debt-to-equity	-0.003	-0.333***	-0.100*
	(0.004)	(0.092)	(0.056)
R&D-to-sales	-0.002**	-0.006**	0.010**
	(0.001)	(0.002)	(0.005)
Fixed assets-to-sales	-0.013***	-0.030**	-0.116***
	(0.004)	(0.014)	(0.038)
Cash-to-revenue	0.002***	0.004**	-0.005
	(0.001)	(0.002)	(0.004)
Cash-to-assets	-0.320***	-0.942***	1.953***
	(0.05)	(0.230)	(0.610)
Log(total assets)	0.121***	0.097*	0.122
	(0.012)	(0.058)	(0.104)
Age at IPO	0.009*	0.022	0.160***
	(0.004)	(0.020)	(0.046)
Post-IPO year 1 dummy	0.025	-0.041	0.828***
	(0.019)	(0.127)	(0.231)
Post-IPO year 2 dummy	-0.001	0.002	0.374**
	(0.016)	(0.134)	(0.168)
Constant	-0.751	-0.657	-1.640*
	(0.092)	(0.532)	(0.877)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	973	973	973
R^2	0.555	0.244	0.206

Notes: This table reports pooled OLS estimates with calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (372 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. The sample consists of 372 firms and 973 firm-year observations (post-IPO years +1 to +3; IPO year excluded). All continuous variables are winsorized at the 1st and 99th percentiles. The post-IPO year 3 dummy is omitted due to collinearity. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix IV: Pooled OLS regressions with calendar-year fixed effects, Pharma subsample.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-0.600*	2.784***	9.985***
	(0.284)	(0.684)	(3.058)
Debt-to-assets	-0.326*	1.149	1.235
	(0.112)	(0.667)	(0.918)
Debt-to-equity	-0.001	-0.984***	0.060
	(0.011)	(0.082)	(0.118)
R&D-to-sales	-0.002	-0.002*	0.006
	(0.001)	(0.001)	(0.005)
Fixed assets-to-sales	-0.006	-0.005	-0.084
	(0.005)	(0.014)	(0.043)
Cash-to-revenue	0.002***	0.003	-0.006
	(0.001)	(0.002)	(0.005)
Cash-to-assets	-0.169***	−0.191***	0.407
	(0.064)	(0.271)	(0.733)
Log(total assets)	0.176**	0.225***	0.212*
	(0.027)	(0.075)	(0.106)
Age at IPO	0.005***	0.030	0.013
	(0.009)	(0.025)	(0.066)
Constant	-1.015***	-2.151***	-0.408
	(0.329)	(0.547)	(1.119)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	301	301	301
R^2	0.272	0.671	0.199

Notes: This table reports pooled OLS estimates for the pharmaceuticals subsample. All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (127 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix V: Pooled OLS regressions with calendar-year fixed effects, Technology subsample.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-0.647***	-2.796**	-3.395
	(0.243)	(1.271)	(4.423)
Debt-to-assets	-0.339***	-0.115	0.155
	(0.064)	(0.128)	(0.491)
Debt-to-equity	-0.006	-0.005	-0.053
	(0.004)	(0.005)	(0.116)
R&D-to-sales	-0.003***	-0.003	0.002
	(0.001)	(0.002)	(0.007)
Fixed assets-to-sales	0.029	-0.011	-0.033
	(0.105)	(0.008)	(0.027)
Cash-to-revenue	0.002***	0.001	-0.011
	(0.001)	(0.002)	(0.016)
Cash-to-assets	0.059	-0.187	2.796
	(0.094)	(0.217)	(2.644)
Log(total assets)	0.148***	0.213***	0.217
	(0.052)	(0.083)	(0.167)
Age at IPO	0.023**	0.023	0.012
	(0.010)	(0.016)	(0.009)
Constant	-0.628***	-0.009	-2.777
	(0.213)	(1.317)	(1.975)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	176	176	176
R^2	0.676	0.383	0.199

