11th Hour Option Discounting: The Significance of IPO Prognostications in Fixing Equity Compensation

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This article examines the pervasive practice by pre-IPO firms of granting stock options as compensation while preparing to go public. These last-minute option grants, which are typically not contingent upon initial public offering (IPO) completion, feature substantially lower exercise prices relative to the IPO price, thus producing a windfall potential to executives and other option recipients once these firms consummate their IPOs shortly after having made these discounted option awards. I present empirical evidence to the effect that this 11th hour option discounting practice is common. I scrutinized the option grant practices of a hand-collected dataset comprising U.S. preclinical and clinical-stage biotechnology companies that pursued initial public offerings of common stock on a national stock exchange via registration on Form S-1 during the period from 2017 through 2021. The data I collected was derived from securities filings as well as correspondence by these pre-IPO firms with the Securities and Exchange Commission (SEC), including as a result of Freedom of Information Act requests.

The difference between the exercise prices of options awarded near the IPO and the IPO price at which firms offered their shares to the public shortly after making these option grants was substantial. Option holders enjoyed median and equal-weighted average discounts of forty-eight percent and forty-seven percent on the IPO price for 147 discounted option grants made during IPO preparations, with a weighted average of forty-eight percent. Almost half of these discounted options were awarded within forty-five days prior to the first day of public trading. These last-minute discounted option awards were sizable. When aggregating the shares of common stock underlying the discounted option grants during IPO preparation with the shares of common stock offered by these firms in their IPOs, the total shares of stock underlying these option awards represented, on average, eight percent of the total combined offering per firm, with a median of six percent. Albeit the pre-IPO firms allowed option recipients to effectively purchase eight percent of the total shares at a deep discount relative to the price at which they then offered the

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other ninety-two percent to the public, thus depriving firms of needed capital while significantly diluting IPO investors.

All of the firms in this study were emerging growth companies. At the time of their IPO, their business model was still unproven. All had accumulated a deficit and virtually none of them were profitable. They went public to raise capital in order to advance their therapeutic candidates through clinical trials. As a result, IPO investors would expect that the equity compensation awarded to corporate insiders—the chief executive officer, other corporate officers, and the board of directors—as well as other key employees incentivized them to grow their firm's equity value post-IPO. Yet, corporate insiders received sizable equity awards at deep discounts on the IPO price just before their firms went public. For example, more than three-quarters (78%) of the firms in this study that granted discounted stock options during IPO preparation awarded heavily discounted options to corporate insiders, who, collectively, captured an average potential windfall of $4.2 million per firm. The average potential windfall per CEO alone came to $2.6 million. Firms routinely asserted in their securities filings and in their correspondence with the SEC that these option grants made in close proximity to their upcoming IPO were "at-the-money" even though the fair value they assigned to the underlying stock was substantially lower than the price at which they would offer shares to the public shortly after option grant. The average and median increases between option exercise price and IPO price were 124% and ninety-two percent.

Current regulatory and accounting rules incentivize firms to keep the fair value of the stock underlying their last-minute option grants low to reduce option expenses, thus improving corporate earnings or reducing corporate losses. Option recipients are highly motivated to receive options with an exercise price equal to a low fair value of the underlying stock to avoid adverse tax consequences and benefit from a future windfall potential. The practice of 11th hour discounting is facilitated by glaring weaknesses in the regulatory framework. Pre-IPO firms exploit a seemingly quantitative stock valuation technique, the Probability-Weighted Expected Return Method. They conjure up exceedingly pessimistic prognostications as to IPO outcome which allow them to set option exercise prices well below the price at which they sell shares to investors in their upcoming IPO. Pre-IPO firms often make incomplete and arguably misleading disclosures regarding their last-minute discounted option grants in their registration statements. Discounted awards made to corporate insiders during IPO preparations are often obscured.

Prospective IPO investors expect pre-IPO firms to take measures during their IPO preparations to align the interests of management and employees with the interests of their new investors in the forthcoming IPO as these firms rapidly transition to public company status. I propose regulatory improvements to address 11th hour option discounting in order to correct the misalignment created by this practice and to ensure corporate insiders and their subordinates are incentivized to grow firm value post-IPO.

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INTRODUCTION

This article examines the widespread practice by pre-IPO firms of granting stock options as compensation while preparing to go public. These last-minute option grants feature deeply discounted exercise prices relative to the initial public offering (IPO) price, thus producing a potential windfall to executives and other option recipients once these firms consummate their IPOs shortly after having made these discounted option awards. While not surprising to the Securities and Exchange Commission (SEC), this 11th hour option discounting practice has largely eluded scrutiny by IPO investors, corporate governance watchdogs, and other market observers, as these option grants are often obscured in securities filings.

Pre-IPO companies frequently make substantial stock option grants for compensatory purposes while they prepare for an IPO, and they routinely price the underlying common stock at a deep discount relative to the price at which they offer the same common stock to the public shortly thereafter. Pre-IPO firms take the position that the exercise price assigned to these options grants equals the fair value of the underlying common stock even though the fair value was substantially lower than the price at which they would offer shares of common stock to the public shortly after these option grants.

I present empirical evidence to the effect that this 11th hour option discounting practice is common. I scrutinized the option grant practices of preclinical and clinical-stage biotechnology companies that pursued IPOs of common stock on a national stock exchange via registration on Form S-1 during the period from 2017 through 2021. While this study focuses on the pre-IPO stock option grant practices of early-stage biotechnology companies, I did not identify any factors that would confine pre-IPO stock option discounting to this particular group of going public candidates. Indeed, I provide examples of last-minute equity award activity at companies from other industries.

Moreover, based on this study, there is no reason to believe that awarding discounted stock options to corporate insiders shortly before going public occurs only sporadically at pre-IPO firms. Corporate insiders—the chief executive officer (CEO), other corporate officers, as well as members of the board of directors—are significant beneficiaries of these last-minute stock option grants. They routinely received sizable equity awards at deep discounts relative to the IPO price just before their firms went public. As a result, their interests are not aligned with those of the IPO investors in growing their firm's value post IPO, as the exercise price of their last-minute stock option awards is set well below the IPO price.

Firms consistently take the position that the lower exercise price of these last-minute stock option awards is nevertheless equal to the fair value of the underlying stock at the time of grant. They assert that they granted "at-the-money" options in close proximity to their upcoming IPOs even though the fair value they assigned to the underlying stock was substantially lower than the

price at which they would offer shares of stock to the public shortly after option grant.

Firms are incentivized by current regulatory and accounting rules to keep the fair value of the stock underlying these last-minute option grants low to reduce their option expenses and thus improve corporate earnings or reduce corporate losses. Option recipients are highly motivated to receive options with an exercise price equal to a low fair market value of the underlying stock in order to avoid adverse tax consequences and to benefit from a future windfall potential.

The practice of 11th hour discounting is tolerated by the SEC and is facilitated by glaring weaknesses in the regulatory framework. Firms exploit these weaknesses by leveraging a seemingly quantitative stock valuation technique, the Probability-Weighted Expected Return Method (PWERM). They conjure up unreasonably pessimistic prognostications as to IPO outcome, which in turn allow them to price the shares underlying their last-minute option awards well below the price at which they sell shares to investors in their upcoming IPO.

I propose regulatory improvements to address these 11th hour discounting practices. First, rather than measuring fair value using the PWERM, pre-IPO firms should be required to set the exercise price for stock option grants near the IPO at no less than the midpoint of their preliminary IPO price range which would need to be disclosed to the public. Indeed, the incomplete disclosure requirements concerning these late-stage option grants to IPO investors need to be considerably strengthened to ensure IPO investors have notice of these 11th hour option discounting practices—in particular when they benefit corporate insiders and other key employees. Applicable tax regulations should be clarified to require contemporaneous fair value assessments of the underlying stock. Safe harbor protections of stock valuations by independent appraisers should not apply during IPO preparations.

My article proceeds as follows. Part I provides an overview of my study, presents my dataset, and discusses my key findings concerning the option grant practices by pre-IPO firms during IPO preparation. Part II discusses the incomplete disclosure rules that facilitate 11th hour option discounting. Part III examines the strategies pursued by the firms in this study that exploit regulatory weaknesses to achieve deep discounts and questions the reasonableness of the IPO prognostications made by firms which are at the heart of these strategies. Part IV proposes my regulatory solutions for fixing these weaknesses.

I. DISCOUNTED STOCK OPTION GRANT PRACTICES DURING IPO PREPARATION

A. AT-THE-MONEY OPTION AWARDS WITH LOW EXERCISE PRICES NEAR THE IPO

While pre-IPO firms prepare to go public, they often make sizable option grants to corporate insiders and other service providers. These grants often feature heavily reduced per share exercise prices compared to the per share IPO prices at which they sell their stock to the public shortly after these stock option grants. In other words, option recipients benefit from a discount on the IPO price, which reflects the aggregate intrinsic value of these stock options based on the IPO price.[1]

To illustrate, on October 28, 2020, clinical-stage biotechnology company Galecto, Inc. sold 5,666,667 shares of its common stock to investors in its initial public offering.[2] The IPO priced at $15.00 per share.[3] In early October 2020, Galecto's board of directors awarded options to purchase 950,181 shares of its common stock to its employees, directors, and consultants featuring a per share exercise price of $7.70 which, according to Galecto, supposedly reflected the per share fair value of the underlying common stock on the grant date.[4] At the time of these option awards on October 7, 2020, Galecto had 21 full-time employees.[5] The same day, Galecto publicly filed its registration statement on Form S-1.[6]

When Galecto's IPO priced three weeks later, the underlying common stock's fair value had increased by ninety-five percent compared to the exercise price. The low exercise price resulted in a 48.67% discount on the IPO price, producing a potential pre-tax windfall to option recipients of about $7 million ($6,936,321.30).

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1. The intrinsic value of an option is, "[f]or accounting purposes, the difference (if any) between the exercise price and the fair market value of a share of the underlying stock on the measurement date." ALISON WRIGHT, ALISA J. BAKER & PAM CHERNOFF, THE STOCK OPTIONS BOOK 386 (Pam Chernoff ed., 22d ed. 2022).

2. Press Release, Galecto, Galecto Announces Pricing of Initial Public Offering (Oct. 29, 2020) (available at https://ir.galecto.com/news-releases/news-release-details/galecto-announces-pricing-initial-public-offering#:~:text=(NASDAQ%3A%20GLTO)%2C%20a,initial%20public%20offering%20of%205%2C666%2C667). All exercise prices, per share fair value amounts, and stock amounts used in my study are calculated after giving effect to any stock split disclosed in the applicable registration statements for the firms in this study.

3. *Id.*

4. Galecto, Inc., Amendment No. 1 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 101, F-43, II-3 (Oct. 22, 2020) [hereinafter Galecto, Inc., Amendment No. 1]; Letter from Galecto, Inc., to Kristin Lochhead, Kate Tillan, Donald Field & Susan Block, SEC, Div. Corp. Fin. 3 (Oct. 13, 2020) (on file with EDGAR) [hereinafter Galecto Letter]. Galecto was inconsistent in its S-1 as to whether the options were granted on October 6 or October 7, 2020, and whether any options were granted on September 27, 2020. *See* Galecto Inc., Amendment No. 1, *supra,* at 101, F-43, II-3. In its correspondence to the SEC on October 13, 2020, Galecto indicated that the option grant date was October 7, 2020. *See* Galecto Letter, *supra*, at 3. In my study, I used October 7, 2020, as the option grant date for all 950,181 shares.

5. Galecto, Inc., Amendment No. 1, *supra* note 4, at 61.

6. Galecto, Inc., Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1) (Oct. 7, 2020).

The primary beneficiaries of these option grants were corporate insiders at Galecto who took the bulk (70%) of these last-minute equity awards in October 2020. Galecto's CEO received options to purchase 519,940 shares, its chief operating officer (COO) received options to purchase 77,991 shares, and one non-employee director, a board member and future chair of the board's compensation committee, received options to purchase 64,992 shares, all featuring the $7.70 per share exercise price.[7] This late-stage option award to the CEO represented two-thirds (67%) of the total stock options held by him at IPO.[8]

This study focuses on the compensatory option grant practices of preclinical and clinical-stage biotechnology companies during IPO preparations. These biotechnology companies are focused on the development and commercialization of treatments, therapies, or drugs for the palliation, treatment, cure, management, or prevention of a disease or health condition in humans. All of the firms in this study were either clinical-stage companies or had not yet progressed beyond preclinical research or exploratory trials by the time they sought to go public.[9] At the time of their planned IPO, their business model was thus unproven, as they still had to advance their therapeutic candidates through one or more clinical trials. All of the firms in this study had accumulated deficits, and all but one remained unprofitable at the time they filed to go public.

These firms thus had significant capital needs to fund development of their therapeutics. Early funding had typically been provided by sophisticated sources of private capital, primarily venture capital or private equity funds.

Preclinical and clinical-stage biotechnology companies seek to tap the public markets early in their lifecycle not only to create liquidity for their pre-IPO investors, but also to continue funding product development, as their business model typically generates high research and development expenses, limited revenues, and significant losses until they succeed in bringing a therapeutic to market.[10] These companies are highly dependent on human expertise and ingenuity to drive research and development forward. On average, the firms in this study that went public had 48 employees (median: 39), and seventy percent of their workforce (median: 73%) was employed in research and development.[11] Given the risks inherent in bringing a therapeutic to market, these knowledge workers and their leaders needed to be incentivized to maximize product development success.

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7. Galecto, Inc., Initial Statement of Beneficial Ownership of Securities (Form 3) (Oct. 28, 2020).

8. *Id.* Information about option awards to insiders of the firms in this study was derived from their respective filings on Form 3 with the SEC, their firms' definitive proxy statements as filed with the SEC on Schedule 14A, and their firms' registration statements on Form S-1.

9. 77% of the firms in this study that completed their IPO were clinical-stage companies and the remaining 23% had not yet progressed to the clinical trial stage at the time of their IPO. *See infra* Part.I.B.

10. Ekaterina Galkina Cleary, Laura M. McNamee, Skyler de Boer, Jeremy Holden, Liam Fitzgerald & Fred D. Ledley, *Comparing Long-Term Value Creation After Biotech and Non-Biotech IPOs, 1997–2016*, PLOS ONE, Jan. 6, 2021, at 1, 1.

11. This is based on the number of employees disclosed by 115 out of 116 firms in this study in their S-1 and 82 firms in this study that disclosed the number of their employees working in research & development.

Equity compensation is considered a critical tool for incentivizing executives and key employees to grow a firm's equity value for the benefit of its owners by giving them a stake in the firm's future success, thereby effectively tying compensation to firm performance. "Economic theory recognizes that agents are effort-adverse and that rewards tied to performance are required to provide them the incentive to supply effort."[12]

If the exercise price of a compensatory stock option award reflects or, at a minimum, closely approximates the fair value of the firm's underlying stock at the time of grant, the option recipient may well be incentivized to grow the firm's equity value for the benefit of the firm's owners, such as investors who purchase stock at the IPO price after the firm goes public. That does not appear to be the case, however, with deeply discounted option grants awarded to a pre-IPO firm's insiders and other key employees so close to its IPO.

By setting a low option exercise price at which the optionee is contractually entitled to purchase shares of a pre-IPO firm's common stock once the option has vested, the optionee benefits from a future windfall potential.[13] If the firm subsequently consummates an IPO of its common stock, the option holder can exercise the vested option and purchase the underlying common stock from the firm at the low exercise price following expiration of the customary contractual lock-up period that precludes stock sales by existing stockholders for 180 days following the IPO. The option holder thus pockets the pre-tax appreciation in the value of the underlying common stock relative to the exercise price – its so-called spread.[14]

To be sure, compensatory stock option awards only create the potential for a windfall. There is no assurance that upon future vesting the per-share market price of the underlying stock at the exercise date will be greater than the exercise price.

Moreover, prior to the IPO, the common stock underlying the options remains largely illiquid. However, with a low exercise price, optionees can certainly improve their chances of reaping such a windfall upon option vesting

12. M.P. Narayanan, Cindi A. Schipani & H.N. Seyhun., *The Economic Impact of Backdating of Executive Stock Options*, 105 MICH. L. REV. 1597, 1624 (2007).

13. Option contracts may allow optionees to exercise unvested options, in which case the purchased shares remain restricted and subject to vesting.

14. The underlying stock from employee stock option exercises becomes tradable after the company's IPO following a 90-day hold period pursuant to SEC Rule 701(g) as amended, assuming the options grants (and underlying securities) were made in compliance with Rule 701, subject to the applicable limitations of Rule 144 (as modified by Rule 701(g)). 17 C.F.R. § 230.701 (2018); 17 C.F.R. § 230.144 (2022). However, firms routinely register the options granted prior to the IPO and the underlying stock on Form S-8 shortly following IPO completion, which allows the employees to sell shares upon exercise of vested options after the customary contractual 180-day lock-up period following the IPO. *See* JENS M. FISCHER, STEWART M. LANDEFELD, ANDREW B. MOORE, JASON DAY, JOHN R. THOMAS & ALLISON C. HANDY, PERKINS COIE, *Chapter 12: Follow-on Offerings and Shelf Registrations*, *in* THE PUBLIC COMPANY HANDBOOK 311, 329 (6th ed. 2021).

once the firm has completed its IPO and the contractual lock-up period has expired.[15]

For example, Akouos, Inc., then a preclinical biotechnology company, went public on June 25, 2020 at an IPO price of $17.00 per share.[16] On May 12, 2020, 44 days before its IPO, Akouos had granted compensatory stock options to purchase 1,423,504 shares of common stock at an exercise price of $7.38 per share, which included awarding options covering 750,676 shares to its CEO, an aggregate of 229,297 shares to its chief development officer and senior vice president of regulatory and quality (subsequently promoted to COO effective October 1, 2020), and an aggregate of 63,230 shares to three non-employee members of its board of directors.[17] The shares underlying the options awarded to the CEO and other officers were subject to vesting over a four-year period from May 1, 2020.[18] In other words, these insiders as well as other option recipients were awarded stock options at a 56.59% discount on the IPO price and a 66.45% discount on the $22.00 closing price on the first day of public trading.[19]

On December 1, 2022, Akouos announced the closing of its acquisition by Eli Lilly & Co. via public tender offer at a price of $12.50 per share plus an additional earn-out right of up to $3.00 per share. This allowed the CEO and other insiders, as well as other employees, to benefit from this exit with all of their then outstanding pre-IPO stock options, both vested and unvested— unlike the investors in its IPO.[20] Under the terms of the acquisition, all of the vested and unvested pre-IPO options then outstanding were converted into a cash payment equal to the spread between the exercise price and the tender offer price multiplied by the number of underlying shares plus the right to receive the additional earn-out right, if any, per underlying share.[21]

Critically, option beneficiaries are not only incentivized to receive options with low exercise prices in order to maximize their chances of reaping future windfalls. They are also highly motivated to receive "at-the-money" options, *i.e.*, options with exercise prices that are set at the fair market value of the underlying stock at the time of grant. In other words, option recipients strongly

15. Vesting of the discounted options grants in this study, to the extent disclosed, was overwhelmingly time-based and not tied to IPO completion or the achievement of post-IPO milestones.

16. Akuous, Inc., *Akuous Announces Pricing of Initial Public Offering*, GLOBENEWSWIRE (June 25, 2020, 7:42 ET), https://www.globenewswire.com/news-release/2020/06/25/2053797/0/en/Akouos-Announces-Pricing-of-Initial-Public-Offering.html.

17. Akouos, Inc., Initial Statement of Beneficial Ownership of Securities (Form 3) (June 25, 2020).

18. *Id.*

19. All post-IPO stock prices in this article were obtained from Refinitiv. Refinitiv has since been rebranded as LSEG Data & Analytics by the London Stock Exchange Group.

20. Akouos, Inc., Current Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 (Form 8-K) (Dec. 1, 2022) [hereinafter Akouos Inc., Current Report]; *see, e.g.*, Akouos, Inc., Statement of Changes in Beneficial Ownership (Form 4) (Nov. 30, 2022).

21. *See* Akouos, Inc., Current Report, *supra* note 20; Akouos, Inc., Statement of Changes in Beneficial Ownership, *supra* note 20.

prefer that prior to an upcoming IPO, the fair market value of the underlying stock remains low relative to the IPO price.

Tax law greatly disincentivizes compensatory stock option awards that are "in-the-money" at the time of option grant. Section 409A of the Internal Revenue Code (IRC) subjects the recipient of compensatory stock options to draconian penalties if the firm sets an option exercise price below the fair market value of the underlying stock at the time of grant unless the option grant is exempt from Section 409A.[22] These adverse tax consequences generally include, acceleration of recognition of the deferred compensation at the time of option vesting, irrespective of option exercise, the imposition of an additional twenty percent punitive tax on the compensation recognized at that time, in addition to all applicable federal income taxes, and imposition of a premium interest charge.[23]

The income so recognized and taxed is the difference between the exercise price and the fair market value of the underlying stock at the time of vesting.[24] In addition, until the option is either exercised or expires, any appreciation in the value of the underlying stock following vesting continues to be taxed annually at federal ordinary income tax rates plus the additional twenty percent punitive tax and the premium interest.[25] The option holder may also owe additional state taxes.[26]

Conversely, the punitive tax regime of Section 409A does not come into play if the exercise price of compensatory options is set, at a minimum, at the fair market value of the underlying stock at the time of option grant.[27]

The IRC also exempts compensatory stock options awarded to employees from the reach of Section 409A if these stock options qualify as incentive stock options (ISOs) under IRC §422.[28] However, IRC §422(d) imposes an annual, non-inflation adjusted $100,000 disqualification threshold for vested (*i.e.*,

22. Option recipients can avoid Section 409A's adverse tax treatment even though they received options with an exercise price below the fair market value of the underlying stock at grant if these options comply with Section 409A. Section 409A-compliant options would need to prohibit option holders from freely exercising their options even if they have time-vested, which makes them unappealing as equity compensation. These options may generally become exercisable only under a limited set of circumstances specifically permitted by the statute, such as, e.g., upon a change of control or change of ownership of a substantial portion of the assets of the option granting firm. 26 U.S.C. § 409A(a)(2)(A); Treas. Reg. § 1.409A–3 (as amended in 2007); MICK BAIN, KIMBERLY WETHLEY, JULIE HOGAN RODGERS, DAVID A. WESTENBERG, R. SCOTT KILGORE, CIARA R.M. BAKER & ANDREW SORRENTINO, WILMERHALE, 2017 VENTURE CAPITAL REPORT 18 (2017), https://www.wilmerhale.com/-/media/files/shared_content/editorial/publications/documents/2017-wilmerhale-vc-report.pdf.

23. 26 U.S.C. § 409A(a)(1); BAIN ET AL., *supra* note 22, at 16. *See* REGINA OLSHAN & ERICA F. SCHOHN, SECTION 409A HANDBOOK 28.1–.37 (2d ed. 2016).

24. 26 U.S.C. § 409A(a)(1); BAIN ET AL., *supra* note 22, at 16.

25. *Id.*; s*ee* OLSHAN & SCHOHN, *supra* note 23.

26. For example, California imposes an additional 5% penalty tax in connection with Section 409A non-compliant compensation. *California Reduces Section 409A State Income Tax Penalty*, COOLEY (Oct. 31, 2013), https://www.cooley.com/news/insight/2013/california-reduces-section-409a-state-income-tax-penalty.

27. Treas. Reg. § 1.409A–1(b)(5)(i)(A) (as amended in 2007); BAIN ET AL., *supra* note 20, at 16.

28. Treas. Reg. § 1.409A–1(b)(5)(ii) (as amended in 2007); I.R.C. § 422.

exercisable for the first time) ISOs per recipient, which is calculated based on the aggregate fair market value of the underlying stock on the grant date.[29] Any vested options above this threshold cannot qualify as ISOs and remain subject to Section 409A. Employees thus benefit from keeping the exercise price of their at-the-money option grants low, as a low exercise price that equals the fair market value of the underlying stock at the time of grant allows a larger number of vested options to qualify as ISOs.

The IRC confers valuable benefits upon employees who receive compensatory stock options that qualify as ISOs. Holders of ISOs can defer taxation on future value increases of the underlying stock and can secure a significantly lower tax rate on the future gain from the eventual sale of the stock, namely the tax rate on long-term capital gain.[30]

However, a stock option that otherwise qualifies as an ISO will be treated as an ISO only if the firm, at a minimum, attempted in good faith to set the exercise price at no less than the fair market value of the underlying stock at the time of option grant.[31] An in-the-money stock option at the time of grant thus cannot qualify as a tax-advantaged ISO, which would preclude its recipient from transforming compensation received for services into deferred long-term capital gain.[32] Instead, upon exercise of a stock option that does not qualify as an ISO, any spread between exercise price and fair market value of the underlying stock at exercise would become immediately taxable at ordinary income tax rates.[33] Moreover, a stock option that loses its ISO status may well trigger the punitive tax consequences to the option holder under IRC §409A, especially if the underlying stock's fair market value exceeds the exercise price at the time of option grant.[34]

Firms are similarly incentivized to award at-the-money options with low exercise prices. The accounting rules applicable to equity compensation under generally accepted accounting principles in the United States (US-GAAP) favor awarding at-the-money options at a low exercise price. Firms are required to treat compensatory stock options as a company expense in their financial

29. I.R.C. § 422(d).

30. A stock option must be exercised by the option holder more than one year prior to the holder's sale of the underlying stock and the underlying stock may not be sold within two years from the option grant date in order to secure long-term capital gain treatment of the gain from the subsequent stock sale. *Id.* §§ 421, 422(a)(1). Option holders may still owe the alternative minimum tax upon exercise of ISOs depending on the size of the spread between exercise price and fair market value of the underlying stock at exercise. *See* Sven Riethmueller, *Rise of the Zombies: The Significance of Venture Capital Investments That Are Not Profitable*, 22 HOUS. BUS. & TAX L.J. 98, 152–53 (2021).

31. I.R.C. § 422(c)(1).

32. Ronald J. Gilson & David M. Schizer, *Understanding Venture Capital Structure: A Tax Explanation for Convertible Preferred Stock*, 116 HARV. L. REV. 874, 901 (2003) ("Managers report a lower tax valuation for their common stock, transforming current ordinary income into deferred capital gain.").

33. *Id.* at 896–97, 897 n.73; Treas. Reg. § 1.83-7 (2004); I.R.C. § 83(i) may permit certain employees of eligible companies to elect to defer federal income tax on the spread for up to five years upon exercise of their non-ISOs.

34. BAIN ET AL., *supra* note 22, at 16; Riethmueller, *supra* note 30, at 146.

statements under Accounting Standards Codification Topic 718, Stock Compensation (ASC 718). ASC 718 generally governs the accounting treatment and financial reporting of equity compensation and addresses the valuation of compensatory stock options, their expense recognition, and related disclosure requirements for financial statement reporting.[35]

Since compensatory stock options cannot be traded publicly, and thus no observable market price for these options is available, ASC 718 requires that their grant date fair value be estimated using an option pricing model.[36] An option pricing model, such as the Black-Scholes-Merton formula, calculates the intrinsic value of the option at the time of option grant as well as its "remaining time value," *i.e.*, "the value of being able to wait to pay the required [exercise, or strike] price" when exercising the vested option during its term.[37] The model thus takes into account the option holder's right to benefit from future appreciation of the underlying stock.[38]

The Black-Scholes-Merton formula was used by the vast majority of firms in this study for determining the fair value of their stock options awards.[39] As Table 1 illustrates, all other input factors under the formula being equal, a significantly reduced exercise price relative to the fair value of the underlying stock at grant *increases* the fair value of an in-the-money grant stock option compared to an at-the-money option, thereby increasing compensation costs, which may materially affect corporate earnings. For example, depending on the number of compensatory stock options awarded, an option exercise price that is discounted by fifty percent compared to the fair market value of the underlying

35. ASC 718 governs the accounting treatment of equity awards to employees and non-employee directors. BARBARA A. BAKSA, ACCOUNTING FOR EQUITY COMPENSATION 156 (18th ed. 2022). Historically, the accounting treatment of equity grants to non-employee service providers was governed by ASC 505-50. *Id.* On June 20, 2018, the FASB adopted ASU 2018-07, which expanded the scope of ASC 718 to apply to equity awards to non-employees for goods and services. FIN. ACCT. STANDARDS BD., ACCOUNTING STANDARDS UPDATE NO. 2018-07, COMPENSATION—STOCK COMPENSATION (TOPIC 718): IMPROVEMENTS TO NONEMPLOYEE SHARE-BASED PAYMENT ACCOUNTING (2018). Victoria Flores & Sinead Kelly, *FASB Approves More Favorable Accounting Treatment for Non-Employee Equity Awards*, BAKER MCKENZIE: COMP. CONNECTION BLOG (Mar. 1, 2018), https://www.thecompensationconnection.com/2018/03/01/fasb-approves-more-favorable-accounting-treatment-for-non-employee-equity-awards.

36. FW COOK, ACCOUNTING FOR STOCK COMPENSATION UNDER FASB ASC TOPIC 718, at 1 (2020), https://www.fwcook.com/content/documents/publications/9-1-20__ORIGINALLY_4-29-05__-_Accounting_for_Stock_Compensation_Under_FASB_ASC_Topic_718_.pdf.

37. BAKSA, *supra* note 35, at 19.

38. TAKIS MAKRIDIS, ADVANCED TOPICS IN EQUITY COMPENSATION ACCOUNTING 5 (10th ed. 2021). *See generally* Charles Baril, Luis Betancourt & John Briggs, *Valuing Employee Stock Options Under SFAS 123R Using Black-Scholes-Merton and Lattice Model Approaches*, 25 J. ACCT. EDUC. 88 (2007) (discussing the Black-Scholes-Merton formula's application to employee stock options allowing stockholders to benefit when stock prices rise). Permissible option-pricing methods under ASC 718 include the Black-Scholes-Merton formula, a "lattice" model, and "Monte Carlo" simulations. FW COOK, *supra* note 36, at 3.

39. Baril et al., *supra* note 38, at 89. Assuming that a firm does not pay dividends, the value of a call option issued by the firm is defined as a function of the following five variables under the basic Black-Scholes-Merton formula when applied to compensatory stock options: (1) the fair value of the underlying stock at the time of grant; (2) the exercise price of the stock option; (3) the expected life of the option; (4) the underlying stock's volatility; and (5) the risk-free interest rate. *Id.* at 90.

stock at grant has the potential of materially increasing compensation cost and decreasing corporate earnings.

TABLE 1

Table 1

Option Value Calculation using Black-Scholes-Merton formula with the following input factor assumptions: 5.5 years for the expected life of the option; 85% for the underlying stock's volatility; and a 2% risk-free interest rate

Option Type	Fair Market Value of Underlying Stock (at time of grant)	Exercise Price	Price Discount	Fair Value of Option	Option Value Improvement ($) to At-the-money Option	Option Value Improvement (%) to At-the-money Option
at-the-money	$10.00	$10.00	0%	$6.98		
in-the-money	$10.00	$8.50	15%	$7.23	$0.25	3.6%
in-the-money	$10.00	$7.00	30%	$7.51	$0.53	7.6%
in-the-money	$10.00	$5.00	50%	$7.95	$0.97	13.9%
in-the-money	$10.00	$4.00	60%	$8.22	$1.24	17.8%

In addition, somewhat counterintuitively, if the fair value of the underlying stock at the time of grant is lower, all other input factors being equal, an option is less valuable under the Black-Scholes-Merton formula, and thus less costly to the firm,.[40] For example, as shown in Table 1, the fair value of an at-the-money option having an exercise price of $10.00 is estimated at $6.98. By comparison, at a $20.00 exercise price, the fair value of the at-the-money option rises to $13.97, making the option far more valuable, and thus considerably more expensive to the firm.

Firms are thus incentivized to grant at-the-money options and to keep the fair value of the underlying stock and the corresponding option exercise price—and hence the fair value of their compensatory at-the-money option grants—low.

The firms in this study routinely asserted in their securities filings and in their correspondence with the SEC that they granted at-the-money options in close proximity to their upcoming IPO even though the fair value they assigned to the underlying common stock was substantially lower than the IPO price at which they would offer shares of common stock to the public shortly after option grant.[41] This article scrutinizes the regulatory shortcomings that permit firms to treat these last-minute option awards as at-the-money grants.

40. MAKRIDIS, *supra* note 38, at 13–14.

41. One firm in this study, Sensei Biotherapeutics, Inc., disclosed that it had awarded options on January 14, 2021, at an exercise price of $9.22 while the fair value of the underlying stock as determined at the time of grant was $7.49. Sensei Biotherapeutics, Inc., Amendment No. 1 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 91 (Feb. 1, 2021). The firm priced its IPO on February 3, 2021, at $19.00 per share. Press Release, Sensei Biotherapeutics, Sensei Biotherapeutics Announces Pricing of Upsized Initial Public Offering (Feb. 4, 2021).

