Cheap stock options: Antecedents and outcomes

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Abstract: We examine the prevalence, determinants, and consequences of cheap stock. "Cheap stock" refers to equity-based compensation valued at less than fair value. Cheap stock grants have drawn regulators' attention, with the SEC frequently commenting on issues related to cheap stock when reviewing firms' IPO registration statements. We find that the average firm's IPO price is more than five times the exercise price of options issued in the fiscal year before the IPO. Cheap stock is greater for firms that grant more options, have larger public offerings, and have venture capitalist backing. Finally, cheap stock options are associated with greater IPO underpricing, lower post-IPO investment, higher CEO compensation, and lower financial reporting quality. Collectively, our results inform investors and regulators about the extent of cheap stock option grants and how these grants influence the post-IPO behavior of the firm.

Keywords: Initial public offering, IPO, cheap stock, stock options, earnings management, executive compensation, financial reporting quality.

JEL Codes: G14, G24, M12, M13, M40, M41

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I. INTRODUCTION

"Cheap stock" is a term the Securities and Exchange Commission (SEC), auditors, and the media often use when referring to grants of equity-based compensation before firms' initial public offerings (IPO) using a share price below the IPO issue price. How firms value equity-based compensation leading up to an IPO is a focus of the U. S. Securities and Exchange Commission (SEC) in its review of IPO registration statements (Plante and Ntiamoah 2018; Latham and Watkins 2010). Cheap stock represents undervalued equity grants and therefore understated compensation expense. Its use also hints at an agency conflict, with some observers speculating that cheap stock provides companies with a "loophole to enrich their executives" (Eaglesham et al. 2019). Alternatively, cheap stock may reflect an effort by pre-IPO firms to attract and retain the talent necessary to lead the company through an IPO. We examine the prevalence of cheap stock options, the determinants of their granting, the impact on IPO pricing, and how post-IPO behaviors are shaped by the incentives cheap stock provides.

We first document the prevalence of cheap stock options, examining a sample of 673 IPOs conducted between 2007 and 2018. Firms typically grant options at the money, with an exercise price equal to the fair value of the underlying stock (Hall and Murphy 2000; Lowry and Murphy 2007).[1] Thus, the exercise price of an option reflects a firm's estimate of the fair value of its pre-IPO shares. Firms must disclose the exercise price of granted options, allowing us to measure cheap stock options as the ratio of the IPO price relative to the exercise price of these options. We rely only on those options granted recently, i.e., in the fiscal year ending immediately before the IPO, when measuring cheap stock. These recently granted options have exercise prices that are

[1] Hall and Murphy (2000, 209) document that 94% of firms grant stock options at the money.

most readily comparable to the IPO issue price and are the grants most likely to draw attention from regulators (Demos 2013). In our sample, the IPO price is on average 5.25 times the exercise price of options granted in the fiscal year preceding the IPO. The distribution of the IPO price relative to the exercise price is highly skewed, with the median firm having an IPO price 2.33 times the exercise price of options issued in the prior fiscal year. At the 90th percentile of our sample, this multiple is 9.32.

We investigate several possible sources for the prevalence of cheap stock. Specifically, we examine the role of earnings management, shareholder incentives to complete an IPO, and agency conflicts. First, granting cheap stock undervalues the associated compensation expense. Thus, firms can use cheap stock to manage reported earnings. Consistent with this motivation, we find that firms, on average, avoid compensation expenses equal to $0.12 per share by using cheap stock. However, granting cheap stock options comes at a financial cost, as the lower exercise price results in lower proceeds to the firm upon the option's exercise. In our sample, the average amount of "foregone cash" due to the underpricing of stock options is $17.51 million, or about 11% of the IPO proceeds. Additional costs of granting cheap stock include tax issues for employees (Internal Revenue Code Section 409A) and compliance issues related to earnings management subject to liability under the Securities Act of 1933. Indeed, we find that cheap stock is positively associated with significant restatements (i.e., "Big R," or non-reliance restatements) in the years following the IPO.

Second, we examine whether pre-IPO shareholders use cheap stock to motivate managers to take the firm public. Pre-IPO shareholders may desire the liquidity an IPO provides, allowing them to cash out of their investment in the firm. Cheap stock options granted to managers are most valuable conditional on a successful IPO, thus aligning managers' incentives with those of

shareholders. Research finds that pre-IPO shareholders (e.g., blockholders and venture capital firms) are eager to take firms public and cash out their investments (Röell 1996; Ritter and Welch 2002; Field and Hanka 2001). Thus, we use the presence of blockholders and venture capital (VC) backed owners to proxy for this IPO incentive. We find evidence that VC backed firms are positively linked to cheap stock. We also find some evidence of greater selling by blockholders and insiders when firms have cheaper stock options, consistent with these shareholders cashing out following the IPO.