Notes: This table reports pooled OLS estimates for the technology subsample. All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (67 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix VI: Pooled OLS regressions with calendar-year fixed effects, residual industries subsample.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-1.026***	-2.664**	2.767
	(0.473)	(1.079)	(3.774)
Debt-to-assets	-0.158*	0.186	0.768
	(0.087)	(0.185)	(0.936)
Debt-to-equity	-0.003	-0.002	-0.114
	(0.004)	(0.006)	(0.366)
R&D-to-sales	-0.005***	-0.002	-0.012
	(0.001)	(0.002)	(0.008)
Fixed assets-to-sales	-0.017**	-0.023	-0.119*
	(0.008)	(0.015)	(0.066)
Cash-to-revenue	0.002***	0.003	-0.013
	(0.001)	(0.002)	(0.014)
Cash-to-assets	-0.276***	-0.203	1.979
	(0.097)	(0.158)	(1.955)
Log(total assets)	0.085***	0.068	0.217
	(0.032)	(0.051)	(0.178)
Age at IPO	0.002	0.006	0.010
	(0.005)	(0.009)	(0.011)
Constant	-0.474***	0.145	0.518
	(0.112)	(0.447)	(1.171)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	496	496	496
R^2	0.543	0.190	0.180

Notes: This table reports pooled OLS estimates for residual industries (excluding pharmaceuticals and technology). All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (178 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix VII: Pooled OLS regressions with calendar-year fixed effects, firms with fewer than 200 employees.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-0.827**	0.076	4.723
	(0.381)	(1.219)	(3.742)
Debt-to-assets	-0.158*	0.161	-0.027
	(0.087)	(0.481)	(0.879)
Debt-to-equity	-0.003	-0.005	0.004
	(0.004)	(0.007)	(0.047)
R&D-to-sales	-0.005***	-0.005	0.005
	(0.001)	(0.002)	(0.004)
Fixed assets-to-sales	-0.017**	-0.029	-0.069*
	(0.008)	(0.014)	(0.033)
Cash-to-revenue	0.002***	0.003	-0.001
	(0.001)	(0.002)	(0.006)
Cash-to-assets	-0.276***	-0.203	1.727**
	(0.097)	(0.158)	(0.635)
Log(total assets)	0.085***	0.068	0.013
	(0.032)	(0.051)	(0.152)
Age at IPO	0.002	0.006	-0.041
	(0.005)	(0.009)	(0.054)
Constant	-0.474***	-1.487**	1.816*
	(0.112)	(0.678)	(0.964)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	324	324	324
R^2	0.599	0.657	0.141

Notes: This table reports pooled OLS estimates for firms with fewer than 200 employees. All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (148 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix VIII: Pooled OLS regressions with calendar-year fixed effects, firms with 200–1,000 employees.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-0.116	−3.707 *	4.785
	(0.433)	(0.658)	(5.183)
Debt-to-assets	-0.400	-0.570	1.838
	(0.165)	(0.534)	(1.272)
Debt-to-equity	-0.010	-0.045**	-0.149
	(0.009)	(0.162)	(0.173)
R&D-to-sales	-0.014***	-0.015***	0.007
	(0.004)	(0.003)	(0.006)
Fixed assets-to-sales	-0.052***	-0.118*	-0.238**
	(0.017)	(0.075)	(0.069)
Cash-to-revenue	-0.013***	-0.036**	-0.045
	(0.004)	(0.020)	(0.065)
Cash-to-assets	-0.175***	-0.235	0.475
	(0.041)	(0.363)	(0.650)
Log(total assets)	0.086***	0.368***	-0.461
	(0.021)	(0.108)	(0.329)
Age at IPO	0.005	0.006	0.101
	(0.005)	(0.023)	(0.074)
Constant	-0.567***	-2.406***	2.160
	(0.154)	(0.833)	(1.785)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	299	299	299
R^2	0.255	0.404	0.252