B. DATASET

My study investigated the pre-IPO option grant practices of preclinical and clinical-stage biotechnology companies seeking to go public in the United States. These firms had to pursue development of a therapeutic as their principal business activity at the time of initial public filing of their registration statement on Form S-1 with the SEC in order to be included in this study. In addition, their principal business activity had to be classified as "Bio Therapeutic Drugs" under The Refinitiv Business Classifications scheme (TRBC), thus allowing me to sort IPO candidates while minimizing selection bias.[42] TRBC is a widely used market-oriented industry classification scheme that is based on the primary business of organizations.[43] TRBC sector classifications are designed to enable peer company comparisons, which allowed me to compare similarly situated companies in this segment of the biotechnology market.[44]

My study focused on all preclinical and clinical-stage biotechnology firms pursuing "Bio Therapeutic Drugs" as their principal business activity that publicly filed their initial S-1 during the 2017-2021 period. Firms were removed from this dataset if they met one or more of the following exclusion criteria: they did not seek to register their shares on Form S-1; their shares of capital stock were already traded prior to their S-1 filing, whether on a stock exchange or over-the-counter; they offered securities other than or in addition to common stock (e.g., units that comprised common stock and warrants to purchase common stock); their stock would not be listed on The New York Stock Exchange, including NYSE American, or NASDAQ; or they did not have an operating business focused on the development of a therapeutic at the time of their S-1 filing, such as, e.g., SPACs or other "blank check" companies.

The resulting hand-collected dataset comprises a total of 121 companies.[45] None of the firms in this study pursued a direct listing of their common stock without raising capital. 116 firms out of the 121 firms in this dataset completed their IPO. All completed IPOs in this dataset culminated in trading on NASDAQ or NYSE American. Ninety-nine percent of the firms in this study preferred NASDAQ. Five firms operated as limited liability companies until they converted to corporations immediately prior to their IPO, which effectively precluded them from offering compensatory stock options to their employees prior to their IPO.[46]

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42. The firms in this study were classified under the TRBC's "Bio Therapeutic Drugs" classification as of September 2022.

43. REFINITIV, THE REFINITIV BUSINESS CLASSIFICATION METHODOLOGY 3–4 (2020).

44. *See* ETF.COM, SELECTING SECTOR BENCHMARKS: OVERVIEW & DESCRIPTION 8 (Feb. 2023), https://www.etf.com/sites/default/files/2023-03/020223_ETF_SelectingSectorBenchmarks_v1a_PH_LB.pdf.

45. The firms in this study are listed in an Appendix to this article.

46. It is not customary for limited liability companies to compensate their employees with options to acquire capital interests. BRETT W. DIXON, MICHAEL P. SPIRO, JOHN TORRENTI, FINN DIXON & HERLING LLP, PRACTICAL LAW EMPLOYEE BENEFITS AND EXECUTIVE COMPENSATION, PARTNERSHIP EQUITY COMPENSATION,

The empirical data presented in this article were collected from the SEC filings and submissions of the firms in this study, foremost their registration statement, including initial draft and amendments thereto, final prospectus filings pursuant to Rule 424(b)(1) under the Securities Act of 1933 as amended (Securities Act), definitive proxy statements on Schedule 14A, and annual and quarterly reports on Forms 10-K and 10-Q, as well as the disclosures of securities ownership by firm insiders on Form 3, under the Securities and Exchange Act of 1934 as amended (Exchange Act), all of which are available on the SEC's EDGAR database. In addition, data were collected from correspondence sent by firms in this study to the SEC including, in particular, concerning stock valuations. This correspondence, which was routinely redacted by the firms, is also available on EDGAR.

I obtained unredacted originals of this correspondence from the SEC under the Freedom of Information Act (FOIA).[47] Altogether, I submitted FOIA requests for unredacted SEC correspondence for fifty-two firms in this study starting in October 2022. As of September 15, 2023, the SEC had produced the unredacted or partially unredacted correspondence from thirty-seven firms and no longer had the unredacted letters of two firms.

C. SUMMARY OF KEY FINDINGS

1. 11th Hour Option Discounting Practices

The practice of 11th hour option discounting was pervasive. At least two-thirds (seventy-four firms) of the 111 firms in this study that became public companies and that were corporations prior to their IPOs and could thus grant compensatory stock options engaged in the practice of granting discounted options during their IPO preparations. These stock options were discounted in that they featured a per share exercise price below the IPO price.[48]

The IPO preparation window used for measuring this option grant activity is quite narrow. For this study, I defined the IPO preparation period as the period from the pre-IPO firm's first submission to the SEC of its S-1, whether initially submitted confidentially in draft form or filed publicly with the SEC, until the IPO priced. By then, the S-1 had been declared effective by the SEC.

Preparations to go public, in actuality, start earlier and involve steps such as selecting the lead underwriter(s) for the IPO, holding an organizational

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PRACTICAL LAW PRACTICE NOTE 14 (database updated Feb. 2025), Westlaw 1-525-2704 ("Compensatory options on partnership interests are relatively uncommon, largely because while options and profits interests are fundamentally economically equivalent, a profits interest is taxed more favorably.").

47. 5 U.S.C. § 552.

48. At least five of the firms that engaged in 11th hour option discounting also granted options featuring an exercise price set at the midpoint of the published IPO price range. For purposes of this study, these option awards are not considered discounted stock options. Four other firms awarded stock options during the IPO preparation period that featured a per share exercise price greater than the IPO price. Other types of equity compensation awarded, such as restricted stock or restricted stock units, or profit interests awarded by limited liability companies before converting to corporations, are not included in this study.

meeting with the lead underwriter(s), and preparing the initial S-1 draft. These earlier activities cannot be easily observed and are therefore disregarded for purposes of this study, which narrows the IPO preparation window considerably.

As so defined, the median IPO preparation process took a mere ninety days to complete for the seventy-four firms that granted discounted stock options during this exceedingly short period (average duration: 131 days). As a further limitation, if the IPO preparation process as so defined exceeded 120 days, only discounted stock options granted during the 120-day period preceding the first day of public trading were included in this study.

Firms are quite active during this short-lived window, often engaging in multiple stock option grants. A stock option grant, as the term is used in this article, covers all compensatory stock options awarded by a firm to one or multiple recipients on a specific date featuring the same per share exercise price.

The seventy-four firms in this study that awarded discounted stock options during IPO preparations made at least 147 separate discounted option grants. On average, each of these firms awarded discounted stock options on two different dates during the narrow IPO preparation period. On average, each discounted stock option grant covered options to purchase 382,732 shares of common stock and each firm awarded discounted options to purchase 760,291 shares.[49]

Notably, thirty-one of the seventy-four firms that engaged in the practice of granting discounted stock options during IPO preparations disclosed that they would also separately award compensatory stock options contingent upon IPO completion with an exercise price set at the IPO price.[50] The average volume of the underlying shares came to 535,963 per firm for these contingent stock options with exercise prices set at the forthcoming IPO price.

By comparison, twenty-three of the forty-two firms that did not engage in 11th hour option discounting disclosed that they would award stock options contingent upon IPO completion with exercise prices pegged to the IPO price. On average, the number of shares underlying these non-discounted option awards came to 982,378 per firm.

The difference between the exercise prices of the discounted stock options awarded near the IPO and the IPO price at which firms offered their shares to the public shortly after making these discounted option awards was substantial. On an equal-weighted basis, the option exercise prices enjoyed an average forty-seven percent (47.49%) discount on the IPO price for these 147 discounted option grants, and the median discount was forty-eight percent (47.94%). The weighted average discount was forty-eight percent (47.75%) for the 147 discounted option grants.

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49. Data collection proved challenging given the incomplete disclosure practices of various firms in this dataset. In a limited number of cases, the volume of underlying shares per option grant were calculated from aggregate information in securities filings and SEC submissions, and option grant dates were estimated from disclosures in securities filings and SEC submissions and submission or filing dates.

50. Firms made promises or incurred contractual obligations to award stock options with exercise prices set at the forthcoming IPO price, which were contingent upon IPO completion.

The fair value of the common stock underlying these purported at-the-money option grants thus rose dramatically over the exceedingly short time period between stock option grant and IPO. The equal-weighted average increase of the per share option exercise price to the IPO price for the 147 discounted option grants in this study was 123.9% (median: 92.08%).

Firms in this study also experienced underpricing, made evident by the tendency of a stock price to rise on the first day of public trading after the IPO priced.[51] The average discount of stock option grants made by the seventy-four firms in this study during IPO preparations relative to the closing price on the first day of public trading thus came to 51.11% on an equal-weighted basis (median: 50.00%) and 50.41% on a weighted-average basis.

The seventy-four firms in this study that engaged in 11th hour option discounting could have raised, at a minimum, close to a billion dollars ($949.556 million), not adjusted for inflation, from discounted options granted during the IPO preparation window if option exercise prices had been set at IPO prices. Instead, the most they could expect to raise from option recipients by virtue of these deep discounts was $489.360 million, representing a total potential pre-tax windfall to option recipients of $460.196 million based on the IPO prices, not adjusted for inflation, or $6.2 million per firm.

When aggregating the shares of common stock underlying the discounted option grants during IPO preparation with the shares of common stock offered by each of these firms in their IPOs, the total shares of stock underlying these option awards represented, on average, eight percent (7.90%) of the total combined offering (median: 6.11%) per firm. Albeit these pre-IPO firms allowed their option recipients to effectively purchase eight percent of the total shares at a deep discount relative to the price at which they then offered the other ninety-two percent to the public.[52] 11th hour option discounting practices thus deprive firms of needed capital while significantly diluting IPO investors.

Chart 1 shows the distribution of the 147 discounted option grants throughout the five-year study period by magnitude of the discount on the IPO price, *i.e.*, the difference of the per share option exercise price per option grant made by a firm and the IPO price at which that firm went public shortly after these option grants, expressed as a percentage discount relative to the IPO price. More than three-quarters (78%) of all discounted option grants featured discounts of thirty-three percent or more, and sixty-two percent featured a discount of forty-five percent or more.

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51. Usha R. Rodrigues & Michael Stegemoller, *Why SPACs: An Apologia* 10, 15 (U. Ga. Sch. L., Legal Stud. Rsch. Paper, Paper No. 2022-04, 2022).

52. This does not include shares issued upon exercise of overallotment options granted to underwriters or shares underlying compensatory options featuring exercise prices set at or above the IPO price or at the midpoint of the preliminary IPO price range. *See supra* note 48.

CHART 1

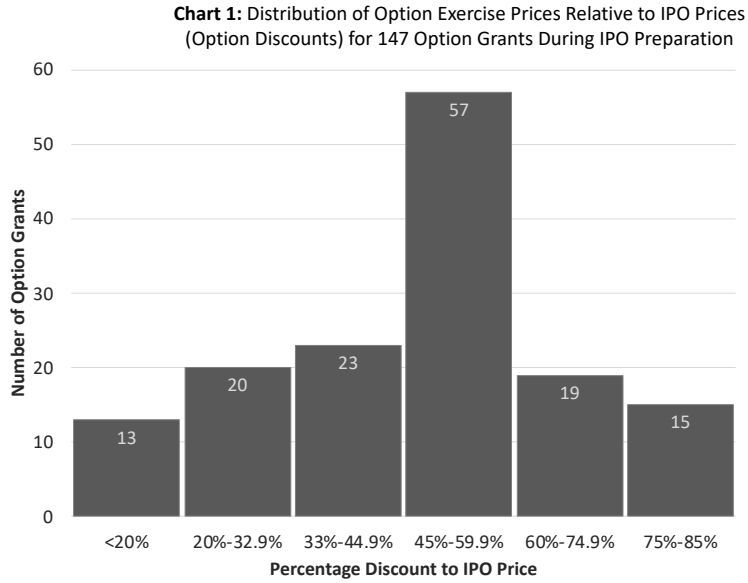
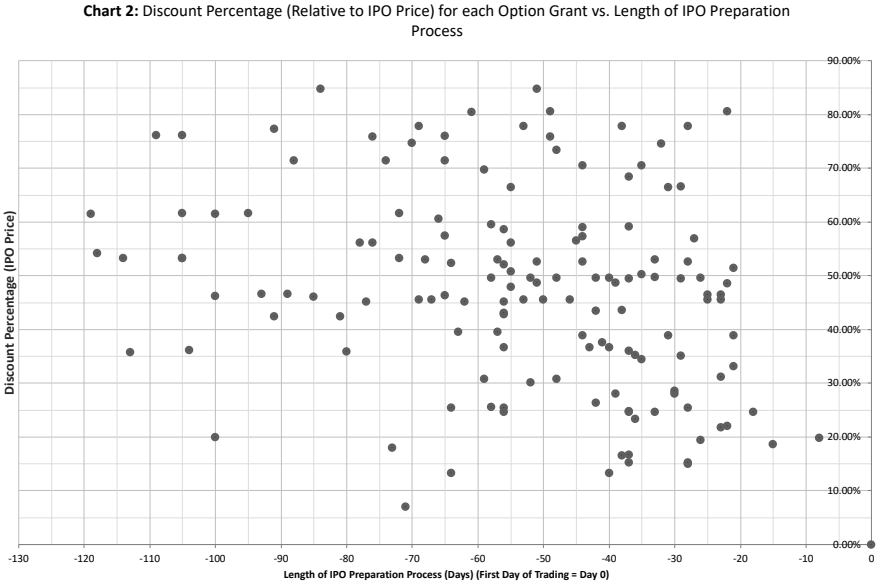


Chart 2 shows the discounts on IPO prices for the 147 discounted option grants made by the seventy-four pre-IPO firms in this study during the IPO preparation process.

CHART 2

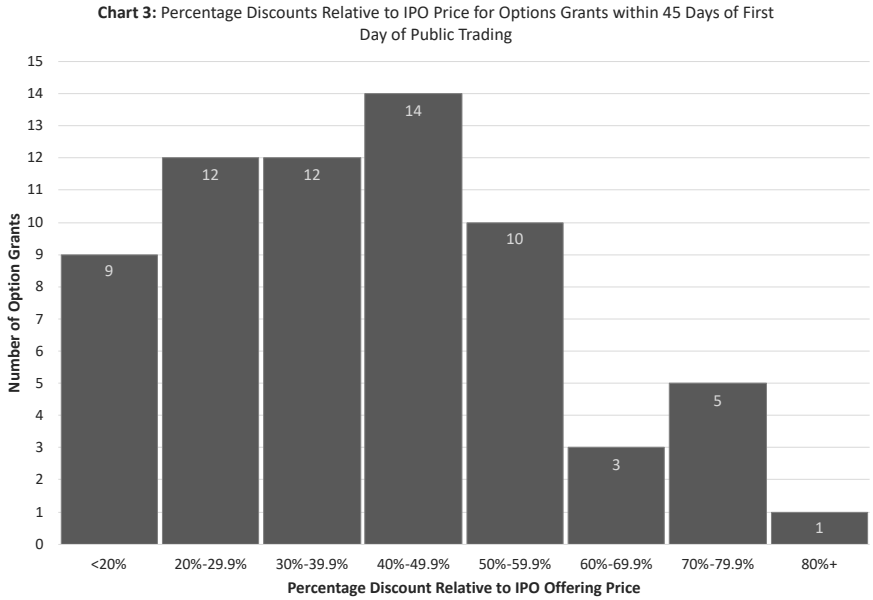


As Chart 2 shows, many of these stock option grants continued to be heavily discounted relative to the IPO price even as the awarding firms rapidly advanced towards IPO completion. The median period between a discounted stock option grant and the IPO pricing date was fifty days (average: fifty-three days) and between a discounted stock option grant and the first day of public trading was fifty-one days (average: fifty-four days).

Sixty-seven percent of all discounted option grants were made within sixty days of the first day of trading. Almost half (45%) of all discounted option grants during the IPO preparation period were made within forty-five days of IPO pricing and the first day of public trading. For the sixty-six discounted stock option grants made within this forty-five day-period, the equal-weighted average discount on the IPO price was 41.45% (median: 41.23%).

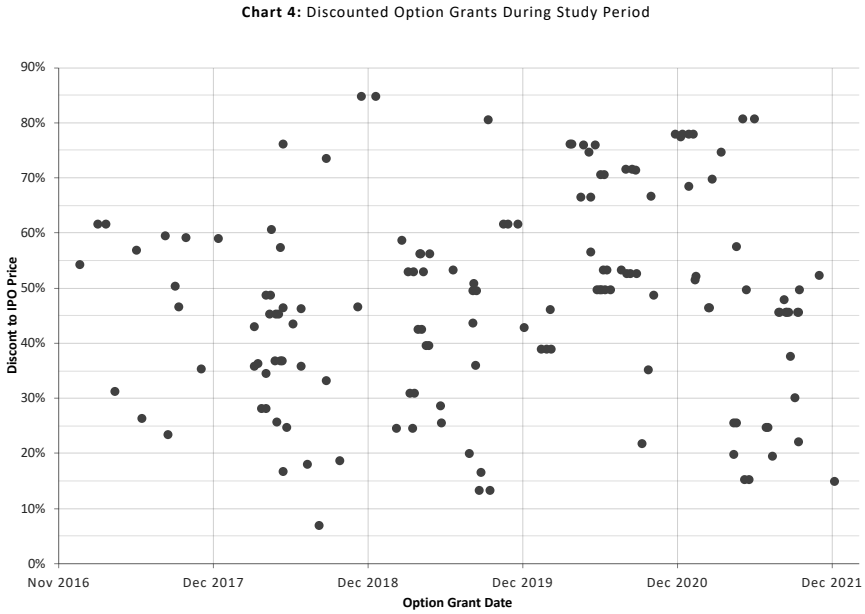
Chart 3 shows the distribution of option discounts relative to IPO price for these sixty-six discounted option grants made within forty-five days of the first day of public trading. Two-thirds (68%) of all discounted option grants during this period featured discounts of thirty percent or greater relative to the IPO price. For half of these sixty-six discounted options grants the discount was forty percent or greater.

CHART 3



Discounts trended upward during this five-year period. Chart 4 plots the 147 discounted option grants by grant date and discount of option exercise price on IPO price during the study period.

CHART 4



11th hour option discounting is not limited to biotechnology companies. Table 2 presents late-stage equity awards made by the following fifteen companies from different industries that went public during the 2017-2021 period: Zoom Video, Roku, Peloton Interactive, Eventbrite, Beyond Meat, Upwork, Gitlab, Snowflake, Slack, Toast, Unity Software, Smartsheet, Bill Holdings, Root, and The RealReal.

TABLE 2

Table 2: Late-Stage Equity Awards												
Stock Exchange and Stock Symbol	Type of Equity Award	Award Date	Number of Underlying Shares	Option Exercise Price per Share	IPO Price or Reference Price Per Share	IPO Pricing Date (Reference Price Date)	Discount to IPO or Reference Price	Distance Award to IPO Pricing or Reference Pricing (in Days)	Closing Price First Day of Trading	Discount to Closing Price on First Day of Trading	Distance Award to First Day of Trading (in Days)	Potential Pre-Tax Windfall (based on IPO Price)
NASDAQ: BYND	Options	4/3/19	264,033	$20.02	$25.00	5/1/19	20%	28	$65.75	70%	29	$1,314,884
NYSE: BILL	Options	10/22/19	652,750	$15.62	$22.00	12/11/19	29%	50	$35.50	56%	51	$4,164,545
NYSE: BILL	Options	11/13/19	309,500	$17.64	$22.00	12/11/19	20%	28	$35.50	50%	29	$1,349,420
NYSE: EB	Options	7/24/18	2,877,468	$13.72	$23.00	9/19/18	40%	57	$36.50	62%	58	$26,702,903
NYSE: EB	Options	7/31/18	2,001,429	$13.72	$23.00	9/19/18	40%	50	$36.50	62%	51	$18,573,261
NASDAQ: GTLB	Options	8/4/21	388,127	$22.34	$77.00	10/13/21	71%	70	$103.89	78%	71	$21,215,022
NASDAQ: GTLB	Options	9/1/21	476,014	$26.64	$77.00	10/13/21	65%	42	$103.89	74%	43	$23,972,065
NASDAQ: PTON	Options	6/13/19	1,424,700	$14.59	$29.00	9/25/19	50%	104	$25.76	43%	105	$20,529,927
NASDAQ: PTON	Options	8/6/19	352,200	$17.22	$29.00	9/25/19	41%	50	$25.76	33%	51	$4,148,916
NASDAQ: ROKU	Options	8/15/17	3,219,857	$8.82	$14.00	9/27/17	37%	43	$23.50	62%	44	$16,678,859
NASDAQ: ROOT	Options	8/12/20	7,600	$8.09	$27.00	10/27/20	70%	76	$27.00	70%	77	$143,716
NASDAQ: ROOT	Options	8/28/20	127,796	$8.09	$27.00	10/27/20	70%	60	$27.00	70%	61	$2,416,622
NASDAQ: ROOT	Options	8/29/20	24,000	$8.09	$27.00	10/27/20	70%	59	$27.00	70%	60	$453,840
NASDAQ: ROOT	Options	9/30/20	30,050	$12.87	$27.00	10/27/20	52%	27	$27.00	52%	28	$424,607
NYSE: WORK	Options	2/26/19	3,651,000	$10.56	$26.00	6/19/19	59%	113	$38.62	73%	114	$56,371,440
NYSE: WORK	RSUs	2/26/19	5,298,448	$0	$26.00	6/19/19	100%	113	$38.62	100%	114	$137,759,648
NYSE: WORK	Options	4/3/19	11,500	$16.93	$26.00	6/19/19	35%	77	$38.62	56%	78	$104,305
NYSE: WORK	RSUs	4/3/19	10,474,488	$0	$26.00	6/19/19	100%	77	$38.62	100%	78	$272,336,688
NYSE: SMAR	Options	1/29/18	320,000	$7.40	$15.00	4/26/18	51%	87	$19.50	62%	88	$2,432,000
NYSE: SMAR	Options	3/5/18	2,903,920	$9.53	$15.00	4/26/18	36%	52	$19.50	51%	53	$15,884,442
NYSE: SMAR	Options	3/21/18	676,500	$9.53	$15.00	4/26/18	36%	36	$19.50	51%	37	$3,700,455
NYSE: SNOW	Options	6/17/20	100,000	$33.83	$120.00	9/15/20	72%	90	$253.93	87%	91	$8,617,000
NYSE: SNOW	RSUs	6/17/20	2,587,289	$0	$120.00	9/15/20	100%	90	$253.93	100%	91	$310,474,680
NYSE: SNOW	Options	7/21/20	30,025	$36.70	$120.00	9/15/20	69%	56	$253.93	86%	57	$2,501,083
NYSE: SNOW	Options	8/21/20	100,000	$69.00	$120.00	9/15/20	43%	25	$253.93	73%	26	$5,100,000
NYSE: SNOW	RSUs	9/1/20*	2,841,823	$0	$120.00	9/15/20	100%	14	$253.93	100%	15	$341,018,760
NASDAQ: REAL	Options	5/8/19	1,004,825	$10.58	$20.00	6/27/19	47%	50	$28.90	63%	51	$9,465,452
NYSE: TOST	Options	6/2/21	506,250	$20.95	$40.00	9/21/21	48%	111	$62.51	66%	112	$9,644,063
NYSE: TOST	RSUs	6/2/21	1,403,000	$0	$40.00	9/21/21	100%	111	$62.51	100%	112	$56,120,000
NYSE: TOST	Options	7/28/21	786,250	$26.10	$40.00	9/21/21	35%	55	$62.51	58%	56	$10,928,875
NYSE: TOST	RSUs	7/28/21	2,241,750	$0	$40.00	9/21/21	100%	55	$62.51	100%	56	$89,670,000
NYSE: TOST	RSUs	8/9/21	2,001,250	$0	$40.00	9/21/21	100%	43	$62.51	100%	44	$80,050,000
NYSE: TOST	RSUs	8/13/21	1,421,025	$0	$40.00	9/21/21	100%	39	$62.51	100%	40	$56,841,000
NYSE: U	Options	6/4/20	2,694,333	$19.62	$52.00	9/17/20	62%	105	$68.35	71%	106	$87,242,503
NYSE: U	RSUs	6/4/20	2,811,018	$0	$52.00	9/17/20	100%	105	$68.35	100%	106	$146,172,936
NYSE: U	RSUs	9/1/20*	28,462	$0	$52.00	9/17/20	100%	16	$68.35	100%	17	$1,480,024
NASDAQ: UPWK	Options	7/1/18	2,293,596	$6.61	$15.00	10/2/18	56%	93	$21.18	69%	94	$19,243,270
NASDAQ: UPWK	Options	8/19/18	399,527	$8.18	$15.00	10/2/18	45%	44	$21.18	61%	45	$2,724,774
NASDAQ: ZM	Options	1/24/19	742,400	$16.02	$36.00	4/17/19	56%	83	$62.00	74%	84	$14,833,152
NASDAQ: ZM	Options	2/28/19*	321,450	$16.72	$36.00	4/17/19	54%	48	$62.00	73%	49	$6,197,556
						AVERAGE (incl. RSUs)	61.98%	AVERAGE: 63		73.25%	AVERAGE: 64	
			*estimated based on SEC filings and submissions			MEDIAN (incl. RSUs)	55.72%	MEDIAN: 56		70.04%	MEDIAN: 57	
						AVERAGE (excl. RSUs)	49.31%			64.33%		
						MEDIAN (excl. RSUs)	48.66%			64.94%		
											TOTAL (with RSUs)	$1,889,002,693
											TOTAL (excl. RSUs)	$397,078,957

As illustrated by Table 2, firms in other industries also engaged in 11th hour option discounting.[53] The fifteen firms in this sample made thirty discounted stock option grants while preparing to go public—either by pursuing an initial public offering or a direct listing. The average IPO preparation period was 115 days (median 117 days).

The equal-weighted average discount measured by the spread between the option exercise price and the IPO price, or the reference price in case of a direct listing, was 49.31% (median: 48.66%). The equal-weighted average and median discounts on the closing price on the first day of public trading rose to 64.33% and 64.94% respectively.

53. Table 2 covers only discounted equity awards made during the window from confidential submission of the initial draft registration statement on Form S-1 to immediately prior to the first day of public trading.

These option grants were sizable. However, due to these deep discounts, the most companies could expect to raise from option recipients was $383.1 million. Altogether, the thirty late-stage option grants produced a total potential pre-tax windfall of $397 million for option recipients, or $26.5 million per firm on average, not adjusted for inflation, based on the IPO price.

Some of the firms listed in Table 2, such as Slack, Toast, and Unity Software, also awarded restricted stock units (RSUs) in addition to their late-stage option grants.[54] These equity awards were typically tied not only to time-based vesting but also to completion of the IPO or direct listing.[55] As a result, when including these RSU awards, the equal-weighted average and median discounts increased to sixty-two percent and fifty-six percent respectively based on the IPO or reference price, and the total potential pre-tax windfall from all late-stage discounted equity awards in Table 2 increased to $1.9 billion, not adjusted for inflation, based on the IPO price.[56]

2. Corporate Insiders as the Principal Beneficiaries

Corporate insiders—the chief executive officer, other officers, and directors—were significant beneficiaries of 11th hour option discounting. More than three-quarters (fifty-eight firms) of the seventy-four firms in this study that engaged in 11th hour option discounting awarded discounted options to at least one insider during IPO preparations. At least thirty CEOs were beneficiaries of these last-minute discounted option grants. Other corporate officers and non-employee directors also benefitted from last-minute discounted stock option grants. Forty-one separate discounted stock option grants were made to non-employee directors during IPO preparations and sixty-three separate awards to corporate officers other than the CEO.

Altogether, corporate insiders took at least fifty-three percent (52.94%) of the entire potential pre-tax windfall of $460.196 million based on the IPO price, not adjusted for inflation, which came to $243.6 million, or an average of $4.2 million per firm. Chart 5 shows the allocation of this total $460.196 million intrinsic value based on the IPO price.

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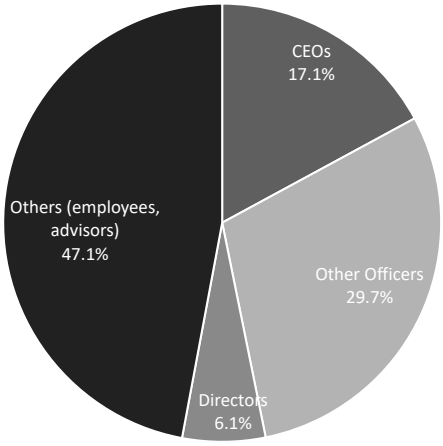
54. For example, on or about February 26, 2019, Slack awarded both discounted stock options to purchase 78,000 shares at a $10.56 per share exercise price and 220,000 restricted stock units to its chief financial officer. *See supra* Table 2; text accompanying note 53.

55. Letter from Robert A. Freedmen, Fenwick & West LLP, to Thomas Kim, SEC, Div. Corp. Fin. 1 (Feb. 7, 2012) (on file with EDGAR). Restricted stock units (RSUs) "represent the right to receive a specified number of shares of the common stock of [a company] upon settlement if certain conditions are met prior to the expiration of the RSUs . . . . No payment is required by the RSU holder upon settlement." *Id.*

56. RSUs are treated as having a $0 exercise price for purposes of Table 2, as holders of vested RSUs do not pay a cash price to receive the underlying shares. *Id.*

CHART 5

Chart 5: Allocation of $460.196 M Pre-Tax Potential Windfall from Late-Stage Discounted Option Grants (Intrinsic Value of Options based on IPO price). Directors are non-employee directors

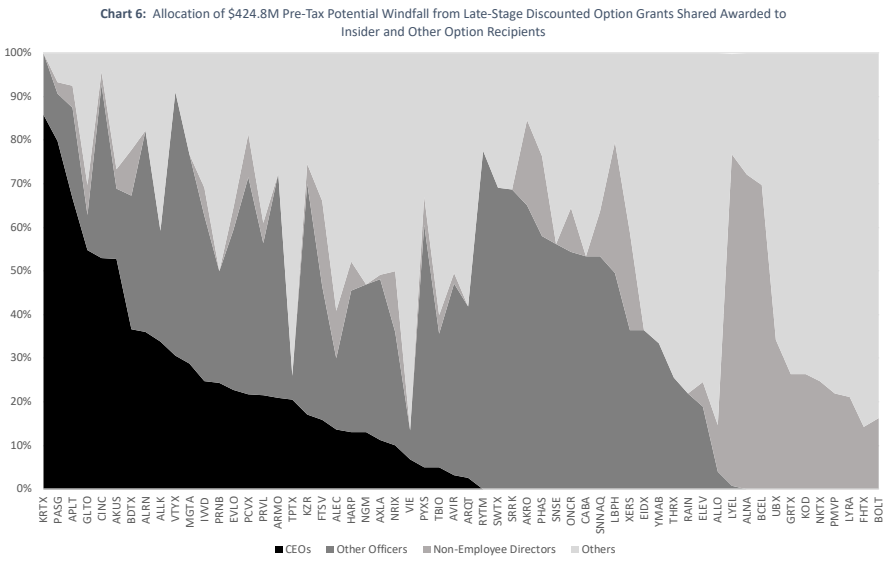


Half (52%) of all firms that awarded discounted options to their insiders during IPO preparations and forty-one percent of all seventy-four firms that engaged in 11th hour option discounting awarded discounted options to their CEOs. The average potential pre-tax windfall for CEOs from these last-minute discounted option grants came to $2.6 million.[57]

Chart 6 shows the distribution of the potential pre-tax windfall, not adjusted for inflation, in the total amount of $424.8 million among corporate insiders and other option recipients from late-stage option grants made by the fifty-eight firms that awarded discounted stock options to insiders during IPO preparations.

57. Insiders at pre-IPO firms active in other industries were also beneficiaries of 11th hour option discounting. For example, during IPO preparations the CEO of Unity Software received options to purchase 875,000 shares at a 62% discount on the IPO price, resulting in a $28.3 million potential pre-tax windfall, not adjusted for inflation. Unity Software Inc., Initial Statement of Beneficial Ownership of Securities (Form 3) (Sept. 17, 2020).

CHART 6



In various cases, pre-IPO firms awarded all or almost all of their senior executives with deeply discounted stock options just before they went public. For example, clinical-stage biotechnology company Forty Seven, Inc. granted compensatory stock options for a total of 1,165,369 shares of common stock at a per share exercise price of $8.76 in three separate grants in April and May 2018.[58] Two-thirds (66%) of the shares underlying these option grants went to corporate insiders, including Forty Seven's entire C-suite, comprising its CEO, CFO, chief medical officer, and chief business officer, and all members of its seven-member board of directors.[59] Its CEO alone received options to purchase 184,516 shares at the $8.76 per share exercise price. On June 27, 2018, Forty Seven priced its IPO at $16.00 per share, thus affording these corporate insiders and other option recipients a 45.25% discount on the IPO price.

The pre-IPO firms in this study routinely did not disclose their reasons for awarding discounted stock options so close in time to their IPOs. Based on my experience and discussions with practitioners, I could discern the following rationales:

First, these last-minute awards, timed just prior to the IPO, are treated as equity bonuses for executives and key employees, presumably for having advanced their firm to an imminent IPO, thereby affording their existing venture capital or other institutional investors an exit opportunity following consummation of the IPO.

58. Letter from John T. McKenna, Att'y for Forty Seven, Inc., Cooley, to Suzanne Hayes, Dorrie Yale & Jacob Luxenburg, SEC, Div. Corp. Fin. 5 (June 8, 2018) (on file with EDGAR) (after reverse stock split).

59. Forty Seven, Inc., Initial Statement of Beneficial Ownership of Securities (Form 3) (June 27, 2018).

Second, discounted options are awarded to induce senior executives to go through with the IPO and manage a public company, as public company status creates additional risks for senior executives, including greater stockholder and governmental scrutiny, greater enforcement and liability risks, and less control—even when establishing a dual-class common stock structure with superior voting rights for founders post-IPO.[60]

Third, these awards are made to new hires, including new executives, near the IPO who are receiving equity compensation as part of their compensation packages.

Fourth, firms are taking measures to retain long tenured and newly arrived executives as well as key employees prior to the IPO by making additional equity awards based upon competitive benchmarking conducted in preparation of the IPO.

Fifth, firms had promised option grants earlier but were delayed in actually granting the options.