Third, firms that grant cheap stock could also have weaker corporate governance, giving managers sway over the firm's board and compensation committees and allowing them to extract rents. In some ways, the cheap stock options resemble another corporate governance failure: option backdating. In backdating, researchers found evidence that firms retroactively set the grant date of options to the date of a firm's lowest recent stock price (Lie 2005). By retroactively setting an option's grant date, firms "spring-loaded" the option's value. In other words, the options were in the money on the actual grant date, as the share price had increased since the retroactively adjusted grant date. Since private pre-IPO firms do not have a publicly observable stock price, the exercise price of options granted ostensibly at the money is subject to substantial discretion and possible manipulation. While we do not find that corporate governance measures are significant determinants of cheap stock issuance, we do find evidence that cheap stock options are associated with corporate governance-related outcomes (e.g., higher compensation after adjusting for cheap stock, and underinvestment). Finally, our results indicate that cheap stock is negatively associated with CEO turnover in the years following the IPO, consistent with these CEOs being more entrenched.

We next turn our attention to the post-IPO behavior of the firms that issue cheap stock. First, we examine post-IPO investment. Deeply in-the-money options provide incentives that more closely resemble stock than at-the-money options. One might expect an IPO firm to have substantial investment opportunities and thus provide incentives for more risk-taking (e.g. Guay 1999). However, deeply in-the-money cheap stock options provide weaker risk-taking incentives relative to a portfolio of options with exercise prices closer to the stock's market price. Consistent with these weaker risk-taking incentives, post-IPO investment is negatively associated with cheap stock. Reduced post-IPO investment is also consistent with agency conflicts associated with cheap stock. Namely, managers may prefer to sit on their deeply in-the-money stock options and enjoy the "quiet life" instead of taking risky actions aimed at maximizing shareholder value (e.g., Bertrand and Mullainathan 2003).

Finally, we examine post-IPO stock returns, and, in particular, the return from the issue price to the close on the first day of trading, a measure of underpricing. Cheap stock may relate to underpricing for several reasons. First, the fair value of the firm assigned when issuing compensation pre-IPO may become a reference point in the book-building process. If this fair value is artificially low, the issue price may be low as well, resulting in greater underpricing. Second, the incentives that manifest in cheap stock may shape underpricing as well. If key employees grant themselves cheap stock to extract wealth from shareholders, these key employees may take steps to reduce monitoring post-IPO. Specifically, Brennan and Franks (1997) find evidence that underpricing allows insiders to ration shares in an oversubscribed offering. Shares are allocated in a way that results in small, dispersed shareholders who have less incentive to monitor. Finally, employees holding deeply in-the-money options at the IPO may seek to generate momentum in share price via underpricing, allowing them to sell their shares at favorable prices

once the IPO lockup period expires (Aggarwal et al. 2002). Note, however, that unlike settings where the exercise price of the option is tied to the IPO price (e.g., Lowry and Murphy 2007), the degree of IPO underpricing does not directly affect the value of the pre-IPO options we study.[2] Overall, our findings show a positive association between pre-IPO cheap stock options and IPO underpricing. Firms with deeply in-the-money options experience greater positive first-day returns. We do not find evidence that cheap stock is associated with longer-window returns.

We also conduct numerous robustness test including controlling for the rapid growth of firms choosing to conduct and complete IPOs (using market returns from the IPO firm's publicly traded peers), liquidity discount for private firms, and alternative measures of cheap stock. Our inferences remain robust. While we find that cheap stock is associated with lower financial reporting quality, greater CEO total compensation, greater underpricing, and reduced investment post-IPO, we cannot definitively conclude that cheap stock reflects inefficient compensation or a governance failure in the pre-IPO firms. The incentives provided by the cheap stock may facilitate the IPO, and any harm from cheap stock post-IPO may be more than offset by the incentives this compensation provides for successfully navigating the IPO process. We note that we can only observe the relation between cheap stock and post-IPO performance for the firms that successfully complete their offering. Further, as firms can confidentially file their registration statements, we cannot observe failed IPOs.

Overall, we aim to help further understanding of share-based compensation in pre-IPO firms by illuminating the antecedents and outcomes associated with cheap stock options. With the exception of Stuart and Willis (2020), there is little empirical research on cheap stock. Stuart and

[2] Our setting differs from that of Lowry and Murphy (2007) as our focus is on pre-IPO options rather than options granted on the day of the IPO for which the exercise price equals the IPO price. Absent the setting examined by Lowry and Murphy (2007), the prevalence of cheap stock still remains.

Willis (2020) examine the impact of an independent specialist on cheap stock and find that firms are less likely to retrospectively revalue option grants upward (their proxy for cheap stock) during the IPO process when using an independent valuation specialist.[3] We provide evidence on how the observability of stock price affects compensation and related incentives in these firms. Our results provide new insight into how these factors influence the IPO process and subsequent performance of newly public firms. Collectively, our study informs investors and regulators about the extent of cheap stock option grants and how grants influence the post-IPO behavior of the firm.