Notes: This table reports pooled OLS estimates for firms with 200–1,000 employees. All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (143 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix IX: Pooled OLS regressions with calendar-year fixed effects, firms with more than 1,000 employees.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-0.074	−3.310*	3.091
	(0.329)	(2.009)	(4.516)
Debt-to-assets	-0.074	0.835	-0.601
	(0.557)	(0.326)	(0.580)
Debt-to-equity	-0.033	-0.067	-0.375
	(0.022)	(0.052)	(0.517)
R&D-to-sales	-0.412***	0.801	-0.117
	(0.157)	(0.924)	(0.553)
Fixed assets-to-sales	0.023	-0.116	0.036
	(0.025)	(0.223)	(0.187)
Cash-to-revenue	-0.005	-0.018	-0.006
	(0.009)	(0.013)	(0.010)
Cash-to-assets	-0.191**	-0.499	0.232
	(0.085)	(0.756)	(0.545)
Log(total assets)	0.048*	-0.142	-0.016
	(0.028)	(0.132)	(0.153)
Age at IPO	0.009	0.003	0.043**
	(0.005)	(0.004)	(0.017)
Constant	-0.252	0.988	0.619
	(0.211)	(0.896)	(1.179)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	351	351	351
Adj. R^2	0.325	0.108	0.444

Notes: This table reports pooled OLS estimates for firms with more than 1,000 employees. All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (139 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix X: Pooled OLS regressions with calendar-year fixed effects, firms younger than 5 years at IPO.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	-0.813***	-0.358	5.372*
	(0.342)	(1.538)	(2.981)
Debt-to-assets	-0.074	0.169	2.672
	(0.075)	(0.476)	(0.847)
Debt-to-equity	-0.060	-0.150	-0.162
	(0.063)	(0.116)	(0.271)
R&D-to-sales	-0.002*	-0.003	-0.010
	(0.001)	(0.003)	(0.005)
Fixed assets-to-sales	-0.021***	-0.053**	-0.085
	(0.007)	(0.024)	(0.049)
Cash-to-revenue	0.001	0.002	-0.004
	(0.001)	(0.002)	(0.007)
Cash-to-assets	-0.416***	-1.160**	-0.116
	(0.103)	(0.505)	(0.389)
Log(total assets)	0.115***	0.079	0.180
	(0.017)	(0.097)	(0.182)
Age at IPO	-0.019	0.022	-0.048
	(0.011)	(0.058)	(0.095)
Constant	-0.637***	-0.946	1.191
	(0.144)	(1.018)	(0.753)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	366	366	366
R^2	0.629	0.123	0.338

Notes: This table reports pooled OLS estimates for firms younger than five years at IPO. All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (145 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Appendix XI Pooled OLS regressions with calendar-year fixed effects, firms equal or older than 5 years at IPO.

	ROAAdjusted	**ROEAdjusted**	**Tobin's Q**
SOX intensity	−0.723***	−0.964	7.034**
	(0.186)	(0.989)	(2.870)
Debt-to-assets	−0.388***	0.777	−1.206**
	(0.082)	(0.562)	(0.587)
Debt-to-equity	−0.001	−0.479***	−0.063
	(0.004)	(0.116)	(0.053)
R&D-to-sales	−0.003***	−0.005**	0.010
	(0.001)	(0.004)	(0.006)
Fixed assets-to-sales	−0.007	−0.023	−0.105*
	(0.005)	(0.019)	(0.053)
Cash-to-revenue	0.002**	0.006**	−0.009*
	(0.001)	(0.003)	(0.005)
Cash-to-assets	−0.248***	−0.833***	1.903**
	(0.054)	(0.228)	(0.804)
Log(total assets)	0.127***	0.106*	0.329**
	(0.016)	(0.064)	(0.143)
Age at IPO	0.022***	0.008	0.228**
	(0.007)	(0.037)	(0.109)
Constant	−0.877***	−0.557	−2.511*
	(0.124)	(0.616)	(1.413)
Year fixed effects	Yes	Yes	Yes
Firm-clustered SE	Yes	Yes	Yes
Observations	607	607	607
R^2	0.5416	0.4435	0.2164

Notes: This table reports pooled OLS estimates for firms that are equal oder older than five years at IPO. All specifications include calendar fiscal-year fixed effects. Standard errors are clustered at the firm level (227 clusters). SOX intensity is defined as stock option expense divided by total assets and lagged by one year. All continuous variables are winsorized at the 1st and 99th percentiles. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.