Firms may take the position that these rationales justify deeply discounted equity awards so close to the IPO. For example, newly hired executives may extract discounted equity awards as an inducement to join a firm that is transitioning to a public company. However, none of these rationales contemplate creating incentives for option recipients to grow their firm's value post-IPO, as the exercise price is set well below the IPO price, even though the firm is rapidly transitioning to public company status.

For example, new hires are not incentivized to grow equity value. Rather, their discounted option awards allow them to capture a potential windfall simply by having joined just before their new employer's IPO. To illustrate, Passage BIO, Inc. hired a new CEO thirty days before it priced its IPO and granted him options to purchase 1,919,782 shares of common stock at a $11.00 per share exercise price, which represented a thirty-nine percent discount on its $18.00 IPO price.[61] The options were not tied to IPO achievement but subject to a traditional time-based vesting schedule with a one-year cliff for the first twenty-five percent and monthly vesting for thirty-six months thereafter. As so structured, the option grant created no incentives for the new CEO to grow the firm's value post IPO but created an immediate pre-tax windfall potential of about $13.44 million based on the IPO price, and $21.5 million based on the $22.20 closing price on the first day of public trading.

IPO investors should thus be concerned that these compensation arrangements are highly inefficient, as they distort incentives. Optionees can benefit irrespective of managerial effort or performance subsequent to the IPO even if their firm's stock price does not rise and even if it declines. Indeed,

60. *See* Yifat Aran & Elizabeth Pollman, *Ousted* 239 (Eur. Corp. Governance Inst., L. Working Paper No. 740/2023, 2023).

61. Passage Bio, Inc., Amendment No. 2 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 90, 163 (Feb. 27, 2020).

Badertscher, Jorgensen, and Katz found evidence that at-the-money stock options granted in the fiscal year ending before the IPO created weaker risk-taking incentives for managers following the IPO.[62]

11th hour option discounting thus arguably departs dramatically from the equity compensation arrangements demanded by venture capital investors when funding a pre-IPO firm. Managers and employees at these firms receive common stock or stock options to purchase common stock that rank junior to the convertible preferred stock security that these institutional investors require.[63] As a result, managers and employees are incentivized to grow their firm's value.

11th hour option discounting turns this approach on its head and now favors insiders over the IPO investors who are supplying fresh capital in the IPO in order to advance the still unproven business model of these firms. The practice is akin to a pre-IPO firm preparing to raise funds from venture capital investors during a financing round, and while preparing for this capital raise, firm managers and employees first receive compensatory options to purchase preferred stock featuring the same economic rights as the preferred stock that the firm will offer in the upcoming financing round, albeit with exercise prices at a deep discount over the price at which they will offer the same preferred security to these institutional investors.

Such arrangements would be routinely rejected by venture capital investors; yet, as this study shows, deeply discounted option grants made shortly before the firm goes public are widespread when firms prepare to raise fresh capital from IPO investors. These arrangements are thus more properly viewed as "rent extraction" mechanisms.[64]

A far more palatable approach for IPO investors would be to structure these late-stage option awards to create incentives to grow value post-IPO, as practiced by the minority of firms in this study that did not engage in 11th hour option discounting. These firms promised generous compensatory stock option awards during IPO preparations that were contingent upon IPO completion, subject to time-based vesting, and featured an exercise price per share to be set at the IPO price.

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62. Brad A. Badertscher, Bjorn Jorgensen, Sharon P. Katz & Jeremy Michels, *Cheap Stock Options: Antecedents and Outcomes* 1, 25 (INSEAD, Working Paper No. 2022/35/ACC, 2022); *see also* Jean Eaglesham, Telis Demos & Coulter Jones, *Lowball Prices on Stock Options Could Be Silicon Valley's Juiciest Perk*, WALL ST. J. (Feb. 20, 2019, 5:52 PM ET), https://www.wsj.com/articles/lowball-prices-on-stock-options-could-be-silicon-valleys-juiciest-perk-11550682199 (describing stock options awarded to employees in the 12 months prior to their employer's IPO as "perks," where these options featured significantly lower exercise prices compared to the IPO price).

63. *See* Riethmueller, *supra* note 30, at 105–10 (discussing superior economic rights attached to convertible preferred stock held by venture capital investors); Will Gornall & Ilya A. Strebulaev, *Squaring Venture Capital Valuations with Reality*, 135 J. FIN. ECON. 120, 125–28 (2020).

64. Badertscher et al., *supra* note 62, at 23.

II. THE REGULATORY DISCLOSURE REGIME FACILITATING 11TH HOUR OPTION DISCOUNTING

A. THE SEC'S APPROACH TO CHEAP STOCK

Since there is no observable market price for the stock of a pre-IPO firm until its IPO, the firm will need to estimate the fair value of its underlying stock at the time of each option grant and may engage in manipulative practices to undervalue its stock. Given the potential for underestimating the fair value of equity awards made by pre-IPO companies, the SEC has indicated that so-called "cheap stock" is a key concern.

In the context of a firm's IPO, cheap stock typically refers to the equity-based compensation awarded to the firm's executives, key employees, and other service providers prior to its IPO at a stock price that is below the subsequent IPO price.[65] With respect to equity-based compensation in the form of compensatory stock options, cheap stock refers to the stock underlying option grants made prior to the IPO that provide for a lower exercise price compared to the eventual IPO price, in particular an exercise price that is at a deep discount relative to the expected IPO price.[66]

Since compensatory stock options are typically structured as at-the-money options, the exercise price represents the purported fair value of the underlying stock at the time of grant. The SEC is concerned that the stock is undervalued and thus the option itself is undervalued which, in turn, may materially overstate reported earnings and understate compensation cost.[67] "Granting cheap stock options provides a way for firms to boost earnings, and therefore the IPO price, by underreporting compensation expense."[68]

During the registration process of a firm's IPO of shares of its common stock, the SEC will often review the fair value set by the firm for the common stock underlying compensatory stock options at the time of each option grant made prior to the planned IPO. The SEC typically focuses on compensatory option grants made during the 12-month to 18-month period preceding the planned IPO.[69]

If the SEC determines that a firm's earlier stock valuations are not reasonable, the firm may need to adjust compensation expenses in its financial statements, which may lower its reported earnings or increase reported losses.

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65. *See, e.g.*, *id.* at 1 (defining cheap stock); Michael D. Stuart & Richard H. Willis, *Use of Independent Valuation Specialists in Valuing Employee Stock Options: Evidence from IPOs*, 25 REV. ACCT. STUD. 438, 439 (2020).

66. Stuart & Willis, *supra* note 65, at 439.

67. *Id.*

68. Badertscher et al., *supra* note 62 at 9.

69. Stuart & Willis, *supra* note 65, at 446. The SEC's Financial Reporting Manual (FRM) permits the SEC to ask companies "to explain the reasons for valuations that appear unusual (e.g., unusually steep increases in the fair value of the underlying shares leading up to the IPO)". DIV. CORP. FIN., SEC, FINANCIAL REPORTING MANUAL § 9520.2 (2020).

The increased expense resulting from the SEC's determination of the underlying stock's fair value will then be recorded as a "cheap-stock" charge.[70] SEC concerns as to a firm's stock option valuations and financial reporting can result in revisions to the S-1 and to the firm's historical financial statements and thus significantly delay IPOs.[71]

The firms in this study routinely detailed the valuation of their stock underlying pre-IPO option grants in correspondence with the SEC during IPO preparations, whether prompted by the SEC in connection with its cheap stock review or proactively by the firm in anticipation of the agency's cheap stock inquiry. Out of the seventy-four pre-IPO firms in this study that completed their IPOs and made discounted stock option grants during IPO preparations, ninety-one percent submitted so-called cheap stock letters to the SEC during the SEC's review of their registration statements.[72]

These letters typically advised the SEC that the option grants made during the previous twelve to eighteen months were at-the-money and often disclosed the fair value estimate of the underlying stock at the time of option grant. Moreover, firms typically provided a reconciliation of the fair value of the stock underlying their most recent option grant to their projected IPO price range.

The SEC did not require a stock revaluation of any of the option grants made by any of the seventy-four firms in this study that granted discounted options during IPO preparations. Five of these firms that submitted cheap stock letters to the SEC informed the SEC that they voluntarily revalued the stock underlying their late-stage option grants made during the IPO preparation window. Two more firms notified the SEC that they would retrospectively revalue these late-stage option grants following IPO completion. Thus, only seven out of sixty-seven firms that had submitted cheap stock letters (i.e., 10%) notified the SEC that they revalued or would revalue discounted option grants made during the IPO preparation window.

B. JOBS ACT OF 2012

Preclinical and clinical-stage biotechnology companies are among the firms that have benefitted from the Jumpstart Our Business Startups Act of 2012 (JOBS Act) which was enacted to ease the regulatory burden associated with going public and to de-risk the IPO process.[73] The JOBS Act "significantly

70. DELOITTE, TECHNOLOGY INDUSTRY ACCOUNTING GUIDE, OTHER ACCOUNTING AND FINANCIAL REPORTING TOPICS: STOCK-BASED COMPENSATION 319 (2023); *see also* Michael Dennis Stuart, The Determinants and Consequences of CEO Cheap Stock in IPOs 1–2 (Aug. 2013) (Ph.D dissertation, University of Arkansas, Fayetteville) (on file with the University Libraries, University of Arkansas).

71. Stuart & Willis, *supra* note 65, at 439.

72. When including the pre-IPO firms in this study that did not make late stage discounted stock option grants, 81% of all 116 pre-IPO firms that completed their IPOs submitted cheap stock letters to the SEC.

73. Michael Dambra, Laura Casares Field & Matthew T. Gustafson, *The JOBS Act and IPO Volume: Evidence That Disclosure Costs Affect the IPO Decision*, 116 J. FIN. ECON. 121, 121 (2015).

changed the IPO playbook, creating a new category of issuer called an emerging growth company (EGC) and rewriting the rules for EGC IPOs."[74]

The JOBS Act allows EGCs to bypass several regulatory hurdles during the IPO preparation process and thereafter. All of the firms in this study qualified as EGCs.[75]

The JOBS Act de-burdens the IPO preparation process for EGCs. Of particular relevance, EGCs can avoid detailed disclosures regarding executive compensation.[76] For example, EGCs are only required to disclose the compensation of three named executives, including their chief executive officers, in summary form, and are exempt from providing the comprehensive Compensation Discussion and Analysis (CD&A) section required of other reporting companies in their registration statements.[77]

None of the firms in this study included a CD&A in their S-1. Indeed, from enactment of the JOBS Act until the end of 2020, all life sciences EGCs and ninety-nine percent of all technology EGCs that completed their IPOs elected to omit a CD&A from their registration statements.[78]

The JOBS Act aims to "de-risk" the IPO process by permitting EGCs to make a confidential submission of their draft registration statements to the SEC for its non-public review.[79] If an EGC proceeds with its IPO, the EGC needs to publicly file its registration statement at least fifteen days before the firm conducts its road show during which the firm's management team makes its investment pitch to potential investors.[80] Upon the firm's public filing of its S-

74. ALEXANDER F. COHEN, KIRK A. DAVENPORT II, DANA G. FLEISCHMAN, JOHN S. KIM, ANTHONY J. RICHMOND & JOEL H. TROTTER, LATHAM & WATKINS, THE JOBS ACT AFTER ONE YEAR: A REVIEW OF THE NEW IPO PLAYBOOK 2 (2013).

75. EGC status is tied to total annual gross revenue during a pre-IPO firm's most recent fiscal year prior to its planned IPO. The inflation adjusted threshold increased from $1,070,000,000 in 2017 to $1,235,430,000 on September 20, 2022. 15 U.S.C. § 77b(a)(19); Inflation Adjustments Under Titles I and III of the JOBS Act, Release Nos. 33–11098, 34–95715, 87 Fed. Reg. 57394 (Sept. 20, 2022) (to be codified at 17 C.F.R. pts 227, 230, 239 & 240).

76. 17 C.F.R. § 229.402(l) (2022).

77. *Id.*

78. WILMERHALE, IPO REPORT 2021, at 11 (2021).

79. Dambra et al., *supra* note 73 at 121; 15 U.S.C. § 77f(e). In 2019, the SEC expanded this confidential submission option to all firms. *See Draft Registration Statement Processing Procedures Expanded*, SEC (June 24, 2020), https://www.sec.gov/corpfin/announcement/draft-registration-statement-processing-procedures-expanded.

80. 15 U.S.C. § 77f(e). If an EGC does not conduct a road show, "its registration statement and confidential submissions should be filed publicly . . . no later than 15 days before the anticipated date of effectiveness of the registration statement." *Jumpstart Our Business Startups Act Frequently Asked Questions: Confidential Submission Process for Emerging Growth Companies*, SEC (Dec. 21, 2015) [hereinafter *JOBS Act FAQs*], https://www.sec.gov/divisions/corpfin/guidance/cfjumpstartfaq.htm. Public filing of the registration statement is required before the IPO can proceed. 15 U.S.C. § 77e; Patrick J. Gallagher, Note, *Going Public Secretly: The SEC's Unavailing Effort to Increase Initial Public Offerings Through Confidential Registration*, 2019 COLUM. BUS. L. REV. 306, 305, 330 n.136.

1, its earlier confidential submissions of its draft registration statement to the SEC then become public.[81]

From enactment of the JOBS Act until the end of 2020, ninety-seven percent of all life sciences EGCs and ninety-seven percent of all technology EGCs that completed their IPOs began the registration process by submitting their draft registration statements confidentially to the SEC.[82] Similarly, only one of the 121 firms in this study initiated the SEC's registration statement review process by filing its registration statement publicly.

As already discussed, the IPO preparation window is short when measured from the initial submission of the draft S-1 for confidential SEC review until the IPO prices. For the seventy-four firms in this study that completed their IPO and granted discounted stock options during IPO preparations, the median confidential review by the SEC took sixty-six days (average: 104 days). The median duration from first public filing of the S-1 until IPO pricing was twenty-four days (average: twenty-six days).

Prior to its first public filing of the S-1, a firm can readily abandon its IPO plans by simply not proceeding with registration of the securities it planned to offer. No filings or notices to the SEC are required, and the SEC does not have to approve withdrawal of the draft S-1, which is typically not formally withdrawn. After the public filing of the S-1, the firm would need to submit a non-confidential request to the SEC for withdrawal of its registration statement pursuant to Rule 477 under the Securities Act, which is routinely approved by the SEC, thus formally terminating its ambitions to go public for the time being.[83] Correspondence submitted to the SEC during the registration process that is not part of the registration statement, including during the non-confidential review period after the public filing of the S-1, only becomes accessible to the public twenty business days after the S-1 has been declared effective.[84]

Before public filing of the S-1, a firm is in the so-called "quiet period."[85] A firm and its underwriters are generally prohibited by so-called "gun-jumping" rules from engaging in communications with potential investors and from making public statements about the firm's prospects or about its planned offering during the quiet period.[86] However, the JOBS Act exempted EGCs from the strict communication restrictions during the quiet period by allowing these companies and their underwriters to engage in oral and written "test-the-

81. 15 U.S.C. § 77f(e). The registration statement as well as the initial confidential draft S-1 submission and all revisions thereto will need to be filed publicly with the SEC no later than 15 days before the road show. *JOBS Act FAQs*, *supra* note 80.

82. WILMERHALE, *supra* note 78, at 11.

83. 17 C.F.R. § 230.477 (2001).

84. *Filing Review Process*, SEC (Sept. 27, 2019), https://www.sec.gov/divisions/corpfin/cffilingreview; *Voluntary Submission of Draft Registration Statements—FAQs*, SEC (June 30, 2017), https://www.sec.gov/corpfin/voluntary-submission-draft-registration-statements-faqs.

85. Rodrigues & Stegemoller, *supra* note 51, at 22.

86. *Id.* at 12, 24–26.

waters" communications with qualified institutional buyers and institutional accredited investors regarding their contemplated IPOs before and after public filing of their S-1 to gauge investor interest.[87]

These "de-risking" features of the JOBS Act have been of particular benefit to EGCs with "high proprietary disclosure costs," such as biotech companies.[88] After confidential submissions of their draft registration statements, these firms can disclose information regarding their proprietary technology and research to investors in test-the-waters meetings, even before they proceed with the public filing of their S-1.

The market for biotech IPOs has certainly grown significantly following passage of the JOBS Act in 2012. Ritter documents a marked increase in completed IPOs of biotech companies: from 140 completed biotech IPOs for the twelve-year period from 2001 until 2012 to 476 biotech IPOs for the nine-year period thereafter (2013-2021).[89] The IPO market for tech companies remained healthy as well, with 421 tech company IPOs during 2001-2012 compared to 429 tech IPOs during 2013-2021.[90]

Biotech companies routinely accessed the IPO market for fresh capital, as they were not profitable when they went public. According to Ritter, only four percent of the 632 biotech companies that went public between 2001 and 2022 were profitable at IPO.[91] Only three percent of biotech companies that went public during 2013–2021 were profitable.[92]

Indeed, EGCs in general, not just biotech companies, have dominated the IPO market since passage of the JOBS Act in 2012 and have taken advantage of the de-burdening and de-risking provisions of the law. EGCs have accounted for the vast majority of all IPOs since the JOBS Act went into effect. From enactment of the JOBS Act in 2012 until 2017, more than eighty percent of all completed IPOs involved firms that qualified as EGCs.[93] For the three-year period from 2018 until 2020, the percentage of IPO companies qualifying as EGCs under the JOBS Act was ninety-one percent.[94] In 2020, IPOs by EGCs accounted for ninety percent of all IPOs completed during that year.[95]

87. *Id.* at 26; 15 U.S.C. § 77e(d). SEC has expanded the scope of the "test-the-waters" exemption by adopting 17 C.F.R. § 230.163B in 2019 which permits any firm, "regardless of its EGC status, to engage in 'test-the-waters' communications in connection with any registered securities offering." WILMERHALE, *supra* note 78, at 11.

88. Dambra et al., *supra* note 73, at 121.

89. JAY R. RITTER, INITIAL PUBLIC OFFERINGS: UPDATED STATISTICS 16 (2024).

90. *Id.*

91. *Id.*

92. *See id.* (highlighting the profitability of biotech companies from 2013–2021 and derived from Professor Ritter's data for the 2013-2021 period).

93. *Update on Emerging Growth Companies and the JOBS Act*, PWC, https://www.pwc.com/us/en/services/consulting/deals/emerging-growth-companies-jobs-act.html (last visited Feb. 1, 2025).

94. WILMERHALE, *supra* note 78, at 8.

95. *Id.* at 2.

EGCs can leverage the de-risking features of the JOBS Act to not only shield proprietary information from competitors and the public in general while preparing to go public. They can also pursue merger and acquisition efforts in parallel as an alternative exit strategy for their investors. By initiating a confidential registration statement, the EGC sends potential acquirers "a clear signal that the target company is ready and willing to pursue this strategic alternative, and hence, practically introducing a background 'bidder'" for the company.[96]

The JOBS Act has thus allowed EGCs to maintain their IPO plans in complete secrecy until they are far along in the IPO preparation process and publicly file their S-1. EGCs have been afforded the option to readily jettison their plans prior to the public filing of their S-1 in favor of becoming acquired or staying private without the public ever learning of their IPO ambitions. "By leveraging confidential submissions, an EGC thus avoids . . . the stigma that is often associated with withdrawing a publicly filed Form S-1."[97]

The SEC does not publish data on the number of confidential submissions of registration statements or their abandonment, nor is this data available under FOIA.[98]

A firm may voluntarily announce that it has initiated a confidential SEC review of its registration statement. But it is simply not possible to derive the total number of confidential submissions or any withdrawals from these select few announcements. The JOBS Act thus deprives the public of data regarding much of a firm's IPO preparation activity. IPO withdrawals are only observable for IPO candidates once they have filed their registration statements publicly.

Given the secrecy imposed by the JOBS Act and the resulting dearth of publicly available data, it is exceedingly challenging to accurately extrapolate how many biotherapeutic drug developers initially submitted draft registration statements on Form S-1 for confidential SEC review only to abandon their secret plans to go public before filing their registration statements publicly, and their reasons for doing so.

C. INCOMPLETE DISCLOSURES CONCERNING 11TH HOUR OPTION DISCOUNTING

1. Incomplete Financial Reporting Obligations

Under the JOBS Act, an EGC must provide audited financial statements for its two most recent fiscal years in its registration statement. Depending on the timing of its IPO, the IPO candidate will typically also include unaudited financial statements for an interim period following the end of its most recent

96. *IPO Insights: Dual Track Process*, ORRICK (Sept. 29, 2023), https://www.orrick.com/en/Insights/2018/06/Dual-Track-Process.

97. Gallagher, *supra* note 80, at 322.

98. 15 U.S.C. § 77f(e)(2); Gallagher, *supra* note 80, at 344.

fiscal year. Regulation S-X requires that the most recent financial statements included in a registration statement cannot be more than 134 days old prior to effectiveness of the S-1.[99]

However, discounted options grants made during IPO preparations routinely occur only *after* these reporting periods have ended. Indeed, 127 of all 147 discounted option awards, or eighty-six percent, in this study that occurred during IPO preparations were made after the end of the most recent reporting period. Moreover, all but two of the twenty discounted option grants that occurred during the most recent reporting period were made within the last thirty days of the most recent reporting period. One discounted option grant was made seventy-one days and the other thirty-four days prior to the end of the most recent reporting period.

The financial statements included in the S-1 thus routinely did not capture these late-stage option grants. Their fair value would not be reported as a compensation expense. Indeed, even the fair value of those compensatory stock option grants made during the tail-end of the most recent reporting period would not typically be reported as a compensation expense to any meaningful extent, as the timing rules of ASC 718 divorce the measurement date for estimating the fair value of compensatory stock options from the period of expense recognition.

For compensatory stock options, ASC 718 "requires a grant-date measurement of expenses. This means that the expense is determined on the date of grant and is not subsequently adjusted for fluctuations in stock price, changes in the initial estimate of fair value, or changes in the assumptions used to determine that fair value."[100] However, firms can then spread the compensation costs measured by the fair value of their option grants over the vesting period, as these costs are only recognized over the subsequent service period.[101]

The guidance articulated in ASC 718 for determining the period over which the compensation cost is to be recognized is quite complex. Fundamentally, the stock option value is to be recognized as an expense over the requisite "service period" of the option recipient, "which is typically the vesting period."[102] Options subject to time-based vesting are thus typically recorded as an expense on a straight-line basis over the vesting period.[103] Once the option has vested,

99. *See* 17 C.F.R. § 210.3-12(a), (g)(1)(ii) (2018).

100. BAKSA, *supra* note 35, at 9. Prior to the effectiveness of the amendments set forth in ASU 2018-07, ASC 505-50 applied to the accounting treatment of equity awards made to consultants and others who did not provide services as employees or non-employee directors. "Under ASC 505-50, the vesting date—rather than the grant date—is generally the measurement date, which effectively requires the re-measurement of the award expense on a periodic basis until the award vests . . . ." Flores & Kelly, *supra* note 35.

101. BAKSA, *supra* note 35, at 43.

102. BAKSA, *supra* note 35, at 41.

103. *Id.* ASC 718 also permits expense recognition under an accelerated manner pursuant to which "each vesting increment is treated as a separate award." *Id*; *see also* WRIGHT ET AL., *supra* note 1, at 211–12; FW COOK, *supra* note 36. Such accelerated attribution front loads recognition, as "a greater part of the fair value of the grant [is] recognized early in the life of the grant." WRIGHT ET AL., *supra* note 1, at 199. Option awards

the compensation cost is not reversed even if the option is never exercised or if it is canceled with the consent or at the request of the optionee.[104]

Consequently, the magnitude of the compensation expense with respect to the discounted option awards that occurred at the tail-end of the most recent fiscal period for which the firms reported on their financial performance in the S-1 would not be readily apparent to IPO investors. These late-stage discounted options either had not yet started to vest or vesting would have just commenced, and the vesting periods were typically lengthy — often three to four years. Since ASC 718 required their fair value to be recognized over these lengthy service periods, only a small fraction, if any, of their total compensation expense would typically have been reported in the registration statement's most recent income statement.

Under ASC 718, firms are also required to provide additional disclosures regarding their option activity in the footnotes to their financial statements which are part of their registration statement.[105] However, ASC 718 requires such stock option activity disclosures only for the most recent fiscal year to be included in the registration statement and only on an aggregate basis.[106]

For example, the minimum disclosure requirements for stock option grants made during the most recent fiscal year cover only the aggregate number of underlying shares and weighted-average per-share exercise price for all option grants during the fiscal year.[107] There is no requirement to disclose the grant date, exercise price, and volume of underlying stock for each separate stock option grant.

Nor are firms required to make meaningful disclosures of fair value or intrinsic value with respect to their late-stage option grants. Firms are only required to disclose the weighted-average grant-date fair value—or calculated or intrinsic value—for all options granted during the most recent fiscal year and during any earlier fiscal year in the financial statement.[108] However, there is no requirement to disclose the fair value of the stock underlying each option award at the time of grant.[109]

Similarly, firms are only required to disclose the total unrecognized compensation costs for all non-vested options at the end of the most recent fiscal

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that contain non-market performance conditions add complexity to the determination of the requisite service period and to recognition of compensation expense. *See* BAKSA, *supra* note 35, at 44–45, 62–68; WRIGHT ET AL., *supra* note1, at 213–14; GINGER BUECHLER & JULIA AMSTUTZ, RSM, ACCOUNTING FOR STOCK COMPENSATION 28–29 (2022).

104. BAKSA, *supra* note 35, at 18.

105. FW COOK, *supra* note 36; ACCT. STANDARDS CODIFICATION, Statement of Disclosure Standards, § 718-10-50-2 (FIN. ACCT. STANDARDS BD.); GRANT THORNTON, SHARE-BASED PAYMENTS: NAVIGATING THE GUIDANCE IN ASC 718, at 96 (2021).

106. Minimum disclosure requirements are set forth in ACCT. STANDARDS CODIFICATION, Statement of Disclosure Standards, § 718-10-50-2 (FIN. ACCT. STANDARDS BD.); *see* GRANT THORNTON, *supra* note 105, at 259.

107. GRANT THORNTON, *supra* note 105, at 284.

108. *Id.* at 285.

109. *Id.* at 285–86.

year as well as the weighted-average period over which the compensation cost is to be recognized.[110]

Additionally, firms are only required to disclose the aggregate intrinsic value of all options exercised during the most recent fiscal year, (and during any earlier fiscal year) in the financial statement, regardless of grant date.[111] For stock options vested or expected to vest at the most recent balance sheet included in the financial statements (*i.e.*, the end of the most recent fiscal year) the number, weighted-average exercise price, and weighted-average remaining option term for these options that are outstanding and exercisable needs to be disclosed by pre-IPO and public companies while aggregate intrinsic value of these options only needs to be disclosed by public companies. [112]

When disclosed, aggregate intrinsic value is calculated based on the difference between each option exercise price and the estimated fair value of the Company's common stock at the end of the applicable fiscal period.[113] Yet, the fair value estimate of the underlying stock does not need to be disclosed.

Firms often provide additional disclosures about their option activity during the interim fiscal period reported in their registration statement ASC 270 provides for disclosure of significant changes since the last reporting period in interim financial statements.[114] However, these disclosures are again limited to stock option activities that occurred during the interim reporting period.

The required footnote disclosure concerning equity compensation included in the registration statement would thus exclude the vast majority of discounted stock option grants made during IPO preparations, as these last-minute compensatory stock options are typically awarded only after the end of the most recent reporting period. As a result, firms are not required to, and routinely do not, include their discounted option grants made after the most recent reporting period in their footnotes disclosures concerning their compensatory stock option activity.

Moreover, any discounted option grants made during the tail end of the most recent reporting period are typically obscured in the required footnote disclosure. Firms often make compensatory stock option awards with lower exercise prices earlier during the most recent reporting period. All of these earlier option grants are aggregated with the discounted option grants made near the end of the reporting period. When so aggregated with earlier option grants, deeply discounted option grants made at the tail end of the reporting period,

110. *Id.* at 284–85.

111. *Id.* at 285.

112. *Id.*

113. *See, e.g.*, Graphite Bio, Inc., Amendment No. 3 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at F-25 (June 22, 2021) ("Aggregate intrinsic value represents the difference between the fair value of the underlying common stock and the exercise price as of December 31, 2020.").

114. GRANT THORNTON, *supra* note 105, at 290–91; 17 C.F.R. § 210.10–01 (2020); 17 C.F.R. § 210.3–12(a) (2018) ("[s]uch interim financial statements may be unaudited and need not be presented in greater detail than is required by [17 C.F.R.] § 210.10–01 [(2020)].").

including the magnitude of these option grants, their discounts relative to the IPO price, and their exercise prices, are easily obscured in the footnote disclosure required by ASC 718.

Importantly, late-stage pre-IPO option grants made after the most recent reporting period in the registration statement and not specifically disclosed in the S-1 would not necessarily be picked up in a firm's subsequent securities filings once the firm has gone public. Again, ASC 718 requires disclosures with respect to option activity during the applicable reporting period only on an aggregated basis.[115] Firms typically make new option grants with exercise prices set at post-IPO stock prices during the post-IPO reporting periods. By then, firms may have also granted stock options with an exercise price equal to the IPO price that had been promised during IPO preparations but made contingent upon IPO completion, and firms may have granted stock options with an exercise price set at the midpoint of the IPO price range.

All of these option grants will be aggregated with the discounted option grants awarded after the most recent reporting period in the S-1 and just before the IPO priced. The financial statements in post-IPO securities filings would thus typically obscure these discounted option grants made during IPO preparations.

Finally, firms may disclose last-minute stock option grants made after the reporting period in the Subsequent Events section of the footnotes to their financial statements included in the S-1. They appear to do so sparingly. Seventy percent of the 127 discounted option grants made after the most recent reporting period were not disclosed in the Subsequent Events section. Disclosures for the other thirty percent often aggregated multiple discounted option grants.

IPO investors thus cannot rely on the financial statements included in the registration statement to learn about late-stage stock option grants near the IPO, the fair value of these stock options, their unrecognized future compensation expense, or period of expense recognition.

2. Incomplete Non-Financial Statement Disclosures

Firms seeking to go public are not specifically required to make detailed disclosures of their pre-IPO compensatory stock option grants in the non-financial statement sections of their S-1. They routinely take advantage of the limited transparency obligations under the securities law to make incomplete disclosures of their late-stage option grants in their registration statement and thus to IPO investors.

Given the dearth of mandatory disclosures under current securities regulations, the firms in this study that engaged in 11th hour option discounting exhibited a wide variety of disclosure practices regarding these last-minute discounted option grants.

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115. *See supra* note 106 and accompanying text.

Firms routinely provided the aggregate number of shares of stock issuable upon exercise of stock options granted after the most recent reporting period and a weighted-average option exercise price covering the option grants during this period without disclosing each option grant or the per share exercise price applicable to each option grant. These aggregate disclosures frequently omitted the grant date, option recipients, fair value of the stock options granted after the reporting periods, corresponding unrecognized compensation expense over the recognition period, and vesting terms.

These limited disclosures often do not reveal the proximity of the last-minute option grants to the IPO. Moreover, the use of the weighted-average exercise price obscures the number of options granted at different exercise prices.

Firms provide these aggregate disclosures of their late-stage option activity as part of the prospectus, *i.e.*, part I of the registration statement. They typically disclose them in the summary section of the firm's offering and in the description of the firm's capitalization. They also typically provide these aggregate disclosures pursuant to Item 506 of Regulation S-K which governs dilution disclosures.[116]

In addition, firms typically provide aggregate disclosures in part II of the registration statement in response to the requirement of Item 701 of Regulation S-K to disclose recent securities sales.[117] Firms routinely disclosed only summary information about their option grants, such as the aggregate number of shares of stock underlying all stock option grants made and either the weighted average exercise price for all option grants or the range of per share exercise prices from the lowest to the highest price.

The disclosure practices of those firms that chose to go beyond these aggregate disclosures of their 11th hour option discounting activity varied considerably. For example, only twenty-nine of the seventy-four firms, or thirty-nine percent, in this study that made discounted stock option grants during IPO preparations provided detailed disclosures regarding their stock option activity, including all of their last-minute discounted option grants near the IPO, in a comprehensive, reader-friendly table in their IPO prospectus, often in the Management Discussion and Analysis (MD&A) section. This table disclosure typically covered the grant date, number of underlying shares, per share exercise price, and the estimate grant date fair value per underlying share.

Conversely, forty-five out of these seventy-four firms, or sixty-one percent, provided no such detailed table of their stock option grants or omitted from any such table disclosure last-minute option grants. Altogether, eighty-six out of the 147 discounted option awards in this study, or fifty-nine percent, were not disclosed in any such reader-friendly table of stock option activity as part of the registration statement.

116. 17 C.F.R. § 229.506 (2024).
117. 17 C.F.R. § 229.701 (2008).

Various firms provided disclosures regarding their late-stage option grants in narrative form in their S-1. However, these disclosures make it more challenging for IPO investors to identify late-stage stock option activity.