II. BACKGROUND AND MOTIVATION

Background

The Financial Accounting Standards Board (FASB) requires that firms measure the fair value of stock option grants on the grant date (ASC 718). A key input into the fair value of options is the price of the underlying share of stock. In pre-IPO firms, these shares are not actively traded, and a quoted market price is unavailable. Therefore, the firm must estimate the fair value of the stock to then calculate the fair value of the associated stock option.[4] Determining the fair value of a private firm's stock involves significant judgment regarding the choice of different valuation models, the inputs to those models, and the assumptions underlying them (Gornall and Strebulaev 2020). This complexity allows firms to apply discretion opportunistically to achieve the desired valuation. An artificially low valuation will result in an artificially low exercise price for stock option grants; that is, it will result in the granting of cheap stock.

[3] Stuart and Willis (2020) measure cheap stock with an indicator variable equaling one when a pre-IPO firm retrospectively revalues its stock price as of the option grant date upward, and zero otherwise. This measure differs from our construct of cheap stock, which is based on the difference between pre-IPO values and the IPO issue price.

[4] Firms typically grant stock options at the money (Hall and Murphy 2000; Lowry and Murphy 2007), and thus the exercise price reflects the firm's estimate of the underlying share's fair value. Options granted in the money have adverse tax consequences. Options granted out of the money will make the stock appear less undervalued.

Options granted with exercise prices below the IPO price have garnered significant attention from the SEC. Cheap stock grants are a common topic in the SEC's comment letters on firms' IPO registration statements, with Audit Analytics indicating that issues related to deferred, stock-based, and executive compensation are the most commonly discussed (Plante and Ntiamoah 2018). Recently, Staff Accounting Bulletin (SAB) 120 provides interpretive guidance for companies to consider when entering into share-based payment transactions while in possession of material private information, including cases where the market is likely to react positively to information's release (i.e., "spring-loaded" share-based payments). Together, these actions indicate that the valuation of share-based compensation is a priority of the SEC.

Inaccurately measuring the fair value of the stock underlying an option distorts the fair value of the option and consequently the related compensation expense. Cheap stock also has implications for how employees are taxed for option-based compensation. Notably, options granted with an exercise price below the fair value of the stock (i.e., in the money) cannot qualify as incentive stock options (ISOs) and are also subject to additional tax under Section 409A of the Internal Revenue Code. An independent valuation of the firm when granting options can protect against 409A tax and related penalties and is recommended to avoid delays in the IPO process (Latham and Watkins 2010).[5] Anecdotally, third-party valuation services advertise themselves based on their ability to secure a low valuation and thus allow for the grant of options with lower exercise prices (Eaglesham et al. 2019). However, Stuart and Willis (2020) find evidence consistent with independent specialists providing valuations that have less of a downward bias.

[5] Section 409A imposes on individual employees a 20 percent additional income tax, plus potential premium interest taxes on deferred compensation arrangements that do not meet specified criteria, including discount options that permit exercise over a period of years after vesting (as is typical of stock options). See Latham and Watkins (2010).

Stuart and Willis (2020) find that firms are less likely to retrospectively revalue option grants upward (their proxy for cheap stock) during the IPO process when using an independent valuation specialist. Companies with cheap stock, likely anticipating SEC scrutiny, sometimes reassess the value of their options and the related expenses in preparing for their IPO. Companies using a third-party valuation specialist appear to avoid this revaluation. This could indicate that third-party valuations are less biased or alternatively, firms using cheap stock might hire a valuation specialist to defend a biased valuation. We extend this research by examining the prevalence of cheap stock, the motivations that explain cheap stock, and how cheap stock affects the post-IPO investment behavior, performance, and financial reporting.

Motivation for Cheap Stock

We investigate a variety of possible motivations for the prevalence of cheap stock. First, we consider the possibility that a discount for the illiquidity of the firm's shares and firm growth explains the divergence between the firm's fair value at the IPO and the firm's value during the prior year. We next examine the roles of earnings management, shareholder incentives to complete an IPO, and agency conflicts.

Liquidity discount and market conditions. When an investment bank or valuation specialist values a privately held company, they typically apply a discount. This private equity discount is mainly due to the illiquidity of private companies. However, the extent of a private equity discount (or public equity premium) is subject to considerable debate (e.g., Hertzel and Smith 1993; Koeplin et al. 2000; Das et al. 2003; Kooli et al. 2003; Comment 2012).[6] Prior literature sets the liquidity discount as high as 20%-40%, although it is likely much lower, around only 5%-6%, according to Comment (2012). While a liquidity discount could explain a portion of

[6] See Bruner et al. (1998) for a review of the different approaches to measuring the equity premium.

the undervaluation we observe, we argue it is unlikely to explain the full amount. Specifically, given that we find the mean (median) IPO price is 5.25 times (2.33 times) the exercise price of recently granted options, it seems unlikely that a liquidity discount alone drives the extent of possible cheap stock.[7]

The difference between the exercise price of pre-IPO stock options and IPO price could also reflect growth in the firm and favorable general macroeconomic conditions (Lowry 2003; Benninga et al. 2005). We examine this possibility using a variety of firm and macroeconomic factors. We consider firm characteristics, such as sales and sales growth, firm age, the size of the IPO offering, and the volatility in the stock performance of the IPO firm's peers. In terms of macro-environmental conditions, we examine factors such as gross domestic product (GDP) growth, recent market returns in the firm's industry, the number of IPOs in the last three months, and the average underpricing of these recent IPOs.