3. Incomplete Disclosure Requirements for Executive Compensation

Firms are generally required to provide greater disclosures concerning compensatory stock options awarded to their executive officers in their securities filings. However, under the JOBS Act, EGCs benefit from fewer disclosure requirements concerning executive compensation.[118]

For one, EGCs are only required to provide compensation disclosures for their chief executive officers and the next two most highly paid executive officers, *i.e.*, their three named executive officers.[119] Moreover, under Item 402 of Regulation S-K, EGCs are required to disclose only limited quantitative information about the executive compensation of their few named executive officers, which must include (1) a summary compensation table describing the compensation paid to, or earned by, each named executive officer for the two most recent completed fiscal years, accompanied by a narrative explanation of the information presented in the table, and (2) a table listing the outstanding equity awards at fiscal year-end, but only for the most recent completed fiscal year.[120]

The firms in this study could thus exploit these incomplete disclosure requirements, as they typically awarded late-stage options to their CEOs or other named executives after the end of the most recent completed fiscal year. The disclosure requirements of Item 402 did not apply to these last-minute option grants.

Indeed, only nine of the seventy-four firms in this study that engaged in 11th hour option discounting made late-stage discounted stock option grants within the most recent completed fiscal year before going public. Only fifteen of the 147 discounted stock option grants in this study that were made during IPO preparations occurred within the most recent completed fiscal year before the option awarding firm went public. Only nine of these fifteen discounted option grants were included in the summary table of outstanding equity awards to named executives in the executive compensation section of the registration statements of seven of these nine firms.

As a result, the vast majority of late-stage discounted option grants to top executives would only be specifically disclosed as executive compensation in the firm's *later securities filings* following IPO completion, such as in proxy statements or annual reports on Form 10-K, which covered the annual period during which these late-stage options grants were made. IPO investors that relied

118. *See infra* text accompanying notes 119–120.
119. 17 C.F.R. § 229.402 (2022).
120. *Id.*

on the firm's securities filings would only learn about these deeply discounted option grants to top executives well after IPO completion.

In addition, Item 403 of Regulation S-K also requires pre-IPO firms to furnish in their registration statements a table listing the equity securities beneficially owned by each director and each named executive officer as of the most recent practicable date prior to the IPO, including the shares underlying stock options beneficially owned by such directors and executive officers to the extent such options are exercisable within 60 days.[121] The number of underlying shares are to be disclosed by footnote or otherwise.[122] In response, under the heading "Principal Stockholders" firms typically provide only aggregate disclosures of all shares underlying all then outstanding stock option grants made to each named executive that are exercisable within sixty days.

Firms that did disclose these last-minute discounted stock option awards to executives often provided these disclosures in narrative form in their S-1 but did not include them in the summary table of outstanding equity awards to the named executives in the executive compensation section. Moreover, firms routinely did not disclose the fair value of these option grants to their insiders or the corresponding unrecognized compensation expenses from these option grants and the recognition period.

Moreover, firms often limited their disclosures in their registration statements to the minimum number of named executive officers. On average, the fifty-eight firms in this study that awarded discounted stock options to corporate insiders provided executive compensation disclosures required by Item 402 for only the CEO and two other named executives (median: three named executives).

Conversely, corporate insiders, including all corporate officers and directors, are required under the Exchange Act to disclose their beneficial ownership of firm securities, including stock option awards, on Form 3 once their firm has registered a class of securities pursuant to Section 12 of the Exchange Act, which the firm is required to do when it goes public.[123] The pre-IPO firm's insiders are to disclose all of their then outstanding stock option awards, including the per share exercise price and vesting terms, by filing Form 3 on the date their firm's registration statement becomes effective.[124] Once filed, Form 3 disclosures become publicly available on EDGAR.[125]

Pre-IPO firms thus exploit deficiencies in the disclosure regime governing initial public offerings to obscure their 11th hour option discounting practices. The limited equity compensation disclosure requirements under the Securities

121. 17 C.F.R. § 229.403 (2006) (citing 17 C.F.R. § 240.13d–3(d)(1)(i)).

122. *Id.*

123. 15 U.S.C. § 78p; 17 C.F.R. § 240.16a–3 (2022); 15 U.S.C. § 781; *see also* SEC, NO. 1472 (05–19), FORM 3: INITIAL STATEMENT OF BENEFICIAL OWNERSHIP OF SECURITIES (n.d.).

124. 15 U.S.C. § 78p; SEC, NO. 1472 (05–19), *supra* note 123.

125. 15 U.S.C. § 78p(a)(2)(B).

Act allow IPO candidates to go public with incomplete disclosures regarding their late-stage stock option grant practices.

4. Exploiting Regulatory Weaknesses to Limit Disclosure Liability

Firms apparently seek to take advantage of the incomplete disclosure requirements under the federal securities laws. For example, Section 11(a) of the Securities Act only imposes liability if any part of a registration statement, at the time it became effective, "contained an untrue statement of a material fact *or omitted to state a material fact required to be stated therein* or necessary to make the statements therein not misleading [emphasis added]."[126] As explained by the Supreme Court in *Basic, Inc. v. Levinson*, "[s]ilence, absent a duty to disclose, is not misleading" under the federal securities laws.[127]

As noted, there are no specific regulatory requirements to disclose late-stage stock option grants made after the applicable reporting periods. Item 303 requires the MD&A to "focus specifically on material events . . . known to management that are reasonably likely to cause reported financial information not to be necessarily indicative of future operating results or of future financial condition."[128] To the extent pre-IPO firms do not provide disclosures regarding their late-stage option grants in the MD&A, they presumably take the position that these discounted equity awards are not material events and are therefore not required by Item 303. Indeed, securities law generally imposes a materiality threshold for omissions or misstatements.[129]

Firms can take advantage of ASC 718's rather propitious timing rules which, as already discussed, separate the date for estimating the fair value of compensatory stock options from the expense recognition period to soften the impact of stock option grants near the IPO. The relative impact of 11th hour option discounting on the firm's post-IPO earnings will depend on the number of late-stage options granted, their service periods, and their valuations. Firms that did not disclose their late-stage discounted option activity may well have taken the position that the future impact of these discounted last-minute equity awards would not have a material impact on the firm's future financial condition or future results of operations, thus justifying their omission from the MD&A.

However, materiality is not supposed to be measured by quantitative thresholds, such as the oft-used rule of thumb that "the misstatement or omission of an item that falls under a five percent threshold is not material in the absence of particularly egregious circumstances, such as self-dealing or misappropriation by senior management."[130] The SEC has reminded firms and their auditors that "exclusive reliance on this or any percentage or numerical threshold has no basis

126. 15 U.S.C. § 77k(a).
127. Basic Inc. v. Levinson, 485 U.S. 224, 239 n.17 (1988).
128. 17 C.F.R. § 229.303(a) (2021).
129. *See* PAUL VIZCARRONDO, JR., LIABILITIES UNDER THE FEDERAL SECURITIES LAWS 11 (2013).
130. SEC Staff Accounting Bulletin No. 99, 64 Fed. Reg. 45150 (Aug. 12, 1999).

in the accounting literature or the law" but can only serve as an "initial step in assessing materiality".[131] Rather, a matter is "material" if there is "a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the 'total mix' of information made available."[132]

Moreover, "once a party makes a disclosure, even if it is one that it had no duty to make, it assumes a duty to disclose all information necessary to make its statement not misleading, including information that it would not otherwise have been required to disclose had it not made the initial disclosure."[133] Incomplete disclosures concerning late-stage option activity, in particular when benefitting corporate insiders, may thus expose the firm and its underwriters to liability, if these disclosures are misleading. After all, 11th hour option discounting raises legitimate concerns over self-dealing. For example, pre-IPO firms arguably risk misleading investors if they only disclose late-stage option awards with exercise prices set at the IPO price that they promised to firm insiders contingent upon IPO completion while omitting last-minute option awards made to insiders that feature significantly discounted exercise prices relative to the IPO price.[134]

5. Liability Mitigation Stratagems

Firms can take advantage of the measurement and recognition rules of ASC 718 to further mitigate their liability for misleading disclosures or omissions regarding their 11th hour option discounting practice even if they undervalued their late-stage option grants near the IPO. If the valuation used to estimate the underlying stock's fair value at pre-IPO option grant was unreasonably low, the firm would have effectively granted in-the-money options with an exercise price reflecting a lower stock valuation compared to the actual fair value of the underlying stock.

However, as Table 1 illustrates, when applying the Black-Scholes-Merton formula to measure the value of these options, the spread between a low option exercise price and the fair value of the underlying stock at option grant may only result in a modest increase in the option's fair value. Thus, even unrecognized compensation costs, which, pursuant to ASC 718, are to be disclosed in footnotes to the financial statements for option grants made during the applicable reporting period, may not be sufficiently understated to overcome the materiality threshold imposed by the securities laws.

Moreover, as discussed, under ASC 718, the option value increase resulting from undervaluing the underlying stock will only be recognized as a compensation expense over the applicable service period. The impact of any

131. *Id.*

132. TSC Indus., Inc. v. Northway, Inc., 426 U.S. 438, 449 (1976).

133. VIZCARRONDO, *supra* note 129, at 9; *see also* 15 U.S.C. § 77k(a).

134. *See, e.g.*, Applied Therapeutics, Inc., Amendment No. 2 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1), at 7, 130–31 (Apr. 29, 2019); Applied Therapeutics, Inc., Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934 (Schedule 14A), at 16–17 (Apr. 23, 2020).

such unreasonably low stock valuations on corporate earnings and losses for the applicable reporting period may thus be viewed as immaterial by the reporting firm.

Firms can seek to further minimize liability for misleading disclosures or omissions by performing retrospective revaluations of the stock underlying their late-stage pre-IPO option grants once they have gone public. Under ASC 718's recognition rules, firms may well be able to delay revaluation of option grants until IPO completion without a penalty, as the late-stage options are typically subject to vesting. As discussed, their value will only start to be recognized as a compensation expense for financial reporting purposes during the service period following option grant, which frequently implicates only the subsequent financial reporting periods but not the financial disclosures in the registration statement.

As a result, firms can weigh the risk of liability exposure for the earnings and compensation expenses they will report in their post-IPO securities filings under the Exchange Act and any subsequent securities issuances under the Securities Act, and can choose to revalue their late-stage pre-IPO option grants upon IPO completion. For example, Bolt Biotherapeutics, Inc. disclosed in its registration statement that upon IPO completion, it would revalue discounted option grants made only after the end of the reporting periods applicable to its registration statement.[135]

However, any such *ex post facto* efforts to shield a firm from liability for late stage discounted option grants based on unreasonably low stock valuations may be far less effective if the beneficiaries of these discounted equity awards turned out to be corporate insiders. Retrospective revaluations would not necessarily overcome earlier misleading disclosures in a firm's registration statement concerning its last-minute discounted equity awards to corporate insiders, in particular as these insiders would typically continue to enjoy a reduced exercise price following a retrospective revaluation.

Any subsequent stock revaluation would be performed solely for financial reporting purposes but would not actually increase the option exercise price, which was contractually fixed as part of the option award.[136] Option recipients,

135. Given the opportunity for firms to revalue options following the IPO without a penalty, it is doubtful whether pre-IPO firms will become more reluctant to grant late-stage option grants at deep discounts relative to the IPO price following adoption of Exchange Act Rule 10D-1 approved by the SEC on October 26, 2022. *See* Listing Standards for Recovery of Erroneously Awarded Compensation, Securities Act Release No. 11126, Exchange Act Release No. 96159, Investment Company Act Release No. 34732, 87 Fed. Reg. 73076 (Oct. 26, 2022). Under Rule 10D-1, corporate insiders may have to disgorge their compensation if their firm restates financial statements to recognize greater compensation expense as a result of a revaluation of the stock underlying late-state option grants near the IPO. *Id.*

136. For example, Aileron Therapeutics, Inc. made late-stage stock option grants on March 2 and March 21, 2017, for the purchase of altogether 441,273 shares of common stock at an exercise price of $5.77 per share, a 61.53% discount on the $15.00 IPO price. Aileron subsequently retrospectively revalued the underlying stock as of the dates of these grants and recorded a fair value of $6.46 per share. However, the option exercise price remained at $5.77. *See* Aileron Therapeutics, Inc., No. 1 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 77 (June 19, 2017).

including corporate insiders, would continue to benefit from the potential windfall created by these last-minute option awards, which remain shielded from Section 409A penalties and, to the extent these options qualify as ISOs, tax-optimized—as long as the original stock valuations complied with the applicable statutory and regulatory requirements under IRC §409A and §422—irrespective of any subsequent revaluations for financial reporting purposes.

Finally, the firms in this study routinely positioned the valuations of their underlying stock as opinions of their boards of directors, ostensibly to take advantage of the protections afforded to statements of opinion under the U.S. Supreme Court's opinion in *Omnicare, Inc. v. Laborers District Council Construction Industry Pension Fund*, which significantly limited the circumstances under which a statement of opinion in a registration statement is actionable under Section 11 of the Securities Act.[137] Courts routinely view accounting estimates that depend on management's assumptions, judgments, and estimates, including the valuation of non-publicly traded equity securities, as subjective opinions of the firm rather than matters of objective fact.[138]

For example, as discussed, Forty Seven, Inc. had made late-stage option awards to its corporate insiders with an exercise price at a 45.25% discount on its $16.00 IPO price. Forty Seven disclosed these discounted option awards in its registration statement and made clear that the $8.76 option exercise price reflected the fair value of the underlying stock at each grant date in April and May 2018 as determined by its board of directors.[139] Forty Seven further highlighted that its determination of fair value reflected the subjective opinion of its board of directors: "Given the absence of a public trading market for our common stock, our board of directors *exercised their judgment* and considered a number of objective and subjective factors to determine the best estimate of the fair value of our common stock [emphasis added]".[140] Other firms in this study routinely made similar disclosures emphasizing the subjective nature of their fair value determinations and often included corresponding disclaimers.[141]

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137. 575 U.S. 175, 196 (2015). The lower courts subsequently extended the scope of *Omnicare* to securities fraud under Section 10(b). *See, e.g.*, City of Dearborn Heights Act 345 Police & Fire Ret. Sys. v. Align Tech., Inc., 856 F.3d 605, 623 (9th Cir. 2017).

138. *See, e.g.*, Lickteig v. Cerberus Cap. Mgmt., L.P., 589 F. Supp. 3d 302, 312 (S.D.N.Y. 2022). *See generally* Linda L. Griggs, John J. Huber & Christian J. Mixter, *Omnicare and GAAP-Based 'Numerical Opinions'*, BLOOMBERG L., (June 29, 2015, 9:00 PM PDT), https://news.bloomberglaw.com/securities-law/omnicare-and-gaap-based-numerical-opinions (discussing the Court's reasoning in *Omnicare, Inc. v. Laborers District Council Construction Industry Pension Fund*).

139. Forty Seven, Inc., Amendment No. 2 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 73, 118 (June 18, 2018) [hereinafter Forty Seven, Inc., Amendment No. 2].

140. *Id.* at 73.

141. *See, e.g.*, Bolt Biotherapeutics, Inc., Amendment No. 2 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 88 (Feb. 3, 2021) ("There are significant judgments and estimates inherent in the determination of the fair value of our common stock. These judgments and estimates include assumptions regarding our future operating performance, the time to complete an initial public offering or other liquidity event and the determination of the appropriate valuation methods. If we had made different

Despite the broad protections of opinion statements established by *Omnicare*, pre-IPO firms may nevertheless risk antifraud liability exposure with regard to their 11th hour option discounting activities in light of the stock valuation practices uncovered by my investigation. I turn to these practices next.

III. FIRM STRATEGIES FOR EXPLOITING REGULATORY WEAKNESSES TO ACHIEVE DEEP DISCOUNTING

My investigation finds that firms follow an established playbook designed to secure significantly discounted exercise prices when granting at-the-money options so close to their IPOs despite SEC scrutiny. Firms strategically exploit weaknesses in the regulatory and accounting regime to achieve deep discounting near the IPO.

A. UBIQUITY OF PWERM FOR STOCK VALUATIONS

Foremost, firms adopt and then exploit a seemingly quantitative valuation technique, the Probability-Weighted Expected Return Method (PWERM), when assigning a value to the common stock underlying option awards made in close proximity to a prospective IPO. The PWERM has been endorsed by the American Institute of Certified Public Accountants (AICPA) in its comprehensive practice guide on acceptable stock valuation methods under the title *Valuation of Privately-Held-Company Equity Securities Issued as Compensation* (AICPA Guide) as a valuation methodology for estimating the fair value of equity securities of an enterprise with a capital structure involving multiple classes of capital stock.[142]

The general valuation rule articulated by the Internal Revenue Service (IRS) in the Treasury Regulations implementing IRC §409A provides that, in the case of non-publicly traded stock, its fair market value as of the valuation date is "a value determined by the reasonable application of a reasonable valuation method."[143] Whether or not a chosen valuation method is reasonable, or whether an application of the chosen valuation method is reasonable, is to be determined "based on the facts and circumstances as of the valuation date."[144]

In order to facilitate valuations of compensatory stock option grants by privately-held companies, the Financial Accounting Standards Board (FASB) issued ASU 2021-07 in October 2021, which provides privately-held companies with a practical expedient for estimating the fair value of the underlying capital stock when determining the fair value of a compensatory stock option.[145] "As a

assumptions, our stock-based compensation expense, net loss, and net loss per common share could have been significantly different.").

142. AM. INST. OF CERTIFIED PUB. ACCTS., VALUATION OF PRIVATELY-HELD-COMPANY EQUITY SECURITIES ISSUED AS COMPENSATION 49, 57–59 (2013) [hereinafter AICPA GUIDE].

143. Treas. Reg. § 1.409A–1(b)(5)(iv)(B)(1) (as amended in 2007).

144. *Id.*

145. FIN. ACCT. SERIES, Acct. Standards Update: Comp.–Stock Comp. (Topic 718) No. 2021-07 (FIN. ACCT. STANDARDS BD. 2021).

practical expedient, a nonpublic entity is allowed to determine the current price input of equity-classified share-based awards issued to both employees and nonemployees using the reasonable application of a reasonable valuation method", thus mirroring the valuation approach for tax purposes.[146] In fact, the practical expedient endorses the approach taken by the Treasury Regulations implementing Section 409A, specifically providing that "[a] reasonable valuation performed in accordance with the Treasury Regulations is an example of a way to achieve the practical expedient."[147]

The AICPA Guide has traditionally specified the permissible valuation methods, including the PWERM, and guided their application for appraisals of capital stock used for equity compensation purposes.[148] Thus, pre-IPO firms routinely take the position that the PWERM is a reasonable valuation method under the implementing regulations of Section 409A and, correspondingly, under ASC 718.

The PWERM is a scenario-based method for valuing a firm's common stock by modeling and probability weighing various discrete future outcomes of the firm, such as an IPO, a strategic sale or merger, a dissolution, or continuation as a private company, and other potential outcomes based upon the firm's facts and circumstances. This method "involves a forward-looking analysis of the potential future outcomes available to the enterprise, the estimation of ranges of future and present value under each outcome, and the application of a probability factor to each outcome as of the valuation date."[149]

In the PWERM, "[t]he common stock value is based on the probability-weighted present value of expected future investment returns considering each of the possible forecasted outcomes as well as the rights of each class of stock. The future value of the common stock under each outcome is discounted back to the valuation date at an appropriate risk-adjusted discount rate, [further discounted for lack of marketability,] and probability weighted [for each scenario] to arrive at a non-marketable indication of value for the common stock."[150] Under the PWERM, "future equity value under each scenario is

146. *Id.* at 2.

147. *Id.* ASC 718 (and ASC 505–50) "rely on the concept of fair value" while the Internal Revenue Code speaks in terms of fair market value. *See* Treas. Reg. § 1.409A-1(b)(5)(i)(A) (as amended in 2007); 26 U.S.C. § 422(b)(4); AICPA Guide, *supra* note 142, at 9. As noted in the AICPA GUIDE, "[w]hen deliberating FASB Statement No. 157, *Fair Value Measurements*, FASB agreed that the measurement objective encompassed in the definition of fair value used for financial reporting purposes is generally consistent with similar definitions of fair market value used for valuation purposes." *Id.* at 11. Thus, as provided in ASU 2021–07, a fair value estimate for purposes of ASC 718 can be achieved through a fair market value determination that satisfies the valuation requirements of Treas. Reg. § 1.409A–1(b)(5)(iv)(B)(1) (as amended in 2007).

148. Stuart & Willis, *supra* note 65, at 439–40.

149. AICPA GUIDE, *supra* note 142, at 58.

150. Letter from Megan Bier, Att'y for PMV Pharm., Inc., Wilson Sonsini Goodrich & Rosati, to Ameen Hamady, Kevin Kuhar, Deanna Virginio & Dorrie Yale, SEC, Div. Corp. Fin. 4 (Sept. 11, 2020) (on file with EDGAR).

estimated and allocated to each share class. Each outcome and its related share values are then weighted based on the probability of the outcome occurring."[151]

The PWERM thus involves estimating the probability associated with each future potential outcome scenario for the firm, as well as the firm's total equity value, *i.e.*, its pre-money value, associated with each potential outcome.[152] Total equity value for each scenario is derived from application of enterprise valuation approaches, often the market or income approach.[153]

My investigation finds that pre-IPO firms invariably switch their methodology for valuing the common stock underlying compensatory stock option awards to the PWERM, or, more frequently, a variation thereof called the hybrid method, as they approach their IPO. The hybrid method is the PWERM, except that the value of the common stock within at least one of the non-IPO scenarios, such as the staying private scenario or the strategic sale/merger exit, is estimated using an option pricing method (OPM) when the firm has a complex capital structure.[154] The OPM estimates the value of the common stock by treating the common stock and preferred stock as call options on the total equity value of the firm, "with exercise prices based on the liquidation preferences of the preferred stock."[155]

Implied total equity for the non-IPO scenario(s) in the hybrid model is often determined using the backsolve method.[156] The backsolve method derives an implied total equity value from the sale price of the firm's equity securities in a recent arm's length transaction, such as a recent pre-IPO equity financing.[157] Based upon such recent sales price for one type of equity security, the method then solves for the firm's total equity value, "[taking] into account the economic rights of [the] recently issued [equity] securities in relation to the rights of other equity securities within the [firm's complex] capital structure."[158] The total implied equity value is then allocated to the firm's outstanding equity securities based upon their liquidation preferences and other economic rights using the OPM.[159]

The firms in this study used the PWERM or hybrid method for valuing the underlying common stock in ninety-six percent of 133 discounted options grants

151. Lucas Parris & Samantha L. Albert, *Valuation Methods for Private Company Equity-Based Compensation*, MERCER CAP., https://mercercapital.com/article/valuation-methods-for-private-company-equity-based-compensation (last visited Feb. 1, 2025).

152. *Id.*

153. AICPA GUIDE, *supra* note 142, at 27–28, 45. Fair value of company debt would typically be subtracted from the enterprise value determined by these methods to arrive at equity value, unless "the market approach or income approach is used to value equity directly using equity multiples or after-debt cash flows", in which case it would not be appropriate to subtract the debt to arrive at equity value. *Id.* at 45 n.5.

154. *Id.* at 66–68.

155. *Id.* at 61.

156. *Id.* at 28, 66–67, 98.

157. *Id.* at 28.

158. Letter from Laura A. Berezin, Att'y for Harpoon Therapeutics, Inc., Cooley, to Bonnie Baynes, Angela Connell, Donald Field & Dietrich King, SEC, Div. Corp. Fin. 4 (Jan. 28, 2019) (on file with EDGAR).

159. *Id.*

made during the IPO preparation window, while they typically used other methodologies, in particular the OPM, for common stock valuations during earlier stages in their development.[160]

Firms use various strategies to exploit weaknesses inherent in the PWERM.

B. LOW IPO OUTCOME PROBABILITY ASSUMPTION

Fundamentally, "a PWERM requires a number of assumptions about future outcomes that, realistically, are simply unknowable as of the valuation date. These assumptions are often based *only on management estimates* and, therefore, could potentially be biased [emphasis added]."[161] I find significant evidence that firms routinely underestimate the probability assumption that they will achieve the IPO outcome at the target equity valuation within the target time frame when valuing the underlying stock in connection with stock option grants near the IPO.[162]

Empirically, the biotechnology companies in this study had considerable success in going public. As shown in Chart 7, there were 116 completed IPOs during the five-year study period (2017-2021) while only five firms ultimately failed to go public. Two firms that withdrew their registration statements in 2019 filed new registration statements in 2020 and completed their IPOs that year. Two firms in this study publicly filed their registration statement in 2021 and then went public in early 2022. One firm filed its initial public S-1 in 2021 and then withdrew in 2022.

Chart 7 shows that the per-calendar year IPO completion rates ranged from eighty-four percent to 100%. In four out of five years, the completion rate was ninety-four percent or higher.

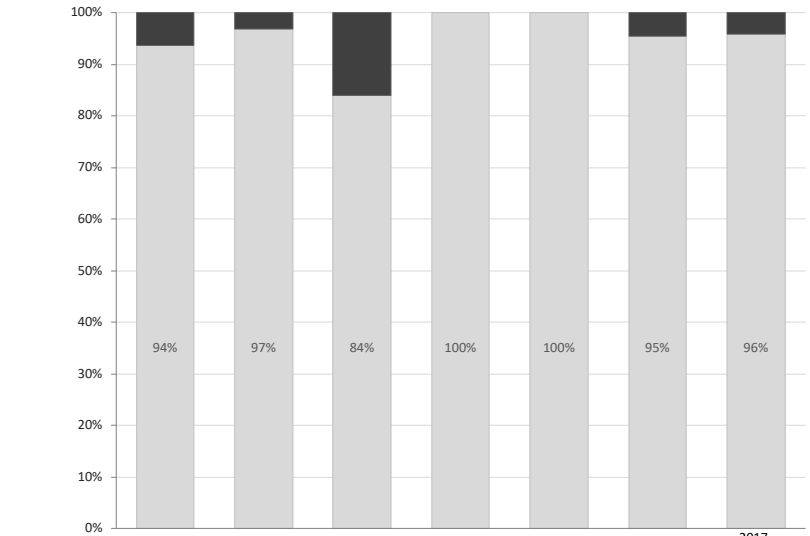
160. The other stock valuation methods used by firms during IPO preparations were limited to the discounted cash flow method (used for two discounted stock option grants) and the OPM (used for another two discounted stock option grants). One firm, Krystal Biotech, Inc., apparently used a recent third-party stock sale to value its common stock in connection with one discounted stock option grant. Seven firms did not disclose the stock valuation methods used for 14 discounted stock option grants made during IPO preparations, although the use of the PWERM/hybrid was highly likely for at least seven of these 14 option grants based on the option granting firms' disclosures.

161. NEIL J. BEATON, VALUING EARLY STAGE AND VENTURE-BACKED COMPANIES 89 (2010).

162. *See* AICPA GUIDE, *supra* note 142, at 61 ("Estimates of the probabilities of occurrence of different events, the dates at which the events will occur, and the values of the enterprise under and at the date of each event may be difficult to support objectively.").

CHART 7

Chart 7: IPO Completions - S-1 Withdrawals
IPO completions (by first day of trading) & S-1 withdrawals per calendar year, irrespective of S-1 filing date (if S-1 was initially publicly filed 2017-2021). For 2021, the S-1 withdrawal occurred in 2022.



	2017	2018	2019	2020	2021	2021-2022	2017-2021/22
S-1 Withdrawals	1	1	4	0	0	1	5
IPO Completion	15	32	21	27	19	21	116

In other words, the average annual IPO completion rate for the biotechnology companies in this study was ninety-four percent during the five-year study period when including the IPO completions and S-1 withdrawal in 2022 of firms that filed their S-1s in 2021 (median: 95%), and ninety-five percent when omitting these firms (median: 97%). There was a 96 percent IPO completion rate when including the two firms that completed their IPOs in 2020 after withdrawing their S-1s in 2019 and including the IPO completions and S-1 withdrawal in 2022 of firms that filed their S-1s in 2021.

Nonetheless, the average IPO outcome probability used by the firms in this study for valuing the underlying stock of discounted option grants made during the narrow IPO preparation window was a mere 58 percent while the median probability came to only sixty percent.[163] For discounted option grants made

163. Based on 104 separate option grants for which firms in this study disclosed the IPO probability used in the PWERM/hybrid valuation. To the extent firms did disclose the probabilities used, they typically disclosed them in their cheap stock letters to the SEC but often redacted them in the publicly filed version of these letters. Aileron Therapeutics, Inc. only disclosed a 60% IPO outcome probability used in a retrospective revaluation of the common stock underlying its March 2 and March 21, 2017, option grants. *See* Letter from Aileron Therapeutics, Inc. to Suzanne Hayes, SEC, Div. Corp. Fin. 3 (June 7, 2017) (on file with EDGAR). The outcome probability used in the original stock valuation was likely lower given that the per share exercise price was $5.77

within forty-five days of the date of IPO pricing, the average IPO probability rose to only sixty-four percent and the median IPO probability barely advanced to sixty-five percent.[164]

In other words, while actively preparing to go public, the firms in this study overwhelmingly exhibited deep pessimism that their IPO would succeed at the target equity value.

1. Impact of IPO Prognostications

IPO probability is a key factor driving the PWERM valuations of common stock. The magnitude of the IPO probability is inversely related to the magnitude of the spread between the IPO price and the exercise price of an at-the-money option. In other words, by reducing the IPO probability used in a PWERM valuation of the common stock, the spread between the option exercise price, which is set at the PWERM valuation, and the IPO price increases, producing outsized discounts for option beneficiaries.

Chart 8 presents the relationship between the IPO outcome probability used in the PWERM and the spread between exercise price for late-stage option grants made in this study and the subsequent IPO price.[165] Each circle represents a separate option grant made by a firm in this study during IPO preparations. The clustering of option grants illustrates the inverse relationship between IPO outcome prognostications and option discounting. As the IPO outcome probability declines, the discount of the option exercise price on the IPO price increases.

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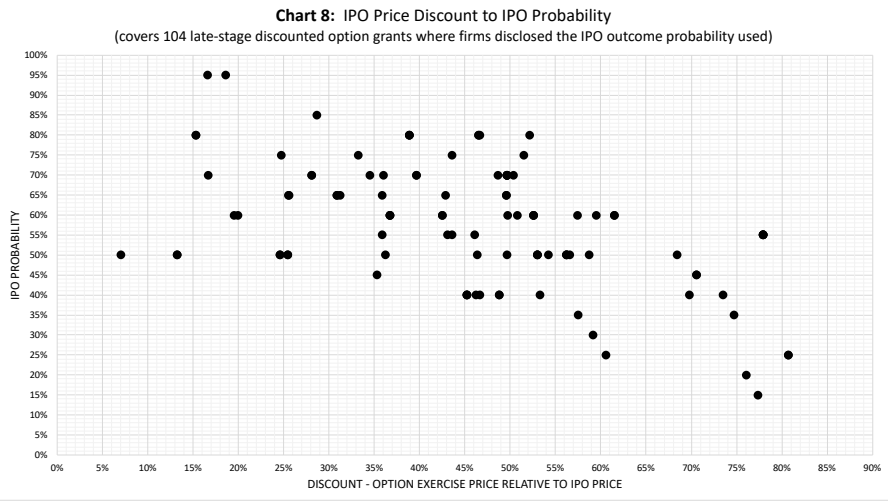
while the retrospective stock valuation estimated the stock's fair value at $6.46. *See* Aileron Therapeutics, Inc., Amendment No. 1 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 77 (June 19, 2017) (after reverse stock split). Aileron priced its IPO at $15.00 per share on June 28, 2017. *Id.* at 3.

164. Covers forty-nine option grants made within forty-five days preceding the IPO pricing date.

165. Only option grants for which the IPO probabilities have been disclosed are included in Chart 6. *See supra* note 163.

CHART 8



In addition to a low IPO outcome probability, the following input factors in the PWERM calculation can amplify the impact of probability weighing to depress stock value further.

a. Discount for Lack of Marketability

The AICPA Guide permits application of a discount for lack of marketability (DLOM) to account for the illiquidity of the stock underlying equity awards for compensatory purposes.[166] The DLOM thus further reduces the common stock value in each outcome scenario. Pre-IPO firms can influence the magnitude of the DLOM in various ways. First, they can estimate an unreasonably long timeframe for IPO achievement, which would reflect a longer holding period of the illiquid stock. In addition, firms will not update the holding period—and thus the DLOM—for option grants subsequent to the valuation date even though the illiquidity period is shorter when measured from the option grant date.

Moreover, firms will often add the customary contractual 180-day lock-up period to the target period until IPO completion, thus significantly extending the holding period for late-stage option grants close to the IPO, which can result in a greater DLOM. On March 23, 2022, the FASB voted to finalize a clarifying rule to the effect that the contractual lock-up period "is not considered in measuring the fair value of an equity security."[167] The FASB's Accounting

166. *See* AICPA GUIDE, *supra* note 142, at 62.

167. FIN. ACCT. SERIES, Acct. Standards Update: Fair Value Measurement (Topic 820) No. 2022-03, at 5–6 (FIN. ACCT. STANDARDS BD. 2022); *see* Denise Lugo, *FASB Will Finalize Narrow Proposal Related to Contractual Sale Restrictions on Equity Shares*, THOMSON REUTERS (Mar. 25, 2022),

Standard Update specifically noted that a discount on the value of an equity security because of a contractual lock-up "is inconsistent with the unit of account being the equity security".[168] Thus, use of the 180-day lock-up period to measure the DLOM is not appropriate, in particular as firms routinely register the shares of common stock underlying outstanding options granted prior to the IPO on Form S-8 immediately following the IPO.[169]

Finally, the valuation specialist may choose one of the various quantitative and qualitative methods available to arrive at a DLOM at the upper end of permissible ranges.[170] After all, firms and option recipients are aligned in keeping stock valuations performed for compensatory purposes low, and there is a market for external appraisers.[171]

Chart 9 shows the DLOMs used for the IPO outcome scenario in the most recent pre-IPO stock valuations to the extent disclosed by firms in this study. The average DLOM used was eleven percent and the median DLOM was ten percent.

https://tax.thomsonreuters.com/news/fasb-will-finalize-narrow-proposal-related-to-contractual-sale-restrictions-on-equity-shares.

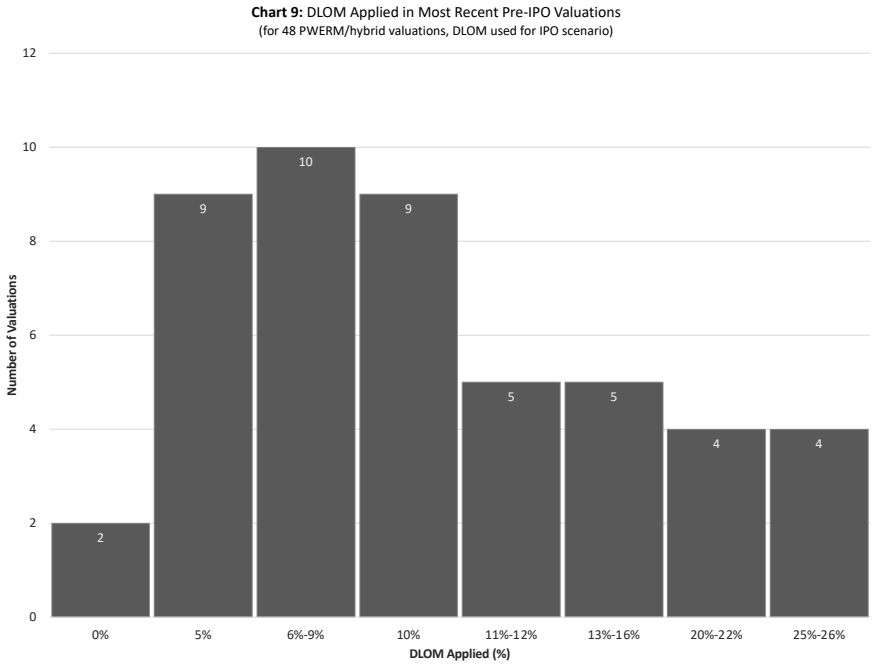
168. *See* FIN. ACCT. SERIES, Acct. Standards Update: Fair Value Measurement (Topic 820) No. 2022-03, at 5, 8 (FIN. ACCT. STANDARDS BD. 2022) ("[T]he fair value of the equity security subject to the contractual sale restriction should be measured on the basis of the market price of the same equity security without the contractual sale restriction and should not be adjusted to reflect the reporting entity's inability to sell the equity security on the measurement date.").

169. *Cf.* FIN. ACCT. SERIES, Acct. Standards Update: Fair Value Measurement (Topic 820) No. 2022-03, at 7 (FIN. ACCT. STANDARDS BD. 2022) (contractual sale restrictions on equity securities can be considered when measuring their fair value if they are not registered for public trading while other equity securities in the same class are registered for public trading).

170. *See* AICPA GUIDE, *supra* note 142, at 81–83. *See generally* JOHN E. ELMORE, DETERMINING THE DISCOUNT FOR LACK OF MARKETABILITY WITH PUT OPTION PRICING MODELS IN VIEW OF THE SECTION 2704 PROPOSED REGULATIONS (2017) (illustrating the considerable differences in DLOM calculations based on different quantitative models, holding periods, and volatility assumptions).

171. William D. Cohan, *Valuation Shell Game: Silicon Valley's Dirty Secret*, N.Y. TIMES (Mar. 8, 2017), https://www.nytimes.com/2017/03/08/business/dealbook/valuation-shell-game-silicon-valleys-dirty-secret.html?searchResultPosition=4.

CHART 9



Moreover, in their most recent pre-IPO stock valuations, firms in this study typically discounted the common stock value applicable to the non-IPO scenario(s) using a considerably higher DLOM, which ranged from twelve percent to forty percent. The average and median DLOMs used for a non-IPO scenario were twenty-seven percent each. Thirty-two out of the forty-five firms that disclosed the DLOM used for the non-IPO scenario in their most recent pre-IPO stock valuation used a DLOM between twenty percent and thirty-five percent.

b. Discounting to Present Value

The PWERM also recommends discounting the projected equity value for each share class under each outcome to present value using a suitable risk-adjusted discount rate.[172] This time value of money discount can be manipulated by applying the unreasonably lengthy target period for achieving IPO completion that was used to fix a high DLOM. Moreover, the risk-adjusted discount rates as used by firms in their PWERM valuations, even if consistent

172. *See* AICPA GUIDE, *supra* note 142, at 59.

with the guidance of the AICPA, have been criticized as too high, resulting in understated stock values.[173]

c. Dilution

The PWERM estimates the fair value per share of common stock. By increasing the common stock volume in the calculation, such as by including not just outstanding shares of common stock but also outstanding but unexercised compensatory stock options, the PWERM can produce a lower per-share price for each scenario.

Allocation of the total equity value to an assumed larger number of shares of stock in the IPO outcome scenario would thus depress the per share value. Pursuant to the AICPA Guide, stock options outstanding at the time of the valuation are to be included in the allocation of stock for a given scenario only if outstanding options can be exercised for a given scenario and "if exercising the options . . . would be optimal in that scenario."[174] Only outstanding shares of common stock, including those from the assumed conversion of outstanding preferred stock, should thus be counted for the IPO scenario. Exercise of options so close to the IPO is suboptimal, as shares from option exercises prior to the IPO cannot be registered on Form S-8 immediately after the IPO.[175] Nonetheless, PWERM valuations used for equity awards near the IPO often include outstanding options in the IPO outcome scenario.

I measured the relative impact of the IPO outcome probability by running large-scale Monte Carlo simulations of PWERM valuations. Table 3 presents the various factors and other assumptions used for my simulation model to calculate the average discount relative to a $16.00 per share IPO price at various IPO outcome probabilities.

173. Jeffrey C. Hooke, *The Probability-weighted Expected Return Method: A Critique*, BUS. VALUATION UPDATE, July 2020, at 1, 3–6 (criticizing the discount rates used by appraisers, which range from 25% to 50%, as far too high and recommending that more appropriate discount rate should be 16% in most cases, and 14%-16% depending on firm-specific attributes).

174. AICPA GUIDE, at 59. Moreover, the resulting proceeds, i.e., the aggregate exercise price, would then need to be added to the equity value for the applicable scenario. *Id*.

175. *Securities Act Sections*, SEC (Nov. 13, 2020), https://www.sec.gov/corpfin/securities-act-sections.html; FISCHER ET AL., *supra* note 14. Without registration the underlying stock from employee stock option exercises becomes tradable after the IPO following a 90-day hold period pursuant to SEC Rule 701(g), if the options grants (and underlying securities) were made in compliance with Rule 701 (which they typically are), subject, however, to the applicable limitations of Rule 144 (as modified by Rule 701(g)). *See supra* note 14; Riethmueller, *supra* note 30, at 140–42 (showing that outstanding stock options routinely do not get exercised prior to IPO).

TABLE 3

Table 3
Assumed Factors for Monte Carlo Simulation of PWERM Valuation
(10,000 runs per IPO probability interval)

Factors	IPO Scenario	Stay Private Scenario
Target Time Period	3 months	2 years
Total Equity Value	$265.155 million	$121.8 million
Shares of Capital Stock	▪ 836,177 shares of common stock outstanding ▪ 15,736,030 shares of common stock converted from outstanding preferred stock	▪ 836,177 shares of common stock outstanding ▪ 8,056,615 shares of Series B Preferred Stock ▪ 7,679,415 shares of Series A Preferred Stock
Allocation Method	On as converted to common basis	To shares of Series A Preferred, Series B Preferred, and Common Stock, based on economic rights of each class and series of stock Original Purchase Price per Share: ▪ Series B Preferred Stock: $8.07 per share ▪ Series A Preferred Stock: $4.23 per share
DLOM	5% - 12%	20% - 35%
Time Value of Money Discount	14 - 16%	14 - 16%
Probability Weighing	95% - 25%	5% - 75%

Total equity values for each scenario used in this simulation were derived from the IPO of Elevation Oncology, Inc., a clinical-stage biotechnology company, which priced at $16.00 per share on June 24, 2021, and from a March 31, 2021 PWERM/hybrid valuation of Elevation Oncology common stock as disclosed by Elevation Oncology in its cheap stock letter to the SEC.[176] Specifically, the $265.155 million pre-money valuation of Elevation Oncology in connection with its IPO was used as the total equity value for the IPO outcome scenario, and the total equity value of $121.8 million for the stay-private scenario came from the stay-private scenario used in Elevation Oncology's March 31, 2021 valuation of its common stock.[177] The number of outstanding shares and capital structure used in this simulation model were derived from Elevation Oncology's disclosures regarding its outstanding equity securities as of March 31, 2021 in its S-1 registration statement.[178]

176. *See* Letter from Elevation Oncology, Inc. to Christopher Edwards, Deanna Virginio, Gary Newberry & Kevin Kuhar, SEC, Div. Corp. Fin. 4 (June 11, 2021) (on file with EDGAR); Elevation Oncology, Inc., Prospectus 9 (2021).

177. *See* Elevation Oncology, Inc., Amendment No. 3 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 8–9 (June 23, 2021); Letter from Elevation Oncology, Inc., *supra* note 176, at 5.

178. *See* Elevation Oncology, Inc., Amendment No. 3, *supra* note 177, at 9. The preferred stock in Table 3 was assumed to feature a non-participating 1x liquidation preference without a right to cumulative preferred dividends and a 1:1 conversion ration into common stock. The number of shares of preferred stock was calculated by applying the 1-for-4.225582 reverse stock split of common stock to the preferred stock of Elevation Oncology disclosed by Elevation Oncology. *Id.*

The other assumptions and discount factors used for my simulation model were conservative and consistent with my empirical findings. For example, I used a three-month time frame for IPO completion, which is consistent with the median IPO preparation period for firms in this study. The DLOM used in the simulations for the IPO outcome scenario weighted at less than 100% probability ranged from five percent to twelve percent, consistent with the DLOMs used by firms in this study, as shown in Chart 9. The DLOMs used for the stay private scenario are consistent with the DLOMs disclosed by the firms in this study that engaged in 11th hour option discounting.[179]

Each simulation employed a different IPO outcome probability in a PWERM valuation that then randomly applied the DLOMs and time value of money discounts within the ranges specified in Table 3 over 10,000 runs. Chart 10 presents the results of these simulations with IPO outcome probabilities from ninety-five percent to twenty-five percent at five percent intervals. Chart 10 readily illustrates the relative impact of a less than 100% IPO outcome probability on stock valuation. Again, a pronounced inverse relationship between IPO probability and IPO discount can be observed.

CHART 10

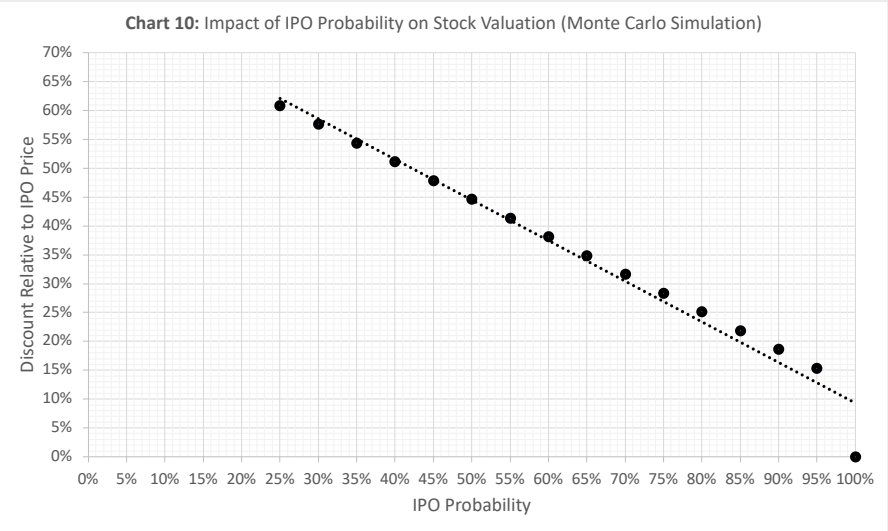


Chart 10 starts out with an assumed 100% IPO outcome probability and allocates this assumed equity value for the IPO outcome to all outstanding shares

179. Other assumptions and input factors apparently used in the March 31, 2021, valuation of Elevation Oncology common stock were not used in my simulation. For example, the March 2021 valuation had used a low $200 million total equity value for the IPO scenario and a high DLOM of 20% for the IPO scenario and 39% for the stay-private scenario and appears to have included outstanding stock options when calculating outstanding shares of common stock in the IPO outcome scenario. *See* Letter from Elevation Oncology, Inc., *supra* note 175, at 4.

of common stock on an as-converted-to-common-stock basis. At 100% IPO outcome probability and without the application of any discounts, the per share equity value in the IPO scenario equals the $16.00 IPO price. However, as soon as the IPO outcome is probability weighted at less than 100 percent, the stock value starts dropping.

When applying an exceedingly high IPO outcome probability of ninety-five percent, the total discount on the IPO price jumps to 15.4% on average. Once probability weighing between the different scenarios is triggered, the PWERM gives five percent weight to the lower common stock value resulting from the non-IPO scenario, which has been further reduced by the applicable discounts for the stay-private scenario. This occurs at the expense of the greater stock value in the IPO scenario—also reduced by the discounts applicable to the IPO scenario—which is now weighted at ninety-five percent.

Lowering IPO probability further results in a corresponding increase in the discount on the $16.00 IPO price. Every additional five percentage point decrease in IPO probability results in a corresponding average 3.3 percentage point increase in the discount on the IPO price, *i.e.*, the spread between the per share common stock valuation and the IPO price.

As highlighted by Chart 10, these simulations of a PWERM valuation thus show a linear relationship between IPO probability and valuation discount relative to the IPO price. Fundamentally, lowering the IPO probability results in a corresponding linear increase in the discount on the projected IPO price. This inverse relationship readily signals to firm insiders that the value of the underlying stock, and thus the exercise price of at-the-money options, can be depressed by simply estimating a lower IPO outcome probability.

By underestimating the IPO outcome probability, the PWERM will give greater weight to the lower valued non-IPO outcome scenario. Indeed, the lower the total equity value for the non-IPO outcome scenario compared to the total equity value for the IPO outcome scenario, the greater the impact of a drop in IPO outcome probability. As discussed, the impact of a low IPO outcome probability can then be further amplified, for example by applying relatively high DLOMs to the equity value for each scenario.

Substituting the hybrid method in the Monte Carlo simulation produced essentially the same results. In a second set of simulations, the common stock value for the stay-private scenario was calculated using the OPM based on the same total equity value of $121.8 million as in the PWERM simulation.[180] The common stock's value initially dropped by 15.6% on average relative to the IPO price when applying the ninety-five percent IPO outcome probability. In the hybrid model simulations, every additional five percentage point decrease in IPO probability resulted in a corresponding average 3.4 percentage point increase in the discount on the IPO price.

180. The OPM in this simulation used a 75% volatility, a 1.87% risk-free interest rate, and the time to exit was 2 years.

The PWERM, including the hybrid method, thus presents a ready blueprint for fixing a low option exercise price ahead of an IPO: decreasing IPO outcome probability results in a corresponding increase in the discount on the IPO price, which can be further amplified by a high time value for money discount and a high DLOM based upon an unreasonably long timeframe for the IPO outcome scenario, which is extended by impermissibly adding the 180-day lock-up period.

2. Impact of the Equity Value Assumption

The other factor driving stock valuations when using the PWERM are the total equity value assumptions used for the various outcome scenarios. Low pre-money value estimates obviously depress the appraised stock value.

By setting a considerably lower total equity value for the non-IPO scenario(s) compared to the IPO outcome scenario, stock value will drop when applying a low IPO outcome probability which will give greater weight to the lower valuations of the other scenario(s). As illustrated by the March 2021 valuation of Elevation Oncology common stock, the non-IPO scenario(s), such as the stay-private scenario, will typically be valued considerably lower than the IPO scenario.[181]

Indeed, even if a firm used a company sale as the non-IPO scenario, it can justify a lower estimated total equity value for this scenario, as IPOs often command a valuation premium compared to an M&A exit.[182] The relative difference in enterprise valuation used for the IPO outcome scenario and the non-IPO outcome scenario(s) will thus impact stock valuation—depending on the probability weighing of the IPO probability.

Firms could, of course, also depress common stock value by lowering the total equity value applied to the IPO scenario. Pre-IPO firms, however, may be cautious about significantly understating the pre-money value for the IPO outcome scenario.

For one, using a lower pre-money value as the starting point for the IPO outcome scenario when valuing equity compensation could expose a firm to arguments of overt manipulation, which would raise auditor concerns, and expose the firm to liability—even under the exacting standard of *Omnicare*—for performing a disingenuous valuation of the firm's pre-money value.[183] Indeed, a valuation is arguably neither reasonable nor made in good faith when, for example, a lower pre-money value is used as the starting point for purposes

181. *See* Letter from Elevation Oncology, Inc., *supra* note 176, at 4.

182. *See, e.g.*, Nihat Aktas, Christian Andres & Ali Ozdakak, *The Interplay of IPO and M&A Markets: The Many Ways That One Affects the Other*, *in* THE OXFORD HANDBOOK OF IPOS 201, 224–25 (Douglas Cumming & Sofia Johan eds., 2018).

183. Caroline Moon, *16 Things to Know About the 409A Valuation*, ANDREESSEN HOROWITZ (Feb. 13, 2020), https://a16z.com/16-things-to-know-about-the-409a-valuation (highlighting that stock appraisals risk not being reasonable if firm uses different forecasts for Section 409A valuations and for board valuations).

of fixing equity compensation but a greater pre-money value for the same firm is used when pitching to prospective IPO investors.

Moreover, during test-the-waters meetings or the road show potential IPO investors may inquire about the pre-money value used by the pre-IPO firm for an expected IPO outcome scenario in its recent stock valuations for compensatory stock option grants. Firms are thus incentivized to keep the total equity value for the IPO outcome scenario high and then reduce that starting value by applying permissible discounts and by applying a low outcome probability to the resulting equity value per share of common stock.

Table 4 lists a limited number of firms in this study engaged in 11th hour option discounting that also disclosed to the SEC their per-share value calculation when alternatively weighting the IPO outcome scenario at 100% and excluding any DLOM or time value of money discounts. These alternative valuations deviated, on average, by only 7.75% from the actual IPO price (median: 6%). Indeed, at a non-discounted 100 percent IPO outcome probability, firms may well overestimate the projected stock price in their valuations compared to the actual IPO price. The stock value at 100% IPO probability exceeded the IPO price in five out of the twelve valuations in Table 4.

TABLE 4

Table 4

Issuer (Stock Symbol)	IPO Price	Per Share Value at 100% IPO Outcome Probability (excluding discounts)	Increase to IPO Price	Option Exercise Price	IPO Probability	Exercise Price Discount Relative to IPO Price	Distance of Option Grant to IPO Pricing (Days)
CABA	$ 11.00	$ 15.15	-27.39%	$ 9.54	50%	13.27%	40
GRTX	$ 12.00	$ 15.12	-20.63%	$ 9.61	60%	19.92%	100
AXLA	$ 20.00	$ 21.72	-7.92%	$ 13.83	65%	30.85%	48
GTHX	$ 15.00	$ 16.00	-6.25%	$ 8.13	50%	45.80%	118
NTGN	$ 16.00	$ 16.15	-0.93%	$ 11.90	65%	25.63%	58
TBIO	$ 13.00	$ 12.67	2.60%	$ 9.78	75%	24.77%	4
BDTX	$ 19.00	$ 17.37	9.38%	$ 10.86	65%	42.84%	55
ALRN (1)	$ 15.00	$ 13.51	11.03%	$ 5.77	60%	61.53%	100
PYXS (2)	$ 16.00	$ 13.80	15.94%	$ 8.71		45.56%	23
SWTX	$ 18.00	$ 14.21	26.67%	$ 9.08	65%	49.56%	29
RUBY	$ 23.00	$ 15.99	43.84%	$ 12.98	75%	43.57%	42
AKUS	$ 17.00	$ 11.59	46.68%	$ 7.38	50%	56.59%	45
		Average	**7.75%**		**61.82%**	**38.32%**	**55**
		Median	**5.99%**		**65.00%**	**43.20%**	**47**

(1) Valuation based on a retrospective valuation by Aileron Therapeutics on March 2, 2017; original valuation was not publicly disclosed by Aileron.
(2) IPO probability used in the stock valuation was not publicly disclosed by Pyxis Oncology but was redacted in its cheap stock letter, dated September 28, 2021, to the SEC.

IPO outcome probability is thus a key driver for lowering the fair value estimates under the PWERM. In fact, firms in this study often pointed to low IPO outcome probability as the main driver of their lower stock valuations when reconciling their lower stock valuations with the preliminary IPO price range disclosed in their cheap stock letters to the SEC.[184]

I examine these unreasonably low IPO prognostications next.

184. *See,* e.g., Letter from Arthur McGivern, Att'y for Rubius Therapeutics, Inc., Goodwin, to Mary Beth Breslin & Jeffrey Gabor, SEC, Div. Corp. Fin. 6 (June 26, 2018) (on file with EDGAR) ("The Preliminary Price Range is based only upon a scenario in which the Company completes the IPO and is not probability weighted, in contrast to the Company's prior valuations of its common stock, which considered multiple potential outcomes, which would result in a lower valuation of the Company's common stock than its IPO.").

C. SUBJECTIVE PROBABILITY ESTIMATES

Firms appear to approach the IPO outcome probabilities used in their PWERM calculations based on the subjective personal beliefs of their management and, perhaps, their underwriters.[185] Firms routinely do not provide empirical data to support their outcome probabilities. Rather, firms appear to fix outcome probability crudely to merely reflect their belief that the firm is more likely than not to achieve the IPO at the target enterprise valuation, even though the magnitude of the probability is inversely related to the exercise price discount for last-minute option grants relative to the IPO price.

For example, Bolt Biotherapeutics started its IPO registration process by submitting its draft S-1 for confidential SEC review on August 10, 2020. Bolt subsequently performed a PWERM/hybrid valuation of its common stock as of October 15, 2020. As part of the valuation, the firm estimated a fifty-five percent probability that it would achieve an IPO in March 2021 with an estimated total equity value of about $300 million.[186]

In its cheap stock letter to the SEC, Bolt explained the fifty-five percent IPO outcome probability as follows: "At the time of the valuation, it seemed more likely than not (*e.g.* >50% chance) that the Company would demonstrate safety and activity [for its therapeutic candidate in an on-going clinical trial] and achieve the IPO scenario."[187]

The October 15, 2020 PWERM/hybrid valuation resulted in a fair value estimate of $4.41 per share of common stock.[188] Bolt subsequently granted compensatory stock options for a total of 240,535 shares of common stock at a per share exercise price of $4.41 in four separate at-the-money option grants between November 28, 2020 and January 8, 2021.[189] For each option grant, Bolt determined that the fair value of the underlying stock remained at $4.41.[190]

On February 4, 2021, *i.e.*, less than a month after its most recent pre-IPO option grant, Bolt Biotherapeutics priced its IPO at $20.00 per share for a pre-money valuation of $460.4 million. The stock's closing price on the first day of public trading on February 5, 2021, was $32.15 per share. Bolt's option recipients thus benefitted from a 77.95% discount on the IPO price and an 86.28% discount on the first day closing price.

Firms have used subjective probability estimates to arrive at dramatically lower IPO outcome probabilities even in close proximity to their IPOs. Such a

185. *See* HOSSEIN PISHRO-NIK, INTRODUCTION TO PROBABILITY STATISTICS AND RANDOM PROCESSES 2 (2014) ("[One] interpretation of probability is that it is the quantification of our degree of subjective personal belief that something will happen." (emphasis omitted)). *See generally* RICHARD JEFFREY, SUBJECTIVE PROBABILITY: THE REAL THING (2004) (discussing the "subjective" approach to probability theory).

186. Letter from John T. McKenna, Att'y for Bolt Biotherapeutics, Inc., Cooley, to Kristin Lochhead, Daniel Gordon, Donald Field & Sonia Bednarowski, SEC, Div. Corp. Fin. 12 (Jan. 25, 2021) (on file with EDGAR).

187. *Id.* (after reverse stock split).

188. *Id.*

189. *Id.*

190. *Id.*

subjective approach to estimating probabilities likely understates fair value given the impact of these probabilities on stock value in the PWERM.

D. DELAYED OPTION GRANTS

As illustrated by the option grant activity of Bolt Biotherapeutics, firms frequently utilize PWERM valuations made at a far earlier date for subsequent stock options awarded later in the IPO preparation process.

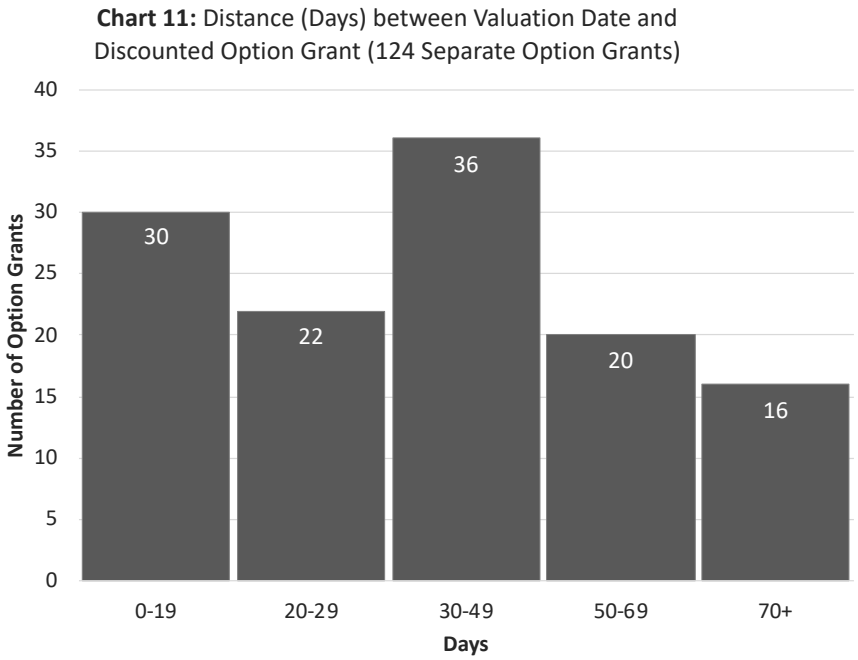
Firms frequently undertake PWERM/hybrid valuations near the start of their IPO preparation process or even before the process begins and thus claim a low IPO probability. Indeed, fifty-nine percent of 124 option grants in this study made during IPO preparations used PWERM/hybrid valuations with valuation dates either before the initial confidential submission of their draft S-1 or within fifteen days after confidential submission.[191]

The average and median durations between the valuation date and option grant date were thirty-eight days and thirty-seven days for the 124 option grants that utilized the PWERM or hybrid method.[192] Chart 11 shows the distribution of late-stage option grants by temporal distance between valuation date and option grant date for these option grants. For more than half of the option grants (57%), the distance between valuation date and option grant date was thirty days or longer. For more than a quarter of option grants (29%), the distance was at least fifty days. For eighteen percent of option grants, the distance was at least sixty days. These are exceptionally long periods given the narrow IPO preparation window.

191. This does not include stock valuations for which the valuation date was not disclosed nor two late-stage option grants made by NGM Biopharmaceuticals, Inc., which were outliers. NGM made option awards on February 7 and March 17, 2019, each with a $12.06 exercise price and went public on April 3, 2019, with an IPO price of $16.00 a share. However, NGM had valued the common stock at $12.06 per share as of August 10, 2018—some 219 days and 181 days prior to these late-stage option grants. *See* Ron Leuty, *Six Months After IPO Filing, Peninsula Biotech's Offering Is on Again—and Upsized*, S.F. BUS. TIMES (Mar. 26, 2019), https://www.bizjournals.com/sanfrancisco/news/2019/03/26/ngm-biopharmaceuticals-jumpstarts-ipo.html.

192. This does not include stock valuations for which the valuation date was not disclosed nor the two outlier option grants by NGM. *See supra* note 191.

CHART 11



Firms typically take the position that earlier stock valuations are not stale and do not require any updating even if used to fix subsequent stock option grants near the IPO because supposedly no material event occurred between valuation and option grant that would impact firm value. Firms can point to outdated tax regulations and accounting rules in support of their continued reliance on these earlier valuations.

The Treasury Regulations implementing IRC §409A provide that use of a stock's fair market value previously calculated under a valuation method is no longer reasonable "as of a later date if such calculation fails to reflect information available after the date of the calculation *that may materially affect the value of the corporation* (for example, the resolution of material litigation or the issuance of a patent) or the value was calculated with respect to a date that is more than 12 months earlier than the date for which the valuation is being used [emphasis added]."[193] Similarly, the practical expedient under ASU 2021-07 considers the use of a stock's fair value to be reasonable under ASC 718 if (1) "[t]he value is updated for any information available after the date of calculation that may *materially affect the value of the entity*;" and (2) "[t]he

193. Treas. Reg. § 1.409A-1(b)(5)(iv)(B)(1) (as amended in 2007).

value is calculated no more than 12 months earlier than the date for which the value is being used [emphasis added]."[194]

In practice, these provisions are routinely interpreted to the effect that a stock valuation that otherwise meets the requirements of the Treasury Regulations remains reasonable for up to twelve months from the valuation date, thus allowing companies to offer options with an exercise price at least equal to such stock valuation, unless a subsequent material event occurs during this twelve-month period that would affect the firm's value.[195]

By utilizing the PWERM during the IPO preparation process, pre-IPO firms seek to take advantage of what appears to be a regulatory shortcoming. It would appear that pre-IPO firms construe the Treasury Regulations and the accounting rules to only require new stock valuations in case a subsequent event occurs that may materially affect company value. By contrast, under the PWERM, stock value can be materially affected *even before the event occurs*, as the fair value calculation depends upon the *probability* of that event occurring. Thus, as the firm marches towards its IPO as the future material event, the probability of going public improves rapidly during the exceedingly narrow IPO preparation window while the firm's value (under the various outcome scenarios) remains unchanged.

For example, the firms in this study did not consider the organizational meeting that launched their IPO preparations or the submission of their initial draft registration statement to the SEC for confidential review a material subsequent event that would impact firm value. To illustrate, Bolt Biotherapeutics applied its October 15, 2020, PWERM-based valuation, which had assigned a fifty-five percent probability of IPO completion, to a January 8, 2021, option grant that was made less than a month before Bolt went public on February 4, 2021. Bolt reasoned that it did not need to update its earlier PWERM valuation for subsequent at-the-money option grants, because there had been no changes that would materially impact the firm's equity value following the October 15, 2020, valuation date.[196]

Bolt was no outlier. Chart 12 clearly shows that firms utilize earlier low IPO outcome probabilities for options grants made much later during the IPO

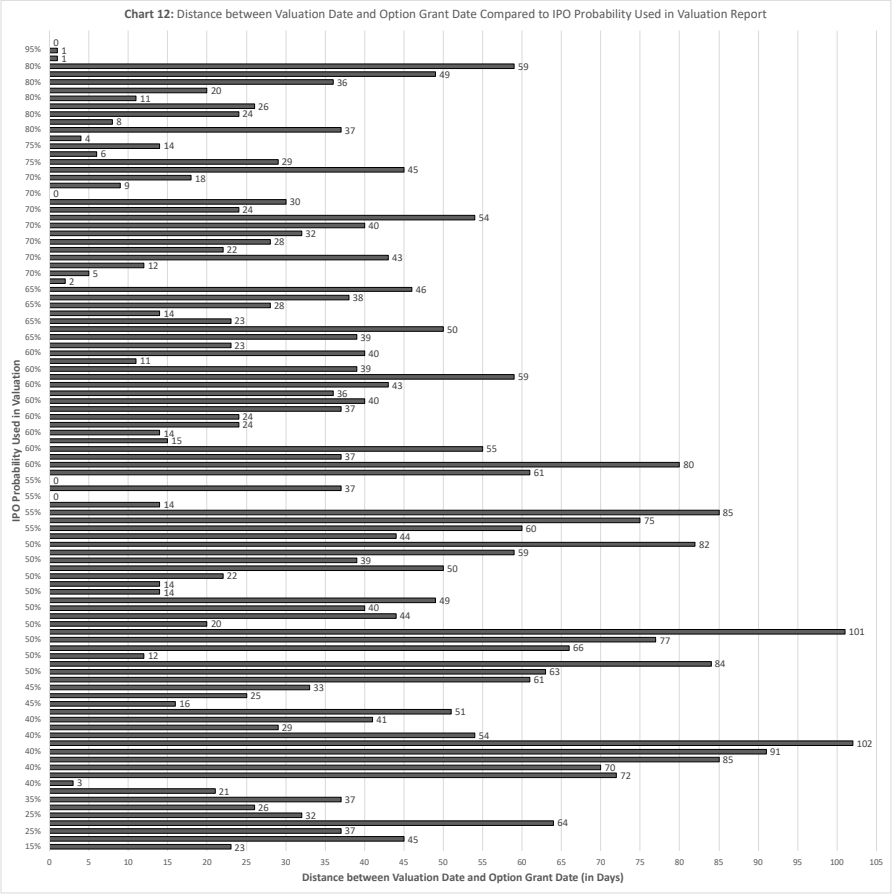
194. FIN. ACCT. SERIES, Acct. Standards Update: Comp.–Stock Comp. (Topic 718) No. 2021-07, at 3 (FIN. ACCT. STANDARDS BD. 2021).