We continue to find evidence consistent with cheap stock when we explicitly adjust for growth in the pre-IPO firm. Specifically, we adjust the exercise price of pre-IPO options by the average buy-hold abnormal return of the IPO firm's ten industry peers that are closest by market cap. We calculate these buy-hold returns starting at the beginning of the fiscal year ending before the IPO, and ending at the IPO date. Our results (untablulated) show the IPO price is on average more than five times this growth-adjusted exercise price. In further robustness tests, we use this growth-adjusted measure of cheap stock and another alternative measure of cheap stock where we adjust for a liquidity discount. Specially, we define an indicator variable equal to one if the discrepancy between the exercise price of pre-IPO options and the IPO price is greater than what

[7] As noted above, even assuming a steep liquidity discount for the lack of liquidity in a private firm's shares of 40%, the difference between the exercise price and offer price would imply average growth of 215% over less than a year.

would be implied by a liquidity discount of 40%, and zero otherwise.[8] Our inferences are robust to these alternative measures.

IPO incentive. Pre-IPO shareholders, wanting to take the firm public, may incentivize managers to go public by granting managers cheap stock. Some pre-IPO shareholders, including blockholders such as VC backed owners, are eager to IPO and access the liquidity of public markets. Ritter and Welch (2002) contend that the primary reason firms go public is so that founders and other shareholders (i.e., VCs, executives, short-term institutional owners, etc.) can cash out. Gompers and Lerner (1999) state that VC firms typically have a fixed, 10-year life, after which time they terminate a particular fund and distribute its returns. VCs often exit successful investments by taking the underlying firm public, as this provides the most profitable exit opportunity (Gompers and Lerner 1998; Gompers and Lerner 2001). Gompers (1996) also demonstrates that VCs will use IPOs to demonstrate their ability to select successful investments. In other words, VCs have strong financial motivations to incentivize managers to go public.

Not only do VCs and blockholders have an incentive to take a firm public, but they also hold key positions enabling them to provide such incentives to managers. Specifically, VCs generally sit on the board of directors and compensation committees and thus have both the ability and the incentive to negotiate for cheap stock for pre-IPO shareholders (Berlin 1998). Moreover, Cadman and Sunder (2014) show that VCs can influence managerial incentives, including stock compensation terms. Therefore, VC backed firms and those with substantial blockholdings are more likely to use cheap stock as an incentive to go public because cheap stock has significant value after a public offering.

[8] Operationally, this indicator equals one if the ratio of the IPO price to the exercise price of recently granted options is greater than 1.67 (i.e., 1/(1-40%) = 1.67).

Earnings management. The IPO process is particularly susceptible to earnings management, offering both motivation and opportunities to manage earnings (Teoh et al. 1998). Teoh et al. (1998) show that investors do not understand the extent to which IPO firms manage earnings, which translates directly into a higher offering price. Granting cheap stock options provides a way for firms to boost earnings and therefore the IPO offering price by underreporting compensation expense.

In addition to understating compensation expense, the use of cheap stock may indicate the quality of the firm's general financial reporting. That is, firms that distort the value of the firm's shares when granting stock options may misrepresent other aspects of financial performance. To illuminate this possible link between cheap stock and financial reporting quality, we examine the frequency of financial restatements in the one, three, and five years following the IPO.

Managerial power. Cheap stock firms could have weaker corporate governance, which gives rise to managerial power over the board and compensation committees. We examine whether the managerial power theory proposed by Bebchuk and Fried (2004) explains the prevalence of cheap stock. Bebchuk and Fried (2004) argue managerial power arises because boards and compensation committees do not function independently, and therefore CEOs can exert influence over their own pay, including the granting of cheap stock. Core, Holthausen, and Larker (1999) indicate that, while managerial power does not necessarily imply suboptimal contracting, using managerial power for self-serving purposes can hurt shareholder value.

Cheap stock options grants enrich the employees who receive them since the options received are in the money relative to the firm's fair value. Similar to option backdating, the firm ostensibly grants the options with an exercise price equal to the underlying share's fair value. However, by understating the fair value of the share, the option's exercise price is set lower than

an unbiased estimate of the share price. More powerful managers may exert more influence on the firm's valuation when setting the exercise price of these cheap stock grants. To explore these issues, we examine the CEO's total compensation, alternatively measured using either the firm's valuation of stock options or an estimate where we value total compensation using the IPO price.

The granting of deeply in-the-money options may also provide distorted post-IPO incentives. Deeply in-the-money cheap stock options provide incentives more akin to those provided by tradtional stock than at-the-money options. This is because the employee's wealth is sensitive to both increases and decreasese in the value of the stock when the option is in-the-money. In other words, the sensitivity of the option's value to volatility, or vega, is low. Entrenched managers with weak risk-taking incentives may be prone to underinvest and less susceptible to CEO turnover. Therefore we examine the association between cheap stock and post-IPO investment as well as cheap stock and post-IPO CEO turnover.

III. DATA

Sample Selection

Our sample consists of IPOs completed between 2007 and 2018. We begin our sample in 2007, as we rely on the SEC's enhanced compensation disclosure requirements, effective December 15, 2006, when collecting some of our variables. In constructing the sample, we omit banks, rollups, spinoffs, IPOs with issue prices of less than five dollars, and issues of non-common shares (e.g., unit offerings, REITs, foreign issuers, etc.). Our initial sample comes from the Securities Data Company (SDC) Platinum database. We merge with Jay Ritter's data on firm founding dates to calculate firm age.[9] We merge our sample with Compustat and CRSP to calculate

[9] https://site.warrington.ufl.edu/ritter/files/founding-dates.pdf

additional financial statement and market-based measures, respectively. Finally, we collect pre-IPO data on stock option usage from the firms' final prospectus, as available on the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system and as described in more detail below. Table 1 shows the composition of the sample over time. As Table 1 indicates, a total of 673 IPOs satisfy our data requirements.

Measurement of Cheap Stock Options

As discussed briefly in the introduction, we measure the extent of cheap stock options by comparing the exercise price of pre-IPO options to the issue price of the IPO. We refer to the ratio of the issue price to the exercise price as the moneyness of the options. When calculating this ratio, we use the weighted-average exercise price of options that the firm granted in the fiscal year before the IPO. Thus, our measure of cheap stock, *Moneyness*, is the IPO issue price divided by the weighted-average exercise price of options granted during the most recent fiscal year ended before the IPO. Appendix B provides an example of this calculation.

The weighted-average exercise price for options granted in the most recent fiscal year comes from the footnote disclosures in the financial statements contained in a firm's final prospectus, as required by ASC 718-10-50. These recent grants are the focal point of many SEC comments related to share-based compensation in firms' IPO prospectuses. Deloitte (2017) provides a representative comment: "*Please tell us the estimated IPO price range. To the extent there is a significant difference between the estimated grant-date fair value of your common stock during the past twelve months and the estimated IPO price, please discuss for us each significant factor contributing to the difference.*"

Table 2 gives summary statistics for *Moneyness* and other variables used in our analyses. The mean of *Moneyness* of 5.25 indicates that the IPO price is on average about five times the

exercise price of options that the firm granted in the most recent year. *Moneyness* exhibits substantial skew, with the 75th percentile being less than the mean. Given this skew, we use the natural logarithm of *Moneyness* in the analyses.

[Insert Table 2]

Figure 1 further illustrates the distribution of *Moneyness*. Most IPOs have *Moneyness* of less than five (77%). However, the distribution of *Moneyness* has a long right tail, and a nontrivial number of IPOs have *Moneyness* above 10. Specifically, 57, 23, and 16 IPOs have *Moneyness* above 10, 20, and 30, respectively. On the flip side, 77 IPOs have *Moneyness* of one or less. Figure 2 plots the distribution of the *Moneyness* by year. Overall there does not appear to be any stark time trends in the degree of cheap stock. Some years have a relatively small variance in *Moneyness* (e.g., 2008 and 2009), which is likely driven by the relatively few IPOs in these years.

[Insert Figure 1 & 2]

Firm Characteristics

We examine a variety of firm characteristics that could influence the prevalence of cheap stock. We construct several measures meant to capture a firm's size and growth, as these likely relate to the degree to which the IPO price exceeds the exercise price of recently granted stock options. Related to size, *Assets* is pre-IPO assets in millions, *Sales* is pre-IPO sales in millions, and *Proceeds* is the size of the issue in millions. We use the natural logarithm of these variables in the analyses.

Related to firm growth, *SalesGrowth* is the percentage sales growth from two fiscal years prior to the IPO to the fiscal year that ended before the IPO. This is likely a noisy measure given many pre-IPO firms have very small or zero sales. Therefore, we use decile ranks of this variable

from 0.1 to 1.0 in the analyses. As percentage growth cannot be calculated for firms with zero sales for the fiscal year ending two years prior to the IPO, we define *SalesGrowth* growth to be zero when sales for the year before the IPO is also zero and one if sales in the most recent pre-IPO year is greater than zero. Note that the decile ranking is not set to one; the decile ranking is based on the assigned *SalesGrowth* value. We also define the indicator variable *Pre-Revenue* to equal one when sales are zero for the fiscal year ending two years prior to the IPO (i.e., when there is a zero denominator for calculating *SalesGrowth*) and zero otherwise.