195. *See, e.g.*, *409A Valuations: What Every Founder Needs to Know*, TECHCRUNCH, https://techcrunch.com/sponsor/first-republic-bank/409a-valuations-what-every-founder-needs-to-know (last visited Feb. 1, 2025) ("Startups also need to update their 409A valuation annually, and should get a new valuation anytime there is a material change that impacts the value of the business."); Moon, *supra* note 183 ("Companies are expected to conduct 409A valuations at least once every 12 months, or when a material event has occurred that would affect the value of the company—whichever occurs sooner.").

196. *See* Letter from Arthur McGivern to Mary Beth et al., *supra* note 186, at 12 ("In determining the fair value of the Common Stock for the November 2020 grants, December 2020 grants and January 2021 grants, the Board considered the October 2020 Valuation, relevant business conditions, preclinical updates and the absence of any changes that would materially impact the Company's equity value since the time of the October 2020 Valuation as of each such grant date.").

process. Chart 12 shows the probabilities used in earlier PWERM/hybrid-based stock valuations and the length of time between the valuation date and the grant date for 102 discounted option grants that featured an exercise price set at the earlier stock valuation.[197]

CHART 12



Taking advantage of earlier appraisals that produce low stock valuations for later stock option grants resembles the option backdating practices of public companies during the late 1990s and early 2000s, which involved backdating or misdating stock option grants to executives and rank-and-file employees, thus disguising in-the-money stock options as at-the-money options. Public companies would use the benefit of hindsight to backdate the option grant date to a point in time when the market price of the companies' publicly traded stock

197. The outlier option grants for NGM were not included. *See supra* note 191.

was lower than the stock price on the actual date of option grant. By fabricating a grant date that reflected the earlier lower stock price in the option award documentation, the optionee could benefit from the stock price performance that occurred before the actual option grant date.[198]

No fabrication is needed in case of 11th hour option discounting. Firms simply utilize an earlier low valuation with a lower IPO outcome probability for late-stage stock option grants even if the probability has improved considerably by the time the option is granted. Indeed, none of the assumptions are updated, including total equity value or the projected IPO date or the corresponding periods for determining the DLOM and the time value of money discount.

E. COMPLEX OUTCOME SCENARIOS

Some firms construct exceedingly complex outcome scenarios, including multiple IPO outcome scenarios, as part of their PWERM valuation. For example, on September 24, 2020, PMV Pharmaceuticals, Inc. priced its IPO at $18 per share. The closing price rose to $37.52 on the first day of public trading. Less than a month earlier, on August 28, 2020, PMV had granted 109,209 at-the-money stock options with a $8.53 per share exercise price that resulted in a 52.61% discount on the IPO price and a 77.27% discount on the closing price.[199] PMV justified this low exercise price with a June 30, 2020, PWERM/hybrid-based stock valuation that in addition to a stay-private scenario had used four different IPO scenarios:

> In this valuation, the hybrid method was used to address two probability-weighted scenarios: a non-IPO scenario and an IPO scenario, which was further split into an early high IPO scenario, an early low IPO scenario, a late high IPO scenario and a late low IPO scenario. The non-IPO scenario was assigned a weight of 40.0 percent, the early high IPO and early low IPO scenarios were each assigned a weight of 21.0 percent and the late high IPO and late low IPO scenarios were each assigned a weight of 9.0 percent.[200]

The additional complexity undoubtedly contributed to the exceedingly low discount on the IPO price. For one, different target equity values for the various IPO scenarios were used.[201] In addition, the different target completion dates for the different IPO scenarios allowed use of different DLOMs.[202]

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198. *See* David I. Walker, *Some Observations on the Stock Option Backdating Scandal of 2006* at 6 (Bos. Univ. Sch. of L., Working Paper Series, L. & Econ., Working Paper No. 06–31, 2006); Narayanan et al., *supra* note 12.

199. *See* Letter from Megan Bier to Ameen Hamady et al., *supra* note 150, at 5 (after applying reverse stock split).

200. *Id*. at 11.

201. *Id*. at 11–12.

202. *Id.* (using a DLOM of 10% for early IPO scenarios with a September 30, 2020, IPO completion date and 15% for late IPO scenarios targeting June 30, 2021, for IPO completion).

Put simply, the PWERM lacks standards for scenario selection. [203] The AICPA Guide provides no meaningful guidance on scenario selection for late-stage option grants near the IPO. While these more complex scenarios appear to render the valuation more quantitative and supposedly more objective, they effectively open more avenues for applying subjective probabilities in order to lower stock value.

F. INFLUENCE OVER THE INDEPENDENT VALUATION PROCESS

Firms routinely use external appraisers to perform valuations of the common stock underlying their late-stage option grants. Indeed, the stock valuations for at least ninety-six percent of all 147 discounted option grants made during IPO preparations utilized valuations prepared by third-party independent appraisers.[204] All of the PWERM/hybrid-based stock valuations disclosed by firms in this study that engaged in 11th hour option discounting utilized third-party appraisals for their discounted option grants.[205]

Firms routinely assert in their registration statement that their boards of directors estimated the fair value of the underlying stock on each option grant date. Moreover, firms routinely convey the notion that their board of directors considered various factors to estimate the fair value of the firm's common stock, including a valuation performed by an independent third party as one of numerous factors.[206]

In reality, firms did not appear to deviate at all from the then most recent third-party stock appraisal when fixing the exercise price of their stock option grants. Except for one firm with respect to one stock option award, none of the firms disclosed in their S-1 or cheap stock correspondence to the SEC that they had deviated from the most recent third-party stock appraisal preceding the option grant when setting the exercise price.[207]

Indeed, for eighty percent of 147 discounted option grants made during IPO preparations, the exercise price of the stock option grant and the most recent external stock appraisal preceding such option grant were disclosed by the awarding firms in their S-1 or their cheap stock correspondence.[208] For ninety-

203. BEATON, *supra* note 161, at 90.

204. Four firms did not disclose whether they utilized third party stock appraisals in connection with six discounted option awards made during IPO preparations. One of these firms, Krystal Biotech, apparently used a recent third-party stock sale rather than a third-party appraisal when setting the exercise for one late stage discounted option award.

205. The PWERM/hybrid method was used for at least 128 discounted stock grants in this study.

206. *See, e.g.*, Forty Seven, Inc., Amendment No. 2, *supra* note 139, at 73 (listing a plethora of objective and subjective factors considered by the board of directors in its common stock valuation, including independent third party valuations).

207. *See supra* note 41 and accompanying text.

208. Krystal Biotech apparently used a third-party stock sale, rather than a third-party stock appraisal, for one discounted stock award. For 23 of the remaining 28 discounted stock awards in this study, the awarding firms disclosed that they had utilized a third-party stock appraisal in connection with their stock valuations but did not disclose the resulting stock value from these third-party appraisals.

nine percent of these 118 discounted stock option awards the exercise price did not deviate at all from the stock value determined by the then most recent external appraisal–even if, as already discussed, a significant period of time had elapsed between the appraisal date and the grant date.[209]

1. Regulatory Preference for Independent Valuations

Firms are strongly incentivized to defer to third party appraisals, as the final Treasury Regulations implementing Section 409A created a safe harbor for privately-held companies if they utilize a stock valuation performed by a qualified independent appraiser within twelve months prior to the stock option grant.[210] The use of a safe harbor is presumed to result in a reasonable stock valuation and shifts the burden of proof to the IRS if the agency were to challenge the resulting fair market value, requiring the IRS to prove that the valuation method or its application was grossly unreasonable.[211]

As envisioned by the IRS, privately held companies should delegate the stock appraisal process for fixing compensation to third party experts. Its regulations greatly incentivize use of a third-party stock appraisal for Section 409A-compliance when granting compensatory options, including during the IPO preparation window. By contrast, another safe harbor valuation approach, the so-called illiquid startup method, for valuing the stock of start-up companies is not available if the start-up company can reasonably expect to conduct an IPO within 180 days of the stock valuation.[212]

Similarly, ASU 2021-07 permits and, effectively, endorses the use of stock appraisals by qualified independent experts. The FASB specifically noted that "it is expected that an independent appraisal will often be the method used by nonpublic entities electing the practical expedient in this Update because of (1) the presumption of reasonableness associated with that method for tax purposes and (2) the requirements associated with, and limiting the availability of, other methods that achieve the presumption of reasonableness."[213]

ASU 2021-07 largely codifies the practices previously recommended by accountants and auditors. The accounting profession had long endorsed the use of unrelated third-party stock appraisals in connection with valuing equity compensation. The AICPA Guide, first published in 2004 and updated in 2014,

209. For the only discounted stock award that used a greater exercise price compared to the third-party valuation, see *supra* note 41.

210. Treas. Reg. § 1.409A-1(b)(5)(iv)(B)(2)(i) (as amended in 2007).

211. Treas. Reg. § 1.409A-1(b)(5)(iv)(B)(2) (as amended in 2007); *see* OLSHAN & SCHOHN, *supra* note 23, at 14.18–.19; BAIN ET AL., *supra* note 22, at 17.

212. Treas. Reg. § 1.409A-1(b)(5)(iv)(B)(2)(iii) (as amended in 2007); *see* OLSHAN & SCHOHN, *supra* note 23, at 14.19–.20.

213. FIN. ACCT. SERIES, Acct. Standards Update: Comp.–Stock Comp. (Topic 718) No. 2021-07, at 8 (FIN. ACCT. STANDARDS BD. 2021).

recommends that valuations be conducted by unrelated third-party appraisers to ensure greater reliability.[214]

Moreover, in order to minimize the risk of undervaluation and financial restatements, and resulting IPO delays, auditors have routinely counseled privately-held firms to obtain stock valuations from independent appraisers in connection with compensatory stock option grants and to have independent appraisers perform these valuations contemporaneously with the option grant dates.[215] These external appraisals can then serve as persuasive evidence of reasonable stock valuations when the firm later has to respond to cheap stock inquiries from the SEC in connection with the firm's IPO.

An independent qualified appraiser who utilized the guidance set forth in the AICPA Guide in performing the valuation can bolster the firm's argument to the SEC that the valuation is more objective and thus more reliable and persuasive. A 2020 study by Stuart and Willis offers empirical support for the notion that the SEC largely defers to stock valuations made by unrelated third-party appraisers in connection with their cheap stock review.[216]

Stuart and Willis reviewed stock option grants by firms conducting IPOs during the period from 2006 to 2016. Their dataset covered 575 IPO firms and 3,551 employee stock option grants made during the eighteen-month period prior to the IPO.[217] The authors found that on average eighteen percent of employee stock option grants were retrospectively revalued when an independent valuation specialist initially estimated the value the stock underlying the option grant within ninety days before the option grant compared to thirty-three percent when the initial valuation was conducted by the firm internally and without the use of an outside expert.[218] Moreover, the magnitude of the upward revaluation of the stock options averaged only 16.5% when an independent valuation specialist initially estimated the fair value of the underlying stock compared to an average of 152% when the initial estimate had been conducted by the pre-IPO firm internally.[219]

As discussed, virtually all of the discounted option grants made during IPO preparations utilized stock valuations prepared by third-party independent appraisers and did not deviate from the appraised value of the underlying stock. The SEC did not require any revaluations of the stock underlying the 147 late stage discounted option grants in this study. Only six firms in this study

214. AICPA Guide, *supra* note 142, at 107 ("[T]he most reliable fair value estimate is produced by a contemporaneous valuation performed by an unrelated valuation specialist.").

215. Stuart & Willis, *supra* note 65, at 439.

216. *Id.* at 467–69.

217. *Id.* at 446.

218. *Id.* at 440.

219. *Id.* ("[T]he frequency and magnitude of upward stock option revaluations are substantially lower for firms that receive independent valuations, suggesting that the emphasis placed in independent valuations by auditors, the SEC, and the AICPA Guide is justified.").

proactively revalued or told the SEC that they would revalue the stock underlying their late stage discounted option grants.

The SEC's cheap stock approach appears to be based upon the assumption that independent valuations performed and documented by qualified third-party appraisers who apply the valuation methodologies endorsed by the accounting profession in the AICPA Guide are less likely to be influenced by management bias, thus reducing the risk that the compensation process is captured by the firm's management. Such external appraisals are apparently assumed to be more reliable for estimating the fair value of the underlying stock and, in turn, the fair value of the compensatory stock options and the corresponding compensation expenses as reported and disclosed in financial statements and securities filings.

External appraisals by independent specialists appear to be viewed as a panacea for the thorny issue of estimating the stock of non-public companies fairly—not only for securities law purposes but also for income tax purposes. Fundamental to this approach is the notion that as long as the requisite valuation process was followed by the company's board of directors in good faith, the outcome will not be challenged, even if the equity compensation could result in a tax-optimized windfall to corporate insiders and their subordinates. Indeed, the SEC has provided comfort to firms to the effect that "so long as the estimates are made in good faith, they will not be subsequently questioned no matter what the actual outcome."[220]

2. ARRANGING INDEPENDENT VALUATIONS

However, my investigation shows that pre-IPO firms have effectively captured the stock valuation process even when outside experts are used. By utilizing the PWERM, firm insiders gain considerable influence over stock appraisals, given that the critical input factor is the probability of the upcoming IPO at the target equity value within the target time frame.

Firm management, rather than the external appraiser, typically estimates the IPO outcome probability in a PWERM valuation.[221] For example, in its cheap stock letter, Rhythm Pharmaceuticals, Inc. advised the SEC that "[a]s of June 30, 2017, the Company's management and board of directors assessed the probability of an IPO in October 2017 as sixty percent (60%) and remain-private scenario in October 2017 as forty percent (40%) . . . ." The timing of these future liquidity event scenarios was determined based primarily on input from the board of directors and management."[222] The valuation, which was performed

220. FW COOK, *supra* note 36; *see Codification of Staff Accounting Bulletins—Topic 14: Share-based Payment,* SEC (Nov. 29, 2021), https://www.sec.gov/interps/account/sabcodet14.htm.

221. *See* BEATON, *supra* note 161, at 89 ("These assumptions are often based only on management estimates . . . ."); AICPA GUIDE, *supra* note 142, at 61 ("The [PWERM] method . . . might depend heavily on subjective management assumptions."); *id.* at 154 ("[The appraiser] [e]valuate[s] the reasonableness of the assumptions . . . provided by management.").

222. Letter from Julio E. Vega, Att'y for Rhythm Pharmaceuticals, Inc., Morgan Lewis, to Suzanne Hayes, SEC, Div. Corp. Fin. 7–8 (Sept. 18, 2017) (on file with EDGAR).

"with the assistance of an independent third-party valuation specialist", produced a fair value estimate of $6.88 per share.[223] On August 8, 2017, Rhythm awarded options to purchase a total of 403,488 shares of common stock to its chief financial officer and chief commercial officer with the per share exercise price set at $6.88. Rhythm priced its IPO on October 4, 2017 at $17.00 per share, resulting in a 59.53% discount on the IPO price and a 77.07% discount on the closing price on the first day of public trading on October 5, 2017.

Given the outsized impact of the probability estimate on valuation outcome, firm insiders thus yield considerable clout over the fair value estimate of the underlying stock at which the exercise price will be set for these late-stage at-the-money option grants. In other words, firm insiders can significantly bias the stock valuation by simply underestimating IPO outcome probability at the target equity valuation.[224]

These valuations nevertheless appear objective. Pre-IPO firms routinely characterize PWERM-based valuations as quantitative and as the work product of independent specialists, including in their correspondence with the SEC. Indeed, pre-IPO firms typically present the third-party specialist's PWERM valuation as external validation of their own, seemingly separate stock valuation.[225]

There are various plausible explanations as to why valuation specialists will accept the low IPO prognostications of firm insiders. First, third-party appraisers typically do not have the requisite expertise to assess the probability that the pre-IPO firm will complete its IPO at the target equity value within the target time frame. Unlike investment bankers and auditors, they are not teaming up with firm management to prepare the firm for its IPO. Lacking insight into the firm's IPO process or the IPO market or company-specific risks facing the IPO candidate, they will, by necessity, likely defer to firm management and the firm's lead underwriters.

Moreover, appraisers may look to the lead underwriters for confirmation of IPO probability. The IPOs of the biotechnology firms in this study were facilitated by sophisticated capital market participants. Chart 13 shows the underwriters managing the 116 completed IPOs in this study as book-running managers or joint book-running managers. Specifically, the chart shows the share of completed IPOs for which an underwriting bank acted as a book-running manager or joint book-running manager during the five-year study period. At least one high-prestige underwriter pursuant to Ritter's and

223. *Id.* at 3 (value after applying actual reverse stock split).

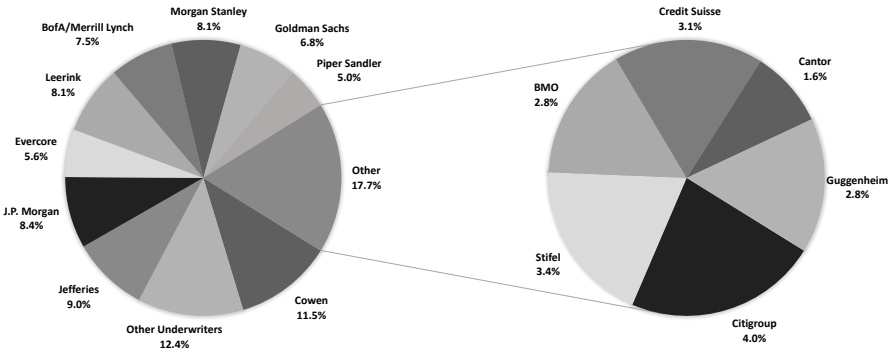
224. BEATON, *supra* note 161, at 89.

225. *See, e.g.*, Letter from John T. McKenna to Kristin Lochhead et al., *supra* note 186, at 2–3 ("The estimated fair value of the Common Stock underlying stock options was determined at each grant date by the Board and was supported by periodic independent third-party valuations.").

Loughran's underwriter classification served as a book-running manager in eighty percent of these 116 IPOs.[226]

CHART 13

CHART 13: Underwriters (Book-Running Managers) on Completed IPOs in the Study during the 5-Year Study Period



Other Underwriters comprise: Allen & Company; B. Riley Securities; Barclays; Berenberg; BTIG; Chardan; Deutsche Bank Securities; EF Hutton; H.C. Wainwright & Co.; Ladenburg Thalmann; MDB Capital Group; Mizuho Securities; Network 1 Financial Securities; Oppenheimer; Raymond James; RBC Capital Markets; ThinkEquity; UBS Investment Bank; Univest Securities; Wells Fargo Securities; and William Blair.
Piper Sandler covers IPOs undwritten by Piper Sandler and Piper Jaffray. Leerink covers IPOs underwritten by SVB Leerink and Leerink Partners.

Underwriters, however, are likely cautious about providing what their clients could view as assurances that they will achieve an IPO at the desired equity valuation even though these projections would only be used in pre-IPO stock valuations. Indeed, to the extent the firm or external appraiser seeks the underwriter's estimate of IPO outcome probability, the underwriter would be exceedingly reluctant to signal a high likelihood of success given its role as a gatekeeper in connection with a firm underwriting as further discussed in the next Section.

G. DOOM AND GLOOM

By setting low probabilities for their target IPO scenario firms effectively exhibit an exceedingly low level of confidence in IPO outcome at the target equity value. Firms typically remain pessimistic about their ability to achieve an IPO at the target equity value throughout the IPO preparation process.

At the same time, the firms in this study that engaged in 11th hour option discounting often provided minimal, if any, disclosures in their S-1 or in their cheap stock letters of their rationale for assigning low probabilities to IPO success while actively preparing to go public. In their cheap stock letters, these firms instead offered explanations to the SEC as to the increase in stock value

226. Tim Loughran & Jay Ritter, *Why Has IPO Underpricing Changed Over Time?*, 33 FIN. MGMT., no. 3, Autumn 2004, at 5, 21–22 [hereinafter Loughran & Ritter, *IPO Underpricing Over Time*]; JAY R. RITTER & TIM LOUGHRAN, IPO UNDERWRITER REPUTATION RANKINGS (1980–2024) (n.d.) [hereinafter RITTER & LOUGHRAN, REPUTATION RANKINGS].

from their earlier stock valuation for at least their most recent stock option grant to the preliminary price range projected for their IPO.[227]

These increases were substantial when measuring the difference between the exercise price of late-stage at-the-money option grants and the midpoint of the preliminary IPO price range disclosed by thirty-five firms to the SEC in their unredacted cheap stock letters.[228] As Table 5 shows, on average stock value increased by 106% (median: 77%) from the exercise price of the most recent at-the money option grant prior to the cheap stock letter date to the midpoint of the preliminary IPO price range disclosed in the unredacted letter.

TABLE 5

Table 5

Issuer (Stock Symbol)	IPO Price	Midpoint of Preliminary IPO Price Range Disclosed in Cheap Stock Letter	Increase from Midpoint of Preliminary IPO Price Range to IPO Price (%)	Exercise Price of Most Recent At-the-Money Option Grant	Increase - Option Exercise Price to Midpoint of Preliminary IPO Price Range	Increase - Option Exercise Price to IPO Price	Distance - Option Date to Cheap Stock Letter Date (in Days)	Distance - Date of Cheap Stock Letter to First Day of Trading (in Days)
ALLO	$ 18.00	$ 17.00	5.88%	$ 14.65	16.04%	22.87%	0	15
VIE	$ 19.00	$ 19.50	-2.56%	$ 15.84	23.11%	19.95%	19	19
PRVL	$ 17.00	$ 16.03	6.05%	$ 12.13	32.15%	40.15%	8	22
BCEL	$ 17.00	$ 17.50	-2.86%	$ 12.66	38.23%	34.28%	11	17
NTGN	$ 16.00	$ 16.50	-3.03%	$ 11.90	38.66%	34.45%	38	20
LYEL	$ 17.00	$ 20.00	-17.65%	$ 14.40	38.89%	18.06%	8	20
UBX	$ 17.00	$ 17.00	0.00%	$ 12.22	39.12%	39.12%	13	17
PRNB	$ 17.00	$ 15.99	6.32%	$ 11.35	40.88%	49.78%	5	16
TBIO	$ 13.00	$ 14.31	-9.15%	$ 9.78	46.32%	32.92%	17	20
PASG	$ 18.00	$ 16.93	6.32%	$ 11.00	53.91%	63.64%	0	21
OVID	$ 15.00	$ 16.00	-6.25%	$ 10.32	55.04%	45.35%	5	18
BDTX	$ 19.00	$ 16.92	12.29%	$ 10.86	55.80%	74.95%	39	17
RUBY	$ 23.00	$ 20.50	12.20%	$ 12.98	57.94%	77.20%	20	22
AXLA	$ 20.00	$ 22.00	-9.09%	$ 13.83	59.07%	44.61%	33	14
DNLI	$ 18.00	$ 18.52	-2.81%	$ 11.64	59.11%	54.64%	13	23
RYTM	$ 17.00	$ 13.76	23.55%	$ 8.44	63.03%	101.42%	18	17
CABA	$ 11.00	$ 16.50	-33.33%	$ 9.54	72.96%	15.30%	26	14
STSA	$ 15.00	$ 15.00	0.00%	$ 8.46	77.30%	77.30%	21	17
LBPH	$ 16.00	$ 15.22	5.12%	$ 8.56	77.80%	86.92%	6	17
ELYM	$ 12.50	$ 18.00	-30.56%	$ 10.06	78.93%	24.25%	13	13
SWTX	$ 18.00	$ 17.00	5.88%	$ 9.08	87.22%	98.24%	12	17
GLTO	$ 15.00	$ 15.00	0.00%	$ 7.70	94.81%	94.81%	6	16
PMVP	$ 18.00	$ 17.00	5.88%	$ 8.53	99.30%	111.02%	30	14
AKUS	$ 17.00	$ 14.96	13.64%	$ 7.38	102.71%	130.35%	30	15
GRPH	$ 17.00	$ 17.78	-4.39%	$ 8.56	107.71%	98.60%	27	15
TPTX	$ 18.00	$ 17.04	5.63%	$ 7.43	129.34%	142.26%	34	22
KOD	$ 10.00	$ 13.50	-25.93%	$ 5.38	150.93%	85.87%	80	20
GTHX	$ 15.00	$ 17.25	-13.04%	$ 6.87	151.09%	118.34%	103	15
KZR	$ 15.00	$ 15.00	0.00%	$ 5.91	153.81%	153.81%	49	17
ALXO	$ 19.00	$ 15.00	26.67%	$ 5.59	168.34%	239.89%	20	15
ALRN	$ 15.00	$ 15.99	-6.19%	$ 5.77	177.12%	159.97%	88	12
PHAS	$ 5.00	$ 13.00	-61.54%	$ 4.65	179.57%	7.53%	51	20
NKTX	$ 18.00	$ 15.50	16.13%	$ 4.33	257.97%	315.70%	38	11
RAIN	$ 17.00	$ 21.06	-19.28%	$ 5.14	309.73%	230.74%	45	14
ELEV	$ 16.00	$ 19.25	-16.88%	$ 3.09	522.98%	417.80%	8	14
		AVERAGE	**-3.23%**		**106%**	**96%**	**27**	**17**
		MEDIAN	**0.00%**		**77%**	**77%**	**20**	**17**

Firms routinely emphasized that their earlier stock valuations in connection with stock option grants utilized a quantitative methodology, such as the PWERM or hybrid method, to estimate fair value of their common stock. By contrast, the preliminary IPO price range "was not derived using a formal determination of fair value but was determined primarily by negotiation between the Company and the Lead Underwriters."[229]

227. When there is a substantial difference between the fair value estimate of the underlying stock at the option grant date and the projected share price at IPO date, the FRM provides that "the registrant should be able to reconcile the difference between them (for example, explain the events or factors that support the difference in values)." FINANCIAL REPORTING MANUAL, *supra* note 69, § 7520.1.

228. Firms routinely redacted their preliminary IPO price range in their cheap stock letters to the SEC, necessitating FOIA requests to obtain the unredacted price ranges.

229. Letter from Denali Therapeutics Inc., to Chris Edwards, Erin Jaskot, Keira Nakada & Jim Rosenberg, SEC, Div. Corp. Fin. 7 (Nov. 15, 2017) (on file with EDGAR).

Moreover, the midpoint of the preliminary price range "assumes with 100% probability that the Company completes an IPO, in connection with which all of the Company's convertible preferred stock will be converted into common stock".[230] Conversely, "because the PWERM methodology utilizes a probability-weighted approach . . . the resulting Estimated Fair Value Per Share reflects the potential for alternative future events, which inherently decreases the Estimated Fair Value Per Share due to the combination of (i) events other than the IPO scenarios (the stay private scenario), (ii) the discounting to present value for each of the future business values at the future event and (iii) the application of a discount for lack of marketability."[231]

To the extent firms did disclose their rationale for assigning a low probability to the IPO outcome, they routinely justified their lack of confidence by pointing to risks they purportedly faced at the time of stock valuation. Moreover, in their cheap stock letters, the firms in this study frequently pointed to recent firm-specific developments to justify future stock value at 100% IPO probability. These developments, which, for example, included further progress on product development, regulatory approvals, or test-the-waters meetings, thus shed light on the risks faced by the firm when it used a low IPO outcome probability to grant stock options before these developments.

These risks typically fell into one or more the following risk categories: market risks, business risks, and execution risks.

Market risks cover the then-current market appetite for IPOs of preclinical and clinical-stage biotechnology companies and the possibility of a future downturn in the IPO market as these biotech firms seek to go public.

Business risks relate to threats to a firm's business activity, which in the case of preclinical and clinical-stage biotech companies mostly concern development risks with respect to their therapeutic candidates and regulatory risks, including risks related to the rejection of a firm's pending investigational new drug application (IND) by the Food and Drug Administration (FDA) for a therapeutic candidate and risks associated with a pending clinical trial of a firm's therapeutic candidate.

Execution risks reflect the supposed uncertainty as to whether a firm will ultimately successfully execute on its plan to go public while it is actively pursuing this objective, including regulatory risks stemming from the SEC's review of the registration statement and the willingness of investment banks to ultimately underwrite the IPO.

To illustrate, clinical-stage biotech Allogene Therapeutics, Inc. justified a forty percent IPO outcome probability, which culminated in an option exercise price featuring a 73.5% discount on its IPO price and a seventy-two percent

230. *Id.* at 8.

231. Letter from Brian J. Cuneo, Att'y for Unity Biotechnology, Inc., Latham Watkins, to Suzanne Hayes, James Rosenberg, Jeffrey Gabor, Ada Sarmento, Lisa Vanjoske &Vanessa Robertson, SEC, Div. Corp. Fin. 13 (Apr. 16, 2018) (on file with EDGAR).

discount on the midpoint of its preliminary IPO price range by pointing to market and business risks in its cheap stock letter: "Unexpected systemic events like the biotechnology IPO market cooling, poor trading performance of recent comparable IPOs, a decline in the valuations of comparable companies, fatigue from institutional investors, geopolitical risk (including market volatility in advance of the U.S. midterm elections or potential delays caused by a U.S. government shutdown), or other Company specific events like an unfavorable data readout for [its therapeutic candidate] prior to the IPO, a setback in the field of CAR T cell therapy at the Company or other companies in the field or other development setbacks could materially impact the viability and timing of the Company's IPO or the Company's aspirations to continue pursuing one."[232]

Allogene also noted executing risks in its cheap stock letter: "[A]t the time of the valuation the Company had just completed its IPO organizational meeting on July 16, 2018, and confidentially submitted the Company's draft registration statement with the Commission on August 10, 2018, each of which gave the Company some visibility into the probability and timing of potential future outcomes. However, mere intent to file a registration statement and exit via an IPO does not necessarily mean that the Company would be successful in doing so."[233]

Execution risks persist even in firm underwritings, because of regulatory strictures and the role of the underwriting banks as gatekeepers under securities regulations. In the IPO, the underwriting banks buy the registered shares of stock from the issuing firm at a discount and resell them to the investing public only after the SEC has completed its review of the S-1 to its satisfaction and has, upon the firm's request, declared it effective.[234]

In order to raise capital from the public markets, the firms in this study turned to underwriters. They overwhelmingly followed the traditional path to the public markets in which the "underwriting banks . . . serve as partners in the regulatory system by policing companies as they prepare for their stock-market debut."[235] All but three IPOs in this study involved a firm commitment IPO.

Before an underwriting bank decides to commit to the offering, it will first complete its due diligence of the firm to its satisfaction and will then build a book of investor interest in the offering that falls within the price range effectively set by the underwriting bank as a result of investor input following the road show.[236] "In an IPO, the underwriting bank sets the price based on a book-building process and an indirect price discovery by way of asking institutional investors and favored clients about their interest in the offering."[237]

232. Letter from Charles J. Blair, Att'y for Allogene Therapeutics, Inc., Cooley, to Tonya K. Aldave, SEC, Div. Corp. Fin. 5 (Sept. 26, 2018) (on file with EDGAR).

233. *Id.*

234. Rodrigues & Stegemoller, *supra* note 51, at 23–24.

235. *Id.* at 1 (abstract).

236. *Id.* at 12–13.

237. *Id.* at 27.

As a result, the underwriters act as gatekeepers and will not move forward with an IPO unless they can be sure that they "will be able to sell the shares to the investing public" at the proposed IPO price.[238]

Prior to proceeding with the IPO, the underwriter will require sign-off by an internal commitment committee and will only enter into the definitive underwriting agreement, which commits the bank to purchasing the shares of stock to be offered in the IPO, immediately prior to the public offering.[239] "That is, the banks do not agree to buy until they know they have enough interest to sell at a given price as well as the SEC's blessing. Basically, up until the actual day of the IPO, no one commits to anything."[240] Thus, there is uncertainty, "as to not just the price of an IPO, but also as to whether it will occur *at all* [emphasis in original]."[241]

In other words, firms can argue that the probabilities assigned to the IPO outcome at the firm's projected equity value and within the projected time frame for purposes of PWERM stock valuations are not overly pessimistic, but appropriately conservative in that they reflect the risk profile of the IPO in light of these risks and uncertainties, even at a late stage in the IPO process. Thus, there is arguably no bias even if these pessimistic IPO prognostications produce deep discounts relative to the IPO price.

My study challenges these arguments. I find persuasive evidence that the subjective probabilities widely used in fixing the purported fair value of the stock underlying late-stage at-the-money option grants are unreasonably low.

1. IPO Market Risks and IPO Prognostications

Pre-IPO firms are exposed to market risk until their IPO is completed, as "[t]he market for IPOs is persistently cyclical."[242] So-called "hot" IPO markets, which are characterized by "high volume of IPO activity and relatively high valuations" can turn "cold."[243] During "cold" periods "the frequency of IPOs and their relative valuations plummet."[244] Swings in IPO activity over time are well documented.[245] "IPOs are known to come in waves, clustering into periods of hot issue markets. The phenomenon . . . is now well established."[246]

Dicle and Levendis have shown that implied, *i.e.*, expected, stock market volatility influences IPO timing decisions of pre-IPO firms.[247] They presented persuasive empirical evidence that implied volatility, as measured by the Cboe

238. *Id.* at 11.
239. *Id.* at 13, 23–24.
240. *Id.* at 24.
241. *Id.*
242. Nihat Aktas et al., *supra* note 182 at 27.
243. *Id.*
244. *Id.* at 27–28.
245. Mehmet F. Dicle & John Levendis, *IPO Activity and Market Volatility*, 7 J. ENTREPRENEURSHIP & PUB. POL'Y 2, 3 (2018).
246. *Id.* at 3.
247. *Id.* at 2.