Next we define *Tech* as an indicator variable taking a value of one if the firm is a technology firm, as defined by Loughran and Ritter (2004). *Age* is the number of years since the firm's founding date (Loughran and Ritter 2004). We also include an indicator for the firm receiving venture capital backing (*VC Backed*). On the one hand, venture capitalists may play a monitoring role, similar to a high-quality auditor. On the other hand, they may pressure the firm to go public quickly (i.e., they have an IPO incentive) and report higher performance to establish their reputation for taking firms public (Gompers 1996; Lee and Wahal 2004). We capture the time in days between a firm's most recent fiscal year-end and the IPO date with *IPO RptDt Lag*. The values related to options reported in a firm's IPO prospectus will be more stale when this lag is longer. Finally, to proxy for the volatility in the IPO firm's value prior to the IPO, we include *Peer Volatility*, which is the average standard deviation of returns during the fiscal year ended prior to the IPO for the IPO firm's ten closest industry peers by market capitalization.

Share-based Compensation and Ownership Variables

Besides gathering stock option exercise prices from the firms' IPO prospectuses, we also collect information related to share-based compensation and the stock holdings of the CEO and other employees. We measure the extent to which firms use stock options with #*Options Granted*,

the number of stock options granted by the firm in the fiscal year ending before the IPO. We also collect the number of restricted stock shares granted in the year before the IPO, *#RS Shares Granted*, although restricted stock usage is relatively uncommon in pre-IPO firms. In our sample, 114 of the 673 IPOs granted restricted shares in the year prior to the IPO. Thus we cannot reliably use restricted shares in developing a measure of cheap stock.[10]

Related to firm ownership, we define *CEO Holdings* as the number of shares owned by the CEO before the offering as a percentage of shares outstanding upon the offering's completion. We similarly define *Block Holdings* as the number of shares held by certain beneficial owners before the offering scaled by the number of shares outstanding upon the offering's completion. Certain beneficial owners are those defined by Item 403 of Regulation S-K (i.e., 5% shareholders). Further, we define *CEO Selling* as the difference between the number of shares held by the CEO before and after the offering, scaled by the number of shares outstanding upon the offering's completion. *Block Selling* is similarly defined for the beneficial owners, as defined above.

Monitoring Related Variables

Next, we define several variables meant to capture aspects of a firm's corporate governance structure. We measure *Board Size* as the number of people sitting on the board of directors and *Independ. Dir. %* as the percentage of these board members who are independent. *CEO Chair* is an indicator variable taking a value of one if the CEO also leads the board and zero otherwise. *Fin. Expert* is an indicator variable for at least one board member holding a CPA credential.

[10] 159 IPOs (19% of our IPO sample) did not grant options in the year before the IPO and therefore were excluded from our analysis.

We define the variables *Big4*, *TopUW*, and *IndVal* as indicators for the firm retaining a Big Four auditor, using a high reputation underwriter as the lead underwriter of the offering (Carter and Manaster 1990; Loughran and Ritter 2004), and retaining an independent third party to assist in the valuation of the firm pre-IPO (Stuart and Willis 2020), respectively. We identify firms that use a third-party valuation specialist by reading the section of the firm's IPO prospectus where it discusses determination of the fair value of its stock for compensation. We expect that Big Four auditors and high reputation underwriters will likely pressure firms to accurately state the value of options and the related compensation expense. However, the effect of an independent third-party valuation specialist in our setting is more ambiguous. Stuart and Willis (2020) find that valuations prepared by independent valuation specialists are associated with fewer retrospective increases in the value of option grants during the IPO process. This result could reflect third-party valuations being less biased. Alternatively, firms using cheap stock might hire a valuation specialist to defend a biased valuation.[11] As previously noted, third-party valuation services advertise themselves based on their ability to secure a low valuation (Eaglesham et al. 2019).

Macro Environment Factors

We include several variables related to general economic conditions and the favorability of the IPO market. *GDP Growth* is the percentage growth in gross domestic product over the year ending the calendar quarter prior to the IPO. *Industry Return* is the average value-weighted return in the firm's Fama-French 48 industry over the year ending the month prior to the IPO. Notably, the *Industry Return* of 18.72% is quite high, consistent with firms timing their IPOs when the market is favorable. *#IPOs last 3mo* is the number of IPOs conducted in the prior three months,

[11] Section 409A provides that an independent valuation is entitled to a presumption of reasonableness, absent a grossly unreasonable valuation methodology (Latham and Watkins 2010).

and *Avg. Underpricing* is the average first-day return of these IPOs. We also include an indicator variable *Fin. Crisis* for IPOs completed during the financial crisis of 2007 to 2009.

IV. DESCRIPTIVE EVIDENCE

Before moving to our primary analyses, we first provide descriptive evidence on how cheap stock is associated with reported compensation expense and foregone cash proceeds due to the lower exercise price associated with cheap stock.

To estimate how much compensation expense firms avoid by using cheap stock, we first estimate the as-reported compensation expense related to options in the fiscal year ending before the IPO. We calculate this estimate as the stated fair value of options granted during the fiscal year ending before the IPO year multiplied by the number of options granted during the year, divided by four. We divide by four to reflect an estimated vesting period of four years. We then compare this estimate of as-reported compensation expense to a recalculated compensation expense where we value options using the IPO price as the fair value of the stock. We take the difference between this recalculated compensation expense and the estimated compensation expense and scale by the firm's pre-IPO assets. We also report this difference on a per share basis. Appendix B provides an example of this exercise. Note this measure likely yields a conservative estimate of how much firms reduce as-reported compensation expense by using cheap stock, because it ignores options outstanding at the beginning of the year and focuses only on recently granted options. Options previously granted likely had lower fair values at their grant date; however, the fair value of earlier grants is not always available.

Panel A of Table 3 reports the mean of this avoided compensation expense by quintile of *Moneyness* and shows that, as expected, avoided compensation increases with the degree of

moneyness. The average avoided compensation expense is $0.12 per share across the full sample. For firms in the middle (highest) quintile of *Moneyness*, the avoided compensation expense is $0.13 ($0.24) per share. This economically significant increase in earnings per share from avoiding compensation expense suggests that earnings management is a plausible motivation for using cheap stock.

[Insert Table 3]

Next we estimate the foregone cash proceeds related to cheap stock, that is, option exercise proceeds foregone due to the exercise price being below the offer price. The low exercise price associated with cheap stock results in the firm receiving less cash when employees exercise the options. We estimate this foregone cash as the difference between the IPO issue price and the weighted-average exercise price of options granted in the year before the IPO, multiplied by the number of options granted during this year. We then scale this quantity by the IPO proceeds. Again, Appendix B provides an example of this calculation. Panel B of Table 3 shows that the amount of foregone cash is economically significant, with the average firm foregoing $17.51 million. The amount of foregone cash increases with our measure of cheap stock, with the firms in the highest quintile of *Moneyness* foregoing $42.01 million, which equals 21.8% of the IPO proceeds.

V. EMPIRICAL RESULTS

Determinates of Cheap Stock

Table 4 presents analyses investigating the factors associated with firms granting more deeply in-the-money options before their IPO. In each column, the dependent variable is *ln(Moneyness).* In the first column, where we focus on firm characteristics, we find that larger

firms, in terms of either assets or sales, tend to grant less in-the-money options. However, larger IPOs in terms of proceeds are associated with higher levels of *Moneyness*. Higher levels of *SalesGrowth* are also associated with more deeply in-the-money options. Thus smaller, growing firms have a larger difference between the IPO price and the exercise price of recently granted options, consistent with firm growth partially explaining the prevalence of cheap stock. Firms with venture capital backing also tend to issue cheaper stock options, as indicated by the positive coefficient on *VC Backed*. This result is consistent with VC owners incentivizing managers to go public so they can access the liquidity of public markets. Finally, the coefficient on *ln(IPO RptDt Lag)* is significantly positive, consistent with options granted further from the IPO being further below the IPO price, again consistent with firm growth contributing to the degree of cheap stock.

The second column of Table 4 focuses on determinates of cheap stock related to compensation and firm ownership. We find that the number of options granted is positively associated with the moneyness of these options. Thus, firms that grant more stock options tend to grant these options with exercise prices that are cheaper, relative to the IPO price. We do not find that restricted stock is significantly associated with *Moneyness*. Of the ownership variables, *Block Holdings* is negatively associated with *Moneyness*, consistent with blockholders playing a monitoring role. However, *Block Selling* is positively associated with *Moneyness*. This result is again consistent with the pre-IPO owners using cheap stock as an incentive for managers to take the firm public, so these owners can access the liquidity the IPO provides.

In columns 3, 4, and 5, we do not find that any of the variables related to monitoring and the macro environment are significantly associated with cheap stock. The coefficient on *IndVal* is positive but insignificant. The insignificant coefficient perhaps reflects the countervailing effects

of an independent third-party providing less biased valuations and firms using valuation specialists to defend cheap stock valuations against IRS and investor scrutiny.

[Insert Table 4]

Blockholder Selling

Table 5 examines whether cheap stock is associated with more selling of shares by large pre-IPO shareholders. Selling by these shareholders is consistent with these shareholders desiring the liquidity provided by the IPO and thus using cheap stock to motivate management to complete the offering. We measure blockholder selling in two ways. First, as previously discussed, we measure blockholder selling at the IPO, *Block Selling*, based on disclosures in the IPO prospectus. Again, the measure captures the difference between shares held by certain beneficial owners (i.e., 5% shareholders) before and after the offering, scaled by the number of shares outstanding upon the offering's completion.