Volatility Index® (VIX®), impacts the short-term timing of IPOs and that a lack of expected stock market volatility promotes IPO activity.[248]

The VIX "is based on real-time prices of options on the S&P 500® Index and is designed to reflect investors' consensus view of future (30-day) expected stock market volatility."[249] The VIX as well as its companion index, the Cboe NASDAQ-100 Volatility Index℠ (VXN), which is "a key measure of market expectations of near-term [(30-day)] volatility conveyed by NASDAQ-100® Index (NDX) option prices", serve as important predictors of expected stock market volatility.[250] Indeed, the VIX has been labeled the stock market's "fear gauge."[251]

The VIX and VXN measure expected stock market volatility and gauge the stock market's fear, which in turn is associated with going public decisions. Therefore, I should, at a minimum, be able to detect a correlation between the VIX or VXN and the IPO outcome probability used by the firms in this study given the close proximity of the IPO to the option grants to which these IPO outcome probabilities are to apply, if IPO outcome probability is tied to market risk. I thus measured the strength of the correlation between the probability of IPO outcome used in the PWERM or hybrid-based stock valuations of 104 discounted stock option grants during IPO preparations for which firms in this study disclosed IPO outcome probability and the historical data of the VIX and, separately, the historical data of the VXN for the study period.

However, as Table 6 shows, I did not detect a statistically significant linear correlation between the closing values of the VIX and the IPO outcome probabilities used by the firms in this study. Similarly, I did not detect a statistically significant correlation between the closing values of the VXN and these IPO outcome probabilities. The absence of a linear relationship between the IPO outcome probabilities and these fear gauges is surprising, given that, as discussed, stock market volatility influences IPO timing decisions of pre-IPO firms and the pre-IPO firms in this study often pointed to stock market conditions in justifying the IPO outcome probabilities they used in their stock valuations. Nevertheless, there is no evidence of a significant linear relationship between these IPO outcome probabilities and either fear gauge.

248. *Id.* at 5–7. The authors find "no evidence of the reverse lead-lag relationship—i.e. that IPOs precede volatility." *Id.* at 10.

249. *Cboe Volatility Index*, CBOE., https://www.cboe.com/us/indices/dashboard/vix (last visited Feb. 1, 2025).

250. *Cboe NASDAQ-100 Volatility Index*, CBOE., https://www.cboe.com/us/indices/dashboard/vxn (last visited Feb. 1, 2025).

251. Robert E. Whaley, *The Investor Fear Gauge*, J. PORTFOLIO MGMT., Spring 2000, at 12, 12; Cboe NASDAQ-100 Volatility Index, *supra* note 249.

TABLE 6

Table 6 Correlations		
	Coefficient, r (95% Statistical Confidence) **VIX**	**Correlation Coefficient, r (95% Statistical Confidence)** **VXN**
IPO Outcome Probability	r = - 0.014 (p-val = 0.89)	r = - 0.021 (p-val = 0.85)
Option Discount on IPO price	r = 0.331 (p-val = 0.00)	r = 0.325 (p-val = 0.00)

I also measured the strength of the correlation between the discounts of the exercise prices relative to the IPO prices for the 147 discounted stock option grants in this study and the closing values of the VIX as well as the VXN. As Table 6 shows, there is a weak but statistically significant (p-value=0.0) correlation between the option discounts relative to IPO price and the VIX as well as the VXN.

This makes sense, as the other factor driving PWERM-based valuations is the firm's projected equity value at IPO. As discussed, firms are more accurate in projecting equity value at IPO. Conversely, I did not detect a meaningful correlation between these fear gauges and the firms' IPO outcome probability predictions, thus calling into serious question whether the IPO prognostications of the firms in this study are at all reasonable.

Indeed, the IPO prognostications by these firms often do not appear conservative but unreasonably pessimistic when considering the IPO activities of peer companies near the option grant date. Chart 14 presents a chronological snapshot of the IPO activities of the preclinical and clinical-stage biotechnology companies in this study based on publicly available information. Specifically, Chart 14 shows the following publicly disclosed events by week and in chronological order during weeks twelve to twenty-six of calendar year 2018: (1) completed IPOs, (2) IPO price range announcements, (3) initial public filings of registration statements on Form S-1, and (4) withdrawal of a publicly filed S-1.[252]

For example, on June 26, 2018, *i.e.*, in week 26 of calendar year 2018, Principia Biopharma, Inc. awarded at-the-money options based on a PWERM/hybrid valuation as of June 26, 2018 that applied an IPO outcome probability of fifty-five percent.[253] Yet, as Chart 14 illustrates, during the immediately preceding four weeks, there was significant IPO activity by firms

252. Rodrigues & Stegemoller, *supra* note 51, at 10, 15. First-day performance is not considered in Chart 14. A price "pop" on the first day of trading is not an indication of a successful IPO; rather, it reflects that the IPO was underpriced. *Id.* at 15.

253. Letter from David G. Peinsipp, Att'y for Principia Biopharma Inc., Cooley, to Sergio Chinos & Jay Ingram, SEC, Div. Corp. Fin. 5 (Aug. 29, 2018) (on file with EDGAR) (setting a 55% IPO outcome probability "based on discussions with Company management").

that were Principia's peers according to the TRBC industry classification scheme, which signaled a healthy IPO market for Principia.

CHART 14

Chart 14

Events are in chronological order by week. Within a week, events are in chronological order. Abbreviations are the stock symbols of firms as of their IPOs. If no book-running manager for the IPO was a high-prestige underwriter, the event is in italics.
IPO = Pricing of initial public offering; **PR =** IPO price range announcement (as first publicly filed on Form S-1/A with SEC)
S-1 = Public filing of draft registration statement on Form S -1; **RW =** Withdrawal request filed by firm with SEC
OPT = date of option grant by firm. Percentage shown is the IPO outcome probability used for the valuation of stock underlying option grant

Week	Events (in Chronological Order per Week)									
12	**PR** FIXX	**PR** UMRX								
13	**IPO** FIXX	***IPO*** *GNPX*	**IPO** UMRX							
14	**S-1** UBX									
15	**S-1** Abpro	**S-1** EVLO								
16										
17	**PR** UBX	**S-1** SRRK								
18	**PR** EVLO	**PR** Abpro	**IPO** UBX							
19	**IPO** EVLO	***S-1*** *PRVB*								
20	**PR** SRRK	RW Abpro								
21	**S-1** KZR	**S-1** MGTA	**IPO** SRRK	**S-1** XERS	**S-1** EIDX	**S-1** AVRO				
22	***PR*** *PRVB*	**S-1** NTGN	**S-1** FTSV	**S-1** TBIO						
23	**PR** EIDX	**PR** KZR	**PR** MGTA							
24	**PR** AVRO	**PR** XERS	**PR** NTGN							
25	**PR** FTSV	**PR** TBIO	**IPO** EIDX	**IPO** AVRO	**IPO** KZR	**IPO** MGTA	**IPO** XERS	**S-1** ALLK	**S-1** CNST	**S-1** RUBY
26	**OPT** PRNB 55%	**IPO** NTGN	**IPO** FTSV	**IPO** TBIO						

During week twenty-five, *i.e.*, the week immediately preceding the option grant, there were five IPOs by peer firms. In addition, during weeks twenty-five and twenty-two, six more peer firms publicly filed their registration statement on Form S-1, and nine peer firms publicly announced the price range for their upcoming IPOs during weeks twenty-two, twenty-three, twenty-four, and twenty-five. Of the firms that announced their price range in week twenty-three and twenty-four, all but one completed their IPOs in week twenty-five. All IPOs priced within or above the published price range. Each of these IPOs was underwritten by at least one high-quality underwriting bank that served as a joint book-running manager.

By setting an exceedingly low IPO probability Principia Biopharma could fix a low exercise price for its late-stage stock option grant which resulted in a thirty-six percent discount compared to the forthcoming IPO price. Similar inconsistencies between the state of the IPO market for preclinical and clinical-stage biotechnology firms and their IPO prognostications in connection with discounted option grants abound throughout the entire five-year study period.

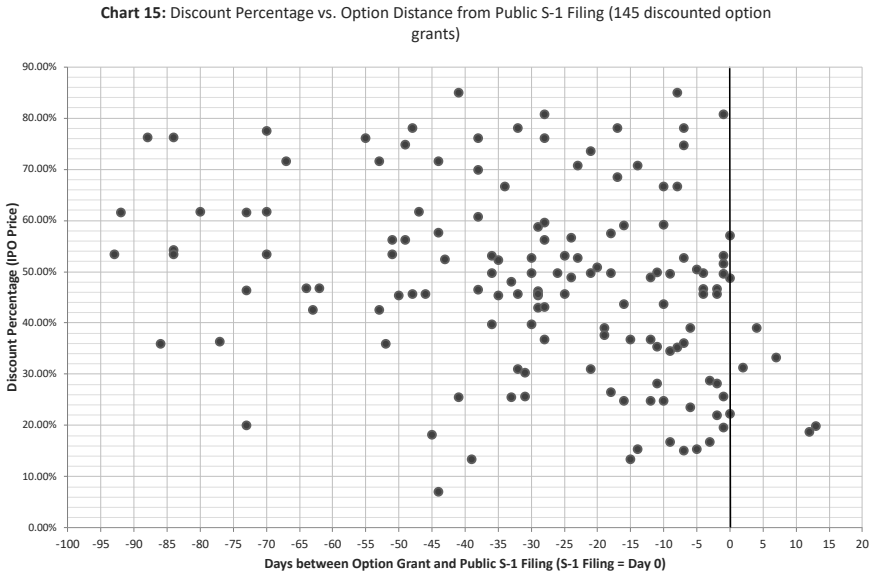
2. SPRING-LOADING BEFORE GOING PUBLIC

As discussed, the median duration of the non-confidential portion of the SEC review process for the seventy-four firms that engaged in 11th hour option discounting took twenty-four days (average: twenty-six days) and thus represented twenty-seven percent of the total median IPO preparation period. During this period, firms still needed to go on their roadshows.[254]

A normal distribution would have seen a significantly greater number of option grants occurring during the non-confidential SEC review portion of the IPO preparation process following public filing of the S-1. Instead, the data convincingly shows that pre-IPO firms view the public filing of their S-1 as an inflection point for their IPO prognostications.

In this study, 140 out of 145 discounted stock option grants, or ninety-seven percent of discounted option grants made during the IPO preparation process, occurred prior to public filing of the S-1 registration statement.[255] Thus, as firms get ready to file their registration statements publicly, they make what are effectively last-minute pre-IPO option grants at low exercise prices that they contend are at-the-money. Chart 15 readily shows that discounted option grants cluster near the public filing of the S-1.

CHART 15



Only eight discounted stock option grants occurred on the date of or after public filing of the S-1. Twenty-four out of the 140 option grants made prior to

254. *See supra* note 81.

255. See *supra* note 191 for a discussion on how the outlier option grants for NGM were not included.

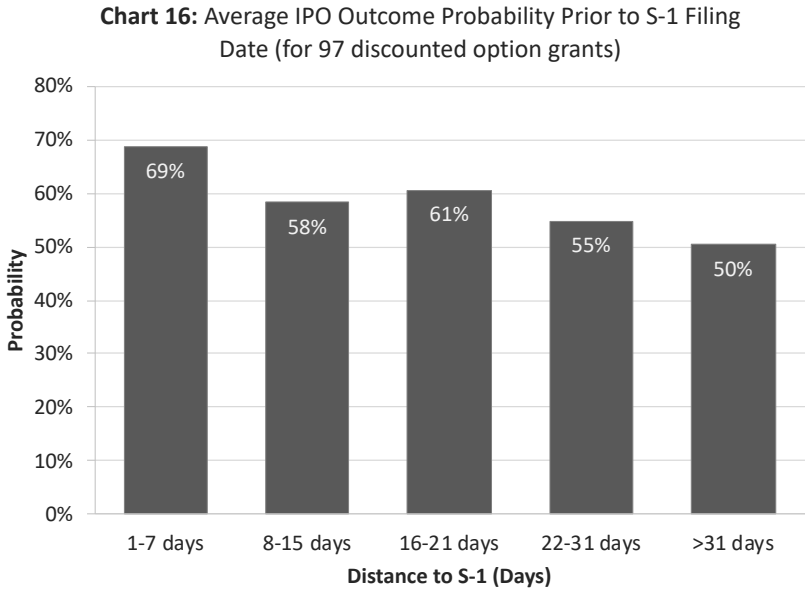
the public S-1 filing, or seventeen percent, occurred within seven days prior to the S-1 filing date. Almost one-third (31%) of these 140 discounted option grants were made within fifteen days of the S-1 filing date, and more than half (59%) were made within a month (thirty-one days) of the S-1 filing date.

The magnitude of the discounts relative to the IPO price only declined significantly for option grants made after the S-1 public filing date. The equal-weighted average and median discounts relative to the IPO price for the 138 discounted option grants made on or before the S-1 filing date came to 48.5% and 49.2%. Conversely, the average and median discounts for the five discounted option grants made after the S-1 filing dropped to 28.4% and 31.2%.

Similarly, the IPO probabilities used in PWERM-based stock valuations remained low prior to the S-1 public filing. Chart 16 shows the distribution of average IPO probabilities used in PWERM/hybrid-based valuations for discounted stock option grants at different temporal distances to the S-1 public filing event. While IPO probabilities increased somewhat in the last seven days before public filing of the S-1, they still fell well short of the historical IPO completion rates for peer firms during the study period. For example, Galecto used a stock valuation as of September 25, 2020 which applied a seventy percent IPO outcome probability to set the exercise price for its option grants made on the day it publicly filed its S-1 on October 7, 2020 even though Galecto conceded in its cheap stock letter to the SEC that the public filing of its registration statement on October 7, 2020 "increased the probability that [Galecto] will complete an IPO."[256]

256. Galecto Letter, *supra* note 4, at 7 ("[S]ince September 25, 2020, the Company has taken several steps towards the completion of an IPO, holding several 'testing-the-waters' meetings, at which the Company received positive feedback from potential investors, and publicly filing the Registration Statement with the Commission on October 7, 2020. Each of these steps has increased the probability that the Company will complete an IPO."); Galecto Inc., Amendment No. 1, *supra* note 4, at 101.

CHART 16



It is troubling that the JOBS Act, aimed at "de-risking" the IPO process for emerging growth companies, and so effective in facilitating increased IPO activity, is used as apparent cover for the exceedingly low IPO prognostications observed in PWERM valuations in order to produce 11th hour option discounting. As discussed, the fundamental changes to the IPO registration process brought by the JOBS Act have cloaked much of the IPO preparation activity in secrecy, making it virtually impossible to collect comprehensive and reliable historical data, in particular for EGCs.

Of course, comprehensive data on IPO completions and withdrawals after public filing of the registration statement are available. Actual IPO completion percentages for the firms in this study as shown in Chart 7 were substantially greater than the probabilities routinely assigned to IPO completion in the PWERM/hybrid valuations used by firms in this study for their late-stage option grants near IPO completion. Firms apparently try to justify lower IPO probabilities by making option grants before they file their S-1 publicly.

However, in reality, firms cannot hide behind their confidential filings to grant deeply discounted stock options just before they push the button for their S-1 public filing. These last-minute deep discounting maneuvers before the S-1 filing event resemble the option spring-loading practices at public companies. Option spring-loading involves issuing stock options to firm insiders just ahead of a release of positive information with the knowledge that "the company's

stock is worth more than its market trading price because the market is ignorant of information that will affect the price."[257]

In 2021, the SEC issued guidance in Staff Accounting Bulletin No. 120 (SAB 120) on estimating the fair value of share-based compensation under ASC 718 with the aim of curtailing spring-loaded equity awards.[258] Under the SEC's guidance in SAB 120, "[w]hen companies are in possession of positive material non-public information, the staff believes these companies should consider whether adjustments to the current price of the underlying share or the expected volatility of the price of the underlying share for the expected term of the share-based payment award are appropriate when applying a fair-value-based measurement method to estimate the cost of its share-based payment transactions."[259]

The SEC has made clear that in cases where a firm expects its stock price to increase significantly once it announces a material positive event, the firm cannot use the closing price of its exchange-traded stock underlying a compensatory option grant to its executives on the date of option grant when the grant precedes the public announcement.[260] The SEC notes that in that case using the closing price on the date of grant without an adjustment to reflect the impact of the new material information "would not be a reasonable and supportable estimate and, without an adjustment, the valuation of the award would not meet the fair value measurement objective of FASB ASC Topic 718 because the closing share price would not reflect a price that is unbiased for marketplace participants at the time of the grant."[261]

Similarly, maintaining low IPO outcome probabilities and resulting low stock valuations when making option grants close to the public S-1 filing date is unreasonable. Firms fully expect the fair value of their underlying stock to increase significantly upon the public filing of their registration statement. Hence, they cannot award at-the-money options when using a stock valuation that does not reflect this expected increase in IPO outcome probability. Any such stock valuation close in time to the public filing would appear to be unreasonably low.

For the same reason, firms' pessimism over their ability to execute their IPO during the short IPO preparation window is simply not credible. Firms may justify their low probability by noting that they have not yet publicly filed their S-1. However, these execution risks are largely under the firm's control and should not impact IPO outcome probability.

Furthermore, while the underwriters do not commit to a firm underwritten offering in advance, they are incentivized by the generous commissions which

257. Desimone v. Barrows, 924 A.2d 908, 944 (Del. Ch. 2007).
258. SEC Staff Accounting Bulletin No. 120, 86 Fed. Reg. 68111 (Dec. 1, 2021).
259. *Id.*
260. *Id.*
261. *Id.*

they will only earn if the IPO proceeds. Underwriter commissions were consistently seven percent of gross IPO proceeds before expenses and before the overallotment option for the completed IPOs in this study.[262] Underwriters conduct due diligence on the firm as part of their gatekeeper function and to reduce their Section 11 liability under the Securities Act.[263] By the time a firm awards option near the public S-1 filing, the lead underwriters will typically already be well aware of any company-specific roadblocks to IPO execution.

3. Double Dipping

In addition to IPO execution and market risks, firms may also point to business risks. For example, in its cheap stock letter Elevation Oncology explained that its stock valuation for its late-stage option grants had assigned a probability weight of twenty-five percent to its IPO scenario "based on the Company's assessment of its product pipeline, clinical timelines, competitor clinical developments, market conditions and potential execution risk."[264]

However, this approach to IPO prognostications, which was not challenged by the SEC, wholly misses the point. The PWERM requires an assessment as to the likelihood that the firm will achieve IPO completion at a projected equity value by a target completion date. The probability used for the IPO outcome in the PWERM is not supposed to reflect the risks and uncertainties inherent in the company's business or in its efforts to develop a safe and effective therapeutic. Those risks are already priced in the projected equity value.

In other words, the probability assigned to the IPO outcome scenario is to reflect to what extent intervening events or circumstances are likely to arise during the period from option grant until projected IPO completion that will thwart IPO completion. As already discussed, this period is exceedingly narrow. Firms thus need to be able to make a realistic assessment as to the likelihood of these intervening events or circumstances that prevent IPO achievement within an exceedingly short period from option grant, not the fundamental uncertainties associated with its research and development progress or, generally, its business model.

For example, the clinical-stage biotech companies in this study that engaged in 11th hour option discounting faced business risks as to unfavorable outcome of clinical trials involving their therapeutic candidates, such as unfavorable data readouts showing lack of efficacy. However, neither preliminary nor final data readouts from clinical trials typically took place just prior to IPO completion.

Only sixteen percent of the fifty-one clinical-stage biotechnology companies in this study that had engaged in 11th hour option discounting and

262. *See* also Rodrigues & Stegemoller, *supra* note 51, at 11 (highlighting that the typical underwriter's commission rate is 7%).

263. *Id.* at 11–12.

264. Letter from Elevation Oncology to Christopher Edwards, et al., *supra* note 176, at 4.

that had submitted cheap stock letters notified the SEC of the results or preliminary data readouts from their clinical trials that they had first received only after their most recent stock option grants. The eight firms that reported these last-minute data readouts presented them as a factor that contributed to the stock valuation reflected by their preliminary IPO price range. Three of the eight firms reported results of Phase 1 clinical trials which focused only on safety and tolerability of their therapeutic candidates in humans. The other forty-three firms had already reported trial outcomes or preliminary data from their trials prior to their most recent option grants or only reported additional outcome data following their stock option grants or expected to report outcome data only after IPO completion.

Indeed, clinical-stage firms in this study routinely disclosed their development pipeline in their S-1 which typically showed that interim or final results from pending trials would only arrive well after projected IPO completion. Risks as to trial outcome that would occur only after the projected IPO completion date, however, are irrelevant for purposes of the IPO outcome probabilities under the PWERM. Rather, the firm should assess only the likelihood that its clinical trial would be terminated prematurely—for example due to safety concerns, such as severe adverse effects impacting the trial participants—during this brief period.

Such trial safety related terminations, however, are rare. For example, a 2016 study reviewed 475 Phase 1 clinical trials over a period from January 1, 2008 through October 1, 2012 that enrolled 27,185 healthy participants.[265] The study concluded that Phase 1 clinical trials "cause mild and moderate harms but pose low risks of severe harm", finding that there was a median of zero serious adverse events and a median of zero severe adverse events per 1,000 treatment group participants per day of monitoring and concluding that "healthy participants in phase I trials do not experience high rates of significant harm".[266]

These low risks thus cannot justify low IPO outcome probabilities tied to the outcome of Phase 1 trials focused on safety and tolerability that are pending or planned as of the stock option grant date. Therapeutic candidates in Phase 2 or 3 trials have already been tested for safety in earlier Phase 1 trials. Thus, the risk of trial safety related terminations prior to the projected IPO completion date remains low.

Firms may claim a low IPO probability even when favorable trial outcomes had already been reported by the time of option grant. For example, Eidos Therapeutics, Inc. notified the SEC in its cheap stock letter of "[t]he recent release of significant clinical findings by both Pfizer, Inc. and the Company that

265. Rebecca A. Johnson, Annette Rid, Ezekiel Emanuel & David Wendler, *Risks of Phase I Research with Healthy Participants: A Systematic Review*, 13 CLINICAL TRIALS 149, 149–50 (2016).

266. *Id*. at 149–50, 156 ("Participants in over 98% of the trials experienced no drug-related serious adverse events.").

have materially de-risked the Company's therapeutic approach."[267] Eidos explained that in a Phase 3 clinical trial, Pfizer's competitive product with a similar therapeutic approach to that of Eidos' own therapeutic candidate had "met its primary endpoint in the same indication that the Company is pursuing."[268] In addition, Eidos had "reported data from its Phase 1 clinical trial, which demonstrated [its own therapeutic candidate] was well tolerated and met its secondary endpoints of exhibiting 100% target engagement, which further *de-risked* the Company's clinical development plans [emphasis added]."[269]

Yet, Eidos had already disclosed these results from Pfizer's and its own clinical trials in Eidos' draft S-1 by the time it granted at-the-money stock options with a $7.24 exercise price, which represented a fifty-seven percent discount on the forthcoming $17.00 IPO price.[270] Nevertheless, Eidos applied only a sixty percent IPO outcome probability.[271]

Firms in this study also pointed to still pending INDs applications for their upcoming clinical trials or the imposition of a clinical hold by the FDA to justify a low IPO probability.[272] Seventeen percent of the sixty-seven clinical-stage and preclinical firms in this study that had engaged in 11th hour option discounting and that had submitted cheap stock letters notified the SEC that they had an IND pending or forthcoming at the time of their most recent stock option grant. One firm had a clinical hold placed on its IND by the FDA which was released after stock option grant.

However, pending INDs cannot justify a low IPO probability, as the FDA's failure to approve an IND is relatively rare. A recent analysis of new commercial INDs for oncology indications submitted to the FDA's Office of Hematology and Oncology Products (OHOP) in the Center for Drug Evaluation and Research (CDER) showed that out of 956 INDs submitted to OHOP between March 2014 and August 2017, a mere eight percent (seventy-five of 956) did not proceed.[273] Another retrospective study found that out of 1,410 initial INDs received by CDER from October 2012 through September 2013 for all indications only 125,

267. Letter from Eidos Therapeutics, Inc., to Christine Westbrook, SEC, Div. Corp. Fin. 8 (June 5, 2018) (on file with EDGAR).

268. *Id.*

269. *Id.*

270. *Id.* at 2 (calculating exercise price calculated after stock split); Eidos Therapeutics, Inc., Draft Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1), at 1–3 (May 1, 2018).

271. Letter from Eidos Therapeutics to Christine Westbrook, *supra* note 267, at 7.

272. Before conducting a clinical trial of an investigational drug product, the trial sponsor must submit an IND to the FDA for review. *See* 21 C.F.R. § 312.20 (2023); 21 C.F.R. § 312.42(a) (2009) ("A clinical hold order may apply to one or more of the investigations covered by an IND.").

273. Michael L. Manning, Matthew D. Thompson, Haleh Saber, Virginia E. Maher, Joyce Z. Crich, John K. Leighton, *An FDA Analysis of Clinical Hold Deficiencies Affecting Investigational New Drug Applications for Oncology Products* 110 REGUL. TOXICOLOGY & PHARMACOLOGY (2020) (discussing how the FDA only placed 49 IND applications on full clinical hold, 13 INDs on partial clinical hold, and 13 INDs were withdrawn by the applicant during the 30-day review period) ("[o]f the 49 INDs on full clinical hold, four were later withdrawn and five remained on full clinical hold as of [the end of the study period]. The median time to resolve the full clinical hold for the 40 remaining INDs was 114 days".).

or 8.9%, were placed on a clinical hold during the first thirty days after initial submission.[274] The clinical hold rate for INDs by commercial sponsors was a mere 4.3%.[275] Ultimately, "more than ninety-five percent of [all] initial INDs [in the study] became active within the first year after IND submission."[276]

Firms thus cannot argue that their product development risks, or generally their business prospects, are reflected in the low IPO probability. Instead, they are reflected in the projected pre-money value of the firm for the IPO outcome.

Indeed, pre-IPO firms use test-the-waters meetings with investors to calibrate total equity value for the IPO scenario. However, they do not test the waters with investors to set an exceedingly low IPO outcome probability while fixing a target equity value in the IPO that is too expensive for investors. Rather, firms and their lead underwriters test the waters to determine whether there is investor demand for their stock at the projected pre-money value. They will either adjust total equity value for their IPO or determine not to proceed with the IPO if their board and existing investors disagree with the pre-money value expectations of prospective investors.

However, it is non-sensical to also claim exceedingly low IPO probabilities after receiving positive feedback on pre-money value or feedback to lower pre-money value in order to address prospective investor concerns. "With the [test-the-waters] process, while an S1 is confidentially on file, a biotech can meet with public investors to gauge interest. Feedback from [test-the-waters meetings], often with forty to sixty investors, provides hugely valuable input into the likely demand for a biotech's upcoming offering and setting the right price range for an IPO."[277]

Firms may also receive feedback in these test-the-waters meetings that the projected pre-money value, and investors' willingness to invest, is subject to the firm achieving one or more pre-IPO milestones. IPO outcome probability would then take into account the firm's assessment of its likelihood that it will achieve any such milestone(s). Presumably, firms that are already actively preparing for their IPO should exhibit a high degree of confidence in milestone achievement.

For example, a March 16, 2018 stock valuation of Kodiak Sciences Inc. had applied a forty percent IPO outcome probability.[278] Kodiak did not change its stock valuation when it granted 570,000 at-the-money options with a $5.38 per share exercise price on June 26, 2018, pointing to the absence of "significant

274. Larissa Lapteva & Anne R. Pariser, *Investigational New Drug Applications: A 1-Year Pilot Study on Rates and Reasons for Clinical Hold*, 64 J. INVESTIGATIVE MED. 376, 378 (2016).

275. *Id.* at 378.

276. *Id.* at 380 (highlighting that 64 of the 125 INDs (51.2%) "placed on hold came off hold . . . within 1 year after a hold was first imposed" and the median time for removal of the clinical hold was 111 days).

277. Bruce Booth, *Evolution of the Biotech IPO Markets from Busted to Booming*, FORBES (Sept. 21, 2020, 7:16 AM EDT), https://www.forbes.com/sites/brucebooth/2020/09/21/evolution-of-the-biotech-ipo-markets-from-busted-to-booming/?sh=18b3bbf46ae7.

278. Letter from Michael Nordtvedt, Att'y for Kodiak Scis. Inc., Wilson Sonsini Goodrich & Rosati, to Mary Mast, Lisa Vanjoske, Chris Edwards & Irene Paik, SEC, Div. Corp. Fin. 4–5 (Sept. 14, 2018) (on file with EDGAR).

changes in the business, operations, or product candidates" since its stock valuation 102 days earlier.[279] However, Kodiak also noted in its cheap stock letter that "[d]uring the week of April 8, 2018, the Company conducted 'testing the waters' meetings and received feedback that the Company should delay its IPO until it met the primary endpoint for the Phase I trial" of its therapeutic candidate, which was focused on safety and tolerability in patients.[280]

Continued application of the forty percent IPO outcome probability following these testing the water meetings would then presumably reflect Kodiak's low confidence in achieving safety and tolerability of its therapeutic candidate despite the exceedingly low rate of trial safety related terminations discussed above, in particular as Kodiak made these stock option awards on the same day Principia Biopharma made its stock option awards as shown in Chart 14, *i.e.*, during a very healthy IPO market. Kodiak achieved the primary safety and tolerability endpoint of its Phase 1 clinical trial by September 3, 2018, and priced its IPO at $10.00 per share on October 3, 2018.[281]

When engaging in 11th hour option discounting, firms often confuse short-term risks associated with IPO completion, which are to be properly considered in setting IPO outcome probability, with risks associated with the company's business, which are already priced in the targeted pre-money value. In a sense, firms are double-dipping on risks to justify unreasonably low IPO outcome probabilities.

IV. PROPOSED REGULATORY SOLUTIONS

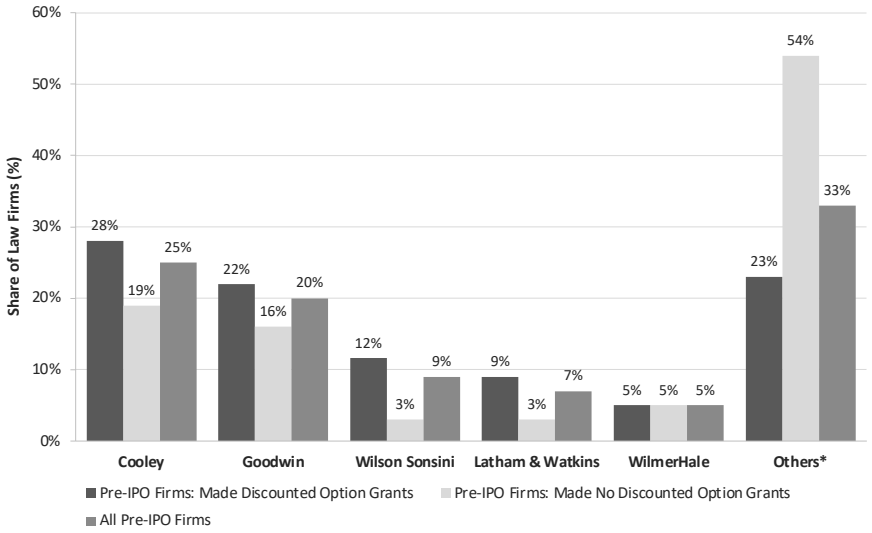
It would appear that pre-IPO firms exploit shortcomings in the regulatory and accounting regime to engage in 11th hour option discounting. These firms are typically advised by experienced capital market participants. Indeed, this study offers empirical support for the notion that the market-leading advisors are quite adept at navigating the regulatory and accounting regime to facilitate the 11th hour option discounting practices of their clients.

For example, the firms in this study were typically advised by sophisticated law firms with expertise in securities regulations. Chart 17 shows each law firm's share of completed IPOs of 111 biotech companies in this study during the five-year study period for which the law firm acted as issuer's counsel.[282]

279. *Id.* at 6.
280. *Id.* at 5–7.
281. *Id.* at 7.
282. The five biotechnology firms that converted from LLCs to corporations when they went public during the study period are not included. *See supra* text accompanying note 46.

CHART 17

Chart 17: Issuer Counsel to Firms in Study that Completed IPOs
Share of law firms as issuer's counsel to pre-IPO firms that offered late-stage discounted stock options, firms that did not, and total share. Excludes 5 firms that converted from LLCs at IPO



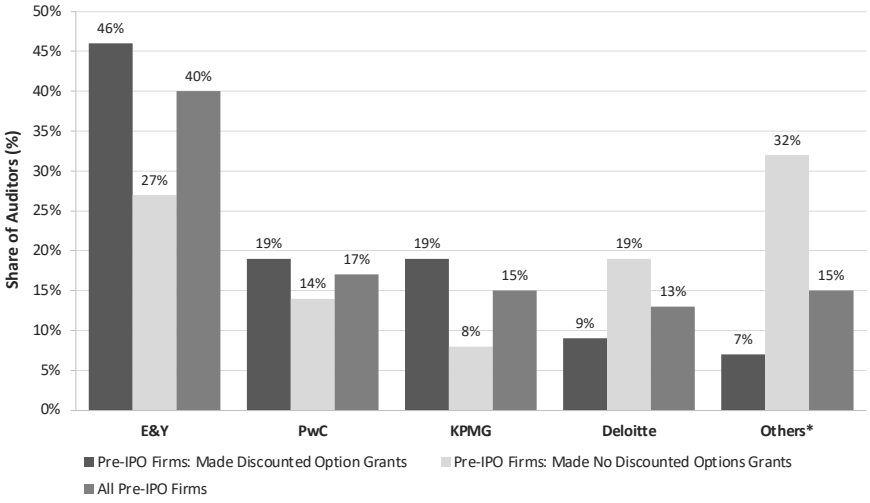
* Others comprise: Alston & Bird; DuaneMorris; Fenwick; Gibson Dunn; Gunderson Dettmer; Hogan Lovells; K&L Gates; Lowenstein Sandler; Mintz; Morrison Foerster; Morgan Lewis; O'Melveny; Orrick; Ropes & Grey; Satterlee Stephens; Sheppard Mullin; Sichenzia Ross Ference; Sidley Austin; Skadden; Streusand Landon & Ozburn; and Troutman Pepper.

Notably, the top five law firms acting as issuer counsel held a share of seventy-seven percent for the IPOs of the seventy-four firms in this study that made late-stage discounted stock option grants but dropped to forty-six percent when considering only the thirty-seven firms that did not make any discounted stock option grants during IPO preparations.

Moreover, these pre-IPO firms typically used experienced auditors in connection with their IPO preparations. As Chart 18 shows, one of the Big Four auditing firms acted as auditor on the financial statements of eighty-five percent of these 111 firms.

CHART 18

Chart 18: Auditors to Firms in Study that Completed IPO
Share of auditors for pre-IPO firms that offered late-stage discounted stock options and pre-IPO firms that did not, and total share. Excludes 5 firms that converted from LLCs at IPO



* Others comprise: Brightman Almagor Zohar & Co.; BDO USA; CohnReznick; Daszkal Bolton; EisnerAmper; GBH CPAs; Grant Thornton; Gumbiner Savett; KMJ Corbin & Company; Mayer Hoffman McCann; OUM & Co; and WithumSmith+Brown

The Big Four auditing firms dominated the auditing work for the pre-IPO firms that did make late-stage discounted option grants. Auditors of the Big Four reviewed the financial statements of ninety-three percent of the seventy-four firms that engaged in 11th hour option discounting. By contrast, the share of the Big Four declined to sixty-eight percent for the thirty-seven pre-IPO firms that did not make any discounted stock option grants during IPO preparations.

Finally, at least one high-prestige underwriter served as a book-running manager for ninety-three percent of the seventy-four IPOs of pre-IPO firms that engaged in 11th hour option discounting while serving as a book-running manager for only fifty-four percent of the thirty-seven IPOs of pre-IPO firms that did not grant discounted late-stage stock options.[283]

By contrast, the SEC's current regulatory approach to equity incentives at pre-IPO firms is of dubious utility. The agency has taken an essentially *laissez-faire* approach to generous equity awards that pre-IPO firms routinely make to their executives and employees. After all, the SEC's cheap stock review gives deference to the outcome of stock appraisals which are routinely represented to the SEC staff as quantitative analyses conducted in accordance with the

283. See Chart 13, for a breakdown of the underwriting banks that acted as book-running managers for the IPOs in this study. Prestige rankings are based on the rankings published by Ritter & Loughran. *See* RITTER & LOUGHRAN, REPUTATION RANKINGS, *supra* note 226.

guidance established in the AICPA Guide and validated by third-party specialists even though these appraisals have arguably been captured by firm insiders. Indeed, the SEC does not appear to probe the reasonableness of the subjective probability assumptions used by firms in their PWERM valuations and proffered to the SEC in cheap stock letters. Thus, the SEC effectively allows pre-IPO firms to hand out deeply discounted stock option grants near their IPOs that create no incentives but offer firm insiders a potential economic windfall after the IPO by tolerating fundamentally flawed stock valuations and incomplete disclosures to IPO investors about these option grants.

With the SEC acting like an absentee landlord, the outdated regulations and accounting rules facilitating 11th hour discounting practices should be reformed to improve proper valuation and ensure greater transparency with respect to equity awards made near an IPO.

A. REPLACING THE PWERM

This study leaves little doubt that the PWERM is fundamentally flawed and not suitable as a reasonable method for stock valuations near an IPO.

The PWERM is not compatible with the regulatory and accounting approach to valuing the stock of privately held firms near their IPO. The final Treasury Regulations implementing Section 409A, which went into effect more than fifteen years ago and became applicable to taxable years beginning on or after January 1, 2008, and the more recent practical expedient under ASU 2021-07 proceed from the assumption that stock value is impacted by increases in firm value. A new stock valuation is therefore not required within a twelve-month period absent the occurrence of a material event affecting firm value. The PWERM fundamentally circumvents this approach. Stock value is already impacted by a change in the *probability* of IPO completion as the future material event before its occurrence.

Moreover, valuations are dependent on reasonably accurate inputs for improved fair value estimates. Indeed, the PWERM has been described as "the most appropriate allocation method to use when management can reasonably predict potential future outcomes."[284] In its cheap stock letter to the SEC, counsel to Lyell Immunopharma, Inc., candidly characterized the PWERM as "particularly useful when discrete future outcomes can be predicted at a high confidence level with a probability distribution."[285]

However, the picture that emerges from this study shows that firms are either incapable or unwilling to predict the probability of IPO success with confidence. Recall that Bolt Biotherapeutics justified its low IPO outcome probability of fifty-five percent by contending that it seemed more likely than

284. BEATON, *supra* note 161, at 89.

285. Letter from David G. Peinsipp, Att'y Lyell Immunopharma, Inc., Cooley, to Thomas Kluck, Laura Rotty, Jenn Do & Vanessa Robertson, SEC, Div. Corp. Fin. 6 (May 28, 2021) (on file with EDGAR).

not that it would achieve IPO success.[286] Moreover, firms can simply aggregate risks, no matter how far-fetched, in order to drive down IPO outcome probability, as illustrated by Allogene Therapeutics' laundry list of "unexpected" systemic and firm-specific events which it used to support a low forty percent probability of IPO success.[287]

Even in the face of de-risking news, firms appear to remain deeply pessimistic. Recall that Eidos claimed that the recent release of favorable clinical outcomes not only of Eidos' own Phase 1 clinical trial but also of Pfizer's separate Phase 3 trial involving a competing therapeutic candidate had "materially de-risked" Eidos' therapeutic approach. Nevertheless, Eidos gave its IPO preparations only a sixty percent chance of success.[288]

Unless firms measure the probability of IPO outcomes with far greater precision, the spread between exercise price and IPO price can be readily manipulated. By simply lowering the purported probability of IPO outcome, firm insiders can engage in option discounting.

Moreover, reliance on outside appraisers will not yield unbiased stock valuations, at least for stock option grants during the IPO preparation process, because the key input factor—probability estimates—is supplied by the firm's management and its underwriter. Both have incentives to underestimate IPO outcome probability.

The PWERM thus fails as a reasonable valuation method for purposes of IRC §409A or US-GAAP, at least when valuing equity awards near an IPO, even if characterized as a "quantitative" valuation method. Any adaptations to improve the AICPA version of the PWERM, such as limiting the number of outcome scenarios and using more objective probability estimates for the IPO outcome scenario, are not likely to overcome manipulations of fair value measurements of equity awards made close in time to an IPO.

Any such reform efforts may mitigate the more extreme discounting practices revealed in this article. However, pre-IPO firms may then still grant at-the-money options near the IPO that will feature a significantly lower exercise price relative to the actual IPO price, as readily illustrated by the simulation results in Chart 10, thus creating fewer incentives for option recipients to grow firm value following the firm's IPO.

Put bluntly, using technical valuation methodologies, such as PWERM, for measuring the stock underlying compensatory option grants so close in time to the IPO is divorced from economic reality. For example, Passage BIO sent its cheap stock letter to the SEC on February 7, 2020, informing the staff that the midpoint of its preliminary IPO price range for a share of its common stock would be $16.93. Yet, a mere ten days earlier, on January 28, 2020, Passage BIO had made a large grant of purported at-the-money stock options to its CEO at a

286. *See* Letter from John T. McKenna to Kristin Lochhead et al., *supra* note 186.

287. *See* Letter from Charles J. Blair to Tonya K. Aldave, *supra* note 232.

288. *See supra* text accompanying notes 267–271.

$11.00 exercise price per share. Passage BIO determined that the fair value of a share of its common stock at the time of grant was $11.00 using the PWERM/hybrid method. Moreover, on the same day it sent its cheap stock letter to the SEC, Passage BIO made another stock option grant featuring the $11.00 per share exercise price for its common stock. Passage BIO then priced its IPO at $18.00 per share less than three weeks later, on February 27, 2020.

In their cheap stock letters, firms routinely attempt to reconcile the difference between their lower priced stock options and the preliminary IPO price range by pointing to their complex capital structure that features preferred stock with superior preferences and economic rights compared to the common stock until IPO completion. These superior rights are eliminated only when the preferred stock converts to common stock upon IPO completion.

Firms engaged in 11th hour option discounting take the position that the preliminary price range reflects the future equity value of stock in a simplified capital structure that is about to become liquid, and thus is not available for estimating the fair value of the stock underlying late-stage stock option grants. By contrast, the stock underlying the compensatory option grants supposedly remains illiquid even after IPO completion due to the contractual 180-day lock-up period.[289]

Yet, market participants, such as prospective IPO investors, are unlikely to share this view. Prospective IPO investors most certainly expect that during IPO preparations, pre-IPO firms take measures to align the interests of management and employees with the interests of those investing in their forthcoming IPO as these firms rapidly transition to public company status. Accordingly, "[t]he fair value measurement tool should serve the market participant perspective; the market participant perspective should not be subordinated to the fair value measurement tool, no matter how insightful and 'correct' it may be."[290]

For one, as discussed, the lock-up period cannot be used to justify illiquidity. As noted, the FASB recently clarified that these contractual restrictions may not be used to measure the discount for lack of marketability of shares.

Moreover, when taking the illiquidity rationale for justifying the substantially lower exercise price of last-minute at-the-money option grants to its logical conclusion immediately following IPO completion, pre-IPO investors

289. *See, e.g.*, Letter from John T. McKenna to Kristin Lochhead et al., *supra* note 186, at 14 ("The [IPO] Price Range represents a future price for shares of Common Stock that, if issued in the IPO, will be immediately freely tradable in a public market, whereas the estimated fair value of the Common Stock as of all of the option grant dates . . . represents a contemporaneous estimate of the fair value of shares that were then illiquid, might never become liquid and, even if an IPO were successfully completed, would remain illiquid at least until the expiration of the 180-day lockup period following an IPO. This illiquidity also accounts for a substantial difference between the estimated fair values of the Common Stock through the January 2021 grants and the Price Range.").

290. Travis W. Harms, *A Layperson's Guide to the OPM: Everything You Always Wanted to Know About the OPM, But Were Afraid to Ask (Part 2)*, MERCER CAP. (May 16, 2016), https://mercercapital.com/financialreportingblog/portfolio-valuation/laypersons-guide-to-the-opm-part-2.

would end up with less valuable shares of common stock than those sold in the IPO. Upon IPO completion, the preferred stock of pre-IPO investors converts to common stock, which remains subject to the same 180-day contractual lockup period applicable to the equity awards held by executives and employees. Yet, the pre-IPO investors most certainly do not treat their unregistered shares as less valuable than those sold in the IPO and trading on NASDAQ or another stock exchange.[291]

IPO investors would thus expect the stock value underlying last-minute equity awards and the price range projected for the IPO to converge rapidly during the exceedingly brief IPO preparation window. Indeed, Bolt advised the SEC in its cheap stock letter that it had abandoned its PWERM/hybrid valuations of the stock underlying its discounted option grants made during IPO preparations, and "with the benefit of hindsight" used "linear interpolation . . . to calculate the estimated fair value for each of the November 2020 grants, December 2020 grants, and January 2021 grants to the midpoint of the Price Range".[292]

In addition, IPO investors would not place much weight on the superior economic rights of the preferred stock given that these stock option grants are made near the IPO. "[M]arket participants may be less impressed by the economic rights accruing to the senior securities" which are used by firms to justify depressing the value of the underlying common stock prior to the IPO, even though the firm is rapidly approaching its IPO which will wipe away these superior rights.[293]

Indeed, firms themselves ignore the complex capital structure when they award at-the-money options with exercise prices set at the midpoint of the price range. At least five firms in this study awarded last-minute stock options with exercise prices set at the midpoint of the published price range prior to IPO completion. For example, in its S-1, clinical-stage biotech Oncorus, Inc. disclosed that it had used the $15.00 midpoint of its IPO price range as published in its S-1 to set the exercise price at $15.00 when it granted at-the-money stock options on September 22, 2020, and disclosed that the midpoint represented the fair value of its common stock as of the grant date.[294] However, at the time of

291. Moreover, unlike the shares of the pre-IPO investors, the shares underlying the pre-IPO equity awards to executives and employees, including the last-minute option grants made near the IPO, will typically be registered by the firm on Form S-8 immediately following the IPO and will become freely tradable upon exercise of vested stock options post-IPO, subject only to the contractual lock-up period. S-8 registrations become effective automatically upon filing. 17 C.F.R. § 230.462(a) (2020). The shares held by the pre-IPO investors, on the other hand, can only be sold under 17 C.F.R. section 230.144 until registered by the firm, which will require SEC review of a new registration statement. Pre-IPO investors typically secure contractual registration rights from the pre-IPO firm when first investing. *See, e.g.*, NAT'L VENTURE CAP. ASS'N, INVESTORS' RIGHTS AGREEMENT 26 (2023), https://nvca.org/recommends/nvca-investors-rights-agreement.

292. Letter from John T. McKenna to Kristin Lochhead et al., *supra* note 186, at 12.

293. Harms, *supra* note 290.

294. Oncorus, Inc., Amendment No. 1 to Form S-1 Registration Statement Under the Securities Act of 1933 (Form S-1/A), at 90 (Sept. 28, 2020).

option grant, Oncorus still had in place its complex capital structure which featured two series of preferred stock in addition to common stock, as it was still preparing to go public.[295] Oncorus priced its IPO on October 1, 2020, at $15.00.

The flawed PWERM should be replaced with an alternative approach that improves fair value measurements of late-stage equity awards and reflects the expectations of IPO investors.

A simplified approach would be to require setting the exercise price at the midpoint of the *bone fide* preliminary IPO price range, or the published IPO price range required by Item 501(b)(3) of Regulation S-K, as determined by the firm in negotiations with its underwriters.[296] Such midpoint may not be reduced by application of any discount for lack of marketability or time value of money discount.[297] The preliminary price range of the common stock as reported by firms in their cheap stock letters arguably reflects the expectations of prospective IPO investors as to stock value at the time of option award far more accurately than a PWERM valuation so close to the IPO.

Indeed, as shown in Table 5, firms and their underwriters are quite adept at determining the preliminary price range. For the thirty-five firms shown in Table 5 that engaged in 11th hour option discounting, their actual IPO price often did not appear to deviate significantly from the earlier midpoint of the preliminary price range that they had disclosed to the SEC in their unredacted cheap stock letters during IPO preparations. The average increase from the midpoint of the preliminary price range to the IPO price for these thirty-five firms was -3.23% (median: 0.0%). The midpoint was greater than the actual IPO price for seventeen out of the thirty-five firms and equaled the IPO price for four more firms.

Firm insiders and employees may have to await the determination of the preliminary IPO price range. However, they would not have to wait long. The median distance between 135 discounted stock option grants in this study and submission of the cheap stock letter to the SEC setting forth the preliminary price range was thirty-four days (average: thirty-six days).[298] A quarter (24%) of these discounted stock option grants occurred within fifteen days of the cheap stock letter submission or thereafter. More than one-third (36%) occurred within twenty-one days of the cheap stock letter submission or thereafter.

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295. *Id.* at 9, II-2.

296. Instructions to Paragraph 501(b)(3), 17 C.F.R. § 229.501 (2019) (discussing the firm's disclosure of firm to disclose a *bona fide* estimate of the range of the maximum offering price in its preliminary prospectus); *Regulation S-K: Questions and Answers of General Applicability, Answer to Question 134.04*, SEC (Nov. 21, 2023), https://www.sec.gov/divisions/corpfin/guidance/regs-kinterp.htm.

297. *See, e.g.*, Letter from Jon C. Avina, Att'y for Zoom Video Communications, Inc., Cooley, to Mitchell Austin, Jan Woo, David Edgar & Kathleen Collins, SEC, Div. Corp. Fin. 3 (Mar. 25, 2019) (on file with EDGAR) (advising SEC that on March 21, 2019, Zoom had granted options to purchase 439,250 shares with an exercise price that "reflects the midpoint of the Preliminary Price Range").

298. *See supra* text accompanying notes 186–190, for a discussion on how the outlier option grants for NGM were not included.

Critically, for compensatory stock option awards made near a planned IPO, the pre-IPO firm should be required to disclose the preliminary IPO price range as determined by the firm together with its underwriters, that is then used for estimating the fair value of the underlying stock. Such disclosure would need to make clear that the preliminary price range represents the firm's *bona fide* estimate of the price at which the firm expects to offer its common stock to investors in its forthcoming IPO based on the projected number of shares of common stock outstanding immediately prior to the offering on an as-converted-to-common basis.

The SEC recently took a similar approach in SAB 120 to discourage the practice of spring-loading options by expanding disclosure obligations. The SEC guidance provides that if a public company needs to make a material adjustment to the stock price used for estimating the fair value of spring-loaded stock options, it is obligated to *inter alia* disclose how it arrived at the adjustment amount and the characteristics of the option grant, including its "spring-loaded" nature.[299] "Such disclosures would highlight the issuer's use of 'spring-loaded' incentive awards and may lead to increased scrutiny from corporate governance watchdogs . . . as well as plaintiffs' counsels."[300]

B. IMPROVING TRANSPARENCY

Indeed, investors place considerable value on transparency regarding equity compensation to assess the firm's compensation practices and their effectiveness to grow firm value after the IPO. Optimal equity incentives are critical for EGCs, such as the firms in this study, which rely foremost on human capital, were still unprofitable when they went public, and raised funds from IPO investors in order to finance development of their unproven products. The lack of transparency by firms with respect to their suboptimal 11th hour option discounting practices should be quite disconcerting to investors.

Yet, the SEC has shown little interest in policing the registration statement disclosures made by firms regarding their stock valuation practices, perhaps given the wide latitude afforded to statements of subjective opinion by *Omnicare*. However, my investigation raises considerable questions as to whether these disclosures are misleading investors even under *Omnicare's* stringent requirements for pleading and establishing securities fraud when matters of subjective opinion are involved, in particular when these stock valuation practices pertain to late-stage option awards to corporate insiders.

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299. John W. White, Eric W. Hilfers, Jennifer S. Conway, Jonathan J. Katz, Michael Arnold, Mathhew J. Bobby, Kimberley S. Drexler & Nicole F. Foster, SEC Releases Accounting Guidance on "Spring-Loaded" Incentive Awards, CRAVATH, SWAINE & MOORE LLP (Dec. 8, 2021), https://www.cravath.com/a/web/bLp71G3T7fK3QywqkGAVmi/3u2eG8/sec-releases-accounting-guidance-on-spring-loaded-incentive-awards.pdf.

300. *Id.*

For one, under *Omnicare*, opinion statements can give rise to liability for securities fraud if the opinion statement contains an embedded statement of a materially untrue fact.[301] As discussed, firms in this study routinely asserted in their registration statements that their boards of directors estimated the fair value of the underlying stock anew on each option grant date. Moreover, firms often conveyed the notion that their board of directors considered a plethora of objective and subjective factors in determining the fair value of the underlying stock at the time of each option grant and that any third-party appraisal was only one factor in their determination of fair value at each option grant—all without disclosing that firms took advantage of the safe harbor provisions of the Treasury regulations implementing Section 409A.[302]

In reality, it would appear that firms routinely deferred to third-party appraisals when determining fair value of underlying stock at the date of option grant — even when these appraisals measured fair value as of a much earlier date — in order to fall under the safe harbor created by the Treasury regulations. Consistent with the Section 409A regulations and the more recent practical expedient under ASU 2021-07, firms apparently inquired primarily as to whether a material event had occurred that would impact firm value rather than performing a new stock valuation on each subsequent option grant date, thus allowing the continued application of the low IPO outcome probability used in an earlier PWERM/hybrid appraisal even as the firms were rapidly progressing towards their IPOs.

Indeed, in their cheap stock letters, pre-IPO firms often explicitly advised the SEC that no new valuation was needed for subsequent stock option grants near the IPO due to the absence of any intervening material event. At the same time, a considerable segment of the firms in this study made disclosures in their S-1s concerning their common stock valuations that conveyed the arguably misleading impression that they performed new fair value determinations for the stock underlying their late-stage option awards as of each option grant date. Yet, as discussed, the exercise prices of late-stage option grants did not typically deviate from earlier third-party stock appraisals even when there was a significant delay between appraisal date and grant date.

A pre-IPO firm further risks liability for securities fraud under *Omnicare* if it does not actually believe its own fair value determinations.[303] As discussed,

301. Omnicare, Inc. v. Laborers Dist. Council Const. Indus. Pension Fund, 575 U.S. 175, 185–86 (2015).

302. Firms will assume responsibility for the valuation to avoid application of 17 C.F.R. § 230.436 (2018) (discussing filing requirements for expert consents when registration statement disclosures are attributed to third party expert); *Securities Act Sections*, *supra* note 175 ("if the disclosure states that management or the board prepared the purchase price allocations and in doing so considered or relied in part upon a report of a third party expert, . . ., then there would be no requirement to comply with Rule 436 with respect to the purchase price allocation figures as the purchase price allocation figures are attributed to the registrant."); *see* AICPA GUIDE, *supra* note 142, at 132, n.3, 154.

303. *Omnicare*, 575 U.S. at 184–85; *see, e.g.*, Lickteig v. Cerberus Cap. Mgmt, L.P., 589 F. Supp. 3d 302, 310 (S.D.N.Y. 2022) (denying motion to dismiss claims for securities fraud on summary

a pre-IPO firm would have exposure if the firm used a lower pre-money value for its IPO outcome scenario in its PWERM/hybrid valuation for purposes of fixing equity compensation but a greater pre-money value when pitching to prospective IPO investors. Similarly, a firm risks liability if it receives favorable investor feedback from test-the-water meetings that implies a higher valuation but continues to use its earlier stock valuation to set the exercise price for subsequent stock option awards only to then justify the greater preliminary IPO price range by reference to the investor feedback received at these earlier test-the-water meetings.[304]

Moreover, as discussed, firms may make late-stage option awards close in time to their preliminary IPO price range determinations which they then communicate to the SEC in their cheap stock letters. Firms risk liability if the preliminary IPO price range deviates materially from the pre-money value applied to the IPO outcome scenario in a PWERM/hybrid valuation that is used to value the stock underlying these late-stage option awards.[305]

In addition, as discussed, it would appear that firms are either incapable or unwilling to predict the probability of IPO success with confidence. Given the impact of IPO outcome probability on the fair value determination under the PWERM/hybrid method, firms have exposure as to whether they actually believe their IPO prognostications, in particular when low IPO probabilities are provided by firm insiders who are the beneficiaries of late-stage at-the-money option awards and thus benefit from low stock valuations. Indeed, these IPO probabilities may be highly suspect when earlier IPO outcome probabilities continue to be applied in connection with later stock option grants despite the firm's rapid advances towards its IPO.

Finally, under *Omnicare*, "a reasonable investor may, depending on the circumstances, understand an opinion statement to convey facts about how the speaker has formed the opinion — or, otherwise put, about the speaker's basis for holding that view. And if the real facts are otherwise, but not provided, the opinion statement will mislead its audience."[306] Given the flaws of the PWERM valuation method and its potential for manipulation by firm insiders, failure to disclose the key assumptions used in a PWERM/hybrid valuation may well render the stock valuation disclosures in connection with last-minute stock

judgment denied when lower adjusted EBITDAs and EBITDA multiples were used in valuation of an equity interest while higher adjusted EBITDAs and EBITDA multiples were used in negotiations for sale of the company, which raised issue of fact as to whether belief in the lower securities valuation was sincere).

304. For example, ten firms in this study that had engaged in 11th hour option discounting disclosed in their cheap stock letters that they had conducted at least some test-the-waters meetings prior to their late-stage stock option grants. Yet, they did not update their stock valuations when awarding late stage discounted stock options in the aftermath of these investor meetings. In their cheap stock letters, the firms then pointed to these and subsequent test-the-waters meetings as a factor contributing to their greater preliminary IPO price range.

305. *See, e.g.*, *Lickteig*, 589 F. Supp. 3d at 325 ("[T]he contemporaneous use of higher [EBITDA] multiples in the Impax negotiations raises an issue of fact regarding whether the multiple given to Lickteig was truly believed.").

306. *Omnicare,* 575 U.S. at 188.

option awards misleading, in particular when corporate insiders are option recipients. "[I]f a registration statement omits material facts about the issuer's inquiry into or knowledge concerning a statement of opinion, and if those facts conflict with what a reasonable investor would take from the statement itself, then [Section] 11's omissions clause creates liability."[307]

Reasonable investors could not have expected the practices that this investigation uncovered from reading the often sparse registration statement disclosures concerning stock valuation furnished by a considerable segment of the firms in this study, such as overly pessimistic IPO prognostications, earlier low stock valuations for subsequent late-stage stock option grants without updating IPO outcome probabilities or total equity values or discounts, or deviations from valuation standards established by the accounting profession when valuing the stock underlying late-stage option grants, such as by using the contractual lock-up period to justify higher DLOMs and time value of money discounts or increasing the common stock volume in calculating the equity value of the common stock in the IPO outcome scenario by including outstanding compensatory stock options.[308]

Firms in this study often provided far more detailed disclosures regarding their actual valuation practices and underlying assumptions with respect to late-stage option grants only to the SEC in their cheap stock letters, which the SEC makes publicly available only well after the IPO. Moreover, they often redacted their cheap stock letters to preclude public access to this information—with the SEC's apparent endorsement.[309]

The SEC appears to share the view that key assumptions used by firms in their stock valuations for late-stage option grants are confidential commercial or financial information that pre-IPO firms may shield from access by the investing public.[310] Some firms in this study went so far as to request that the SEC return or destroy the unredacted originals of their cheap stock letters pursuant to Rule

307. *Id.* at 189.

308. *See, e.g.*, *Lickteig*, 589 F. Supp. 3d at 325 ("[E]ven if [the chairman of the holding company's board] sincerely believed that the 2014 Adjusted EBITDA reported in the Lickteig Valuation was accurate, an issue of fact still exists as to whether a reasonable investor would find it misleading to omit that Defendants believed that a different version of Covis's 2014 Adjusted EBITDA, which resulted in a larger number, was appropriate when selling their own interests in Covis.").

309. *See, e.g.*, Letter from Carrie Hyde Michaels, FOIA Branch Chief, SEC, to Sven Riethmueller 1 (Apr. 6, 2023) (on file with author) ("After engaging in the Rule 83 substantiation process with the submitter company," the SEC refused to release the original unredacted version of Applied Therapeutics Inc.'s April 24, 2019 cheap stock letter requested by me, explaining that it had determined that the redacted information contained confidential commercial or financial information.). Applied Therapeutics had redacted the preliminary IPO price range, the number of shares of common stock underlying each stock option grant made prior to its IPO, the per share exercise price for each option grant, the per share fair value of its common stock, and the results of various retrospective stock valuations with respect to pre-IPO stock option grants. Letter from Jamie L. Chase, Att'y for Applied Therapeutics, Inc., Cooley, to Tom Kluck, SEC, Div. Corp. Fin. 1–10 (Apr. 24, 2019) (on file with EDGAR).

310. Firms routinely invoke 17 C.F.R. § 200.83 to justify their redactions. *See*, *e.g.*, Letter from Laurie A. Burlingame, Att'y for SpringWorks Therapeutics, Inc., Goodwin, to Tonya K. Aldave, SEC, Div. Corp. Fin. 2 (Aug. 27, 2019) (on file with EDGAR). The SEC does not appear to challenge this position. *See id.*

418, implausibly contending that such action would protect the interests of investors.[311]

The securities regulations should thus be updated to require IPO candidates, including EGCs, to provide complete details regarding each option grant until their S- 1 becomes effective, including grant date, award size, exercise price, valuation, including all key assumptions and input factors, valuation date, recognized and unrecognized compensation expense, and vesting terms, as well as option recipients. Equity compensation disclosures should not be limited to the CEO and the few named executives but should be expanded to encompass other executives and key employees in the organization. Moreover, the rationale for these equity grants should be explained to IPO investors.

The "de-burdening" approach of the JOBS Act should thus be reconsidered with respect to equity compensation disclosures that allow firms to avoid making disclosures about equity awards after the most recent completed fiscal year. Stock ledger management has become far less burdensome since the JOBS Act went into effect more than ten years ago. For example, EGCs often manage their capitalization table and equity awards electronically through readily available capitalization table management software.[312]

It is troubling that the Exchange Act imposes greater disclosure obligations upon corporate insiders regarding their equity compensation by requiring them to make Form 3 filings when their firm goes public compared to the incomplete disclosure requirements for the firms making these equity awards under the Securities Act when they register their shares to go public.[313] IPO candidates have ready access to the same data regarding their equity awards to corporate insiders that these insiders disclose in their Form 3 filings.[314]

At the same time, IPO investors cannot rely on Form 3 disclosures by the pre-IPO firm's insiders. Their disclosures are only due on the effective date of the registration statement.[315]

The securities regulations should therefore be expanded to require IPO candidates to produce detailed disclosures of their actual equity compensation practices in their S-1, including each pre-IPO stock option grant made during IPO preparations, and provide a breakdown of recipients beyond the CEO and

311. 17 CFR § 230.418(b)(2) (2020) ("[Supplemental] information shall be returned to the issuer upon request . . . provided that the return of such information is consistent with the protection of investors"); *see, e.g.*, Letter from Matthew P. Dubofsky to Tonya K. Aldave, *supra* note 308 at 10 ("The Company believes that the return of the supplemental information contained in this letter will protect the interests of investors . . . ."); Letter from Charles J. Bair, Att'y for Turning Point Therapeutics, Inc., Cooley, to Tonya K. Aldave & Dietrich King, SEC, Div. Corp. Fin. 7 (Mar. 26, 2019) (on file with EDGAR) (requesting prompt destruction of unredacted letter pursuant to Rule 418).

312. Providers of capitalization table management software include, for example, Shareworks (Morgan Stanley) and Carta.

313. *See supra* note 123 and accompanying text.

314. Indeed, for the firms in this study, their general counsel or another firm representative often acted as attorney-in-fact for their insiders in connection with the filing of their Form 3 disclosures.

315. *See supra* note 123 and accompanying text.

the two other named executive officers, in an easily accessible table form. As this study shows, the current disclosure regime produces incomplete and arguably misleading information and gives firms ample opportunities to obscure their 11th hour option discounting practices.

C. Updating Section 409A Implementing Regulations

Any improved valuation approach would also require corresponding revisions to the Treasury Regulations implementing Section 409A. Amending the Treasury Regulations should result in corresponding changes to ASC 718 by operation of the practical expedient under ASU 2021-07.

Otherwise, firms could continue to use the valuations prepared by independent appraisers to fix a low exercise price for options that qualify as at-the-money for purposes of federal tax law and shielded by the independent appraiser safe harbor even if these valuations would no longer comply with US-GAAP. Firms could then also continue their current practice of retrospectively revaluing the underlying stock without jeopardizing the tax treatment that benefits option recipients.

A few key revisions to the Treasury Regulations implementing Section 409A should suffice to align improved valuation practices under US-GAAP with those under federal tax law:

First, the independent appraiser safe harbor must be subject to the same exclusion for upcoming IPO expectations as the illiquid startup method under the current regulations. Thus, the independent appraiser safe harbor should not be available if the pre-IPO firm reasonably expects to conduct an IPO within 180 days of the stock valuation.

Second, the regulations should make clear that during this 180-day period, every option grant will require a new valuation as of the grant date. Firms cannot defer to an earlier valuation. Moreover, the regulations, as well as the practical expedient under ASU 2021-07, should require that if the valuation methodology for determining the fair value of stock issued by privately held companies utilizes scenario probabilities, a reasonable determination of the probability needs to be made as of the option grant date. Fundamentally, the firm or its appraiser should not be able to rely on an earlier probability or on the argument that no new appraisal is needed because no material event has occurred, or no new information has emerged that adversely impacts firm value.

Third, no discounts for lack of marketability may be applied to reduce stock value for valuations during this 180-day period.

CONCLUSION

This article presents a deep dive into the option grant practices of privately held biotechnology companies near their IPO. I demonstrate that the practice of 11th hour option discounting is widespread among the pre-IPO firms in this study, deprives firms of needed capital while significantly diluting IPO

investors, and misaligns the interests of investors and firm insiders, as it produces potential windfalls to insiders and other employees following IPO completion.

While this study is focused on preclinical and clinical-stage biotechnology firms, I also presented examples of 11th hour option discounting practiced by pre-IPO firms from other industries which illustrates that these practices are not confined to this cohort of emerging growth companies.

This article further examines how firms exploit weaknesses in the regulatory framework and accounting rules to achieve these generous last-minute discounts which are often obscured in mandatory disclosures to investors. Indeed, pre-IPO firms often make incomplete and arguably misleading disclosures regarding their last-minute discounted option grants in their registration statements. I offer regulatory solutions to ensure transparency and to correct the misalignment of interests between prospective IPO investors and corporate insiders created by 11th hour option discounting and to ensure corporate insiders and their subordinates are incentivized to grow firm value post-IPO.

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