After the IPO, we need to rely on Form 4 filings to identify selling by insiders. We identify initial blockholders subject to these Section 16 reporting requirements at the IPO through their Form 3 filings. Then, using Form 4 data, we measure net selling by these shareholders in various time windows around the IPO. Specifically, we take share sales, minus share purchases, and scale by the number of shares outstanding at the IPO's completion. We then express this value in basis points.

At the IPO, we observe a positive association between cheap stock and blockholder selling. However, in the periods immediately following the IPO, we do not find a significant association between *Moneyness* and selling by pre-IPO shareholders, perhaps due to lockup restrictions. This result is consistent with prior work noting that VCs do not immediately access the liquidity

provided by the IPO (Gompers and Lerner 1998). But in the period beginning 31 days after the lockup expiration and ending 180 days following the lockup expiration, we observe a positive relation between cheap stock granted during the pre-IPO period (*ln(Moneyness)*) and net selling by pre-IPO shareholders (coefficient 27.96, t-stat 2.58). This finding is consistent with the IPO incentive hypothesis, namely that pre-IPO shareholders (including VCs) encourage the granting of cheap stock so managers are incentivized to take the firm public, allowing these shareholders to access the liquidity provided by public markets. The coefficient on *VC Backed* in this model is negative, but, as discussed above, sales after the IPO are measured using Form 4 filings, so this sales measure will not capture share sales by VCs except to the extent that the VC is otherwise subject to these filings requirements (i.e., as a 10% shareholder). Further, note that share distributions from a VC to its limited partners do not need to be reported to the SEC, and the limited partners would not typically be subject to Form 4 filing requirements (Gompers and Lerner 1998). The negative coefficient on VC may be consistent with fewer holdings by parties subject to Form 4 filing requirements when the IPO has VC backing (Field and Hanka 2001).

[Insert Table 5]

CEO Total Compensation

We next examine whether managerial power contributes to cheap stock by examining the relation between cheap stock and CEO total compensation. Cheap stock grants may be an attractive form of rent extraction as the undervalued options disguise the compensation's true value, similar to option backdating. On the one hand, if cheap stock is a way to extract additional compensation, it will relate positively to total CEO compensation. On the other hand, if cheap stock substitutes for other forms of compensation, it will be negatively associated with total CEO compensation. Moreover, receiving cheap stock may not relate to CEO total compensation if the CEO receives

fewer options to offset the greater value associated with each option. Overall, the effect of cheap stock on CEO total compensation is unclear.

A difficulty in examining how CEO total compensation relates to cheap stock is that cheap stock distorts the reported value of CEO total compensation. Specifically, the cheap stock undervalues associated stock-based compensation. To address this issue, we investigate the association between cheap stock and both as-reported CEO total compensation and the value of CEO total compensation revalued based on the IPO price. This recalculated CEO total compensation (*CEO Reclac. Comp*) reflects an estimate of the CEO total compensations in the absence of cheap stock. Appendix B gives an example of the specifics of this calculation.

Table 6 presents the results of examining the association between these measures of CEO total compensation and cheap stock after controlling for other determinates of CEO total compensation (e.g., number of options granted, restricted stock awards, board size, firm size, VC backed, etc). As a result of the control variables, one can think of the remaining variation as abnormal compensation. The sample size is somewhat smaller for these analyses, as we only include IPOs where the CEO received option-based compensation in the year before the IPO.

First, when we regress as-reported CEO total compensation on *ln(Moneyness)*, we observe that *Moneyness* is negatively associated with total compensation. This negatively relation is consistent with cheap stock substituting for other forms of compensation and is likely driven by the lower, and perhaps understated, value of cheap stock option grants. Interestingly, when we regress the recalculated value of CEO total compensation based on the IPO issue price, or *CEO Reclac. Comp*, on *ln(Moneyness),* we observe a positive and statistically significant association. This result is consistent with cheap stock serving as a way to extract additional compensation.

Taken together, the compensation results indicate that managerial power likely contributes to the prevalence cheap stock.

[Insert Table 6]

Investment Following IPO

The previous finding that cheap stock is positively associated with CEO compensation suggests a link between cheap stock and agency conflicts. These conflicts may manifest in other ways as well. Entrenched CEOs, having received a financial windfall from the IPO, may prefer the status quo and may not be motivated to take risks that are in the best interest of shareholders (Bertrand and Mullainathan 2003). This situation may be exacerbated by the weaker incentives cheap stock options provide. In the following, we examine how these incentives manifest in post-IPO investment.

As a firm's stock price diverges from the exercise price of an option, the incentives provided by that option change. Deeply in-the-money cheap stock options provide incentives more akin to those provided by traditional stock than at-the-money options. This is because the employee's wealth is sensitive to both increases and decreases in the value of the stock when the option is in-the-money. Said differently, the sensitivity of the option's value to risk (i.e. vega) is lower when the option is more in-the-money (e.g. Core and Guay 2002). Consistent with this issue, research finds that firms reprice out-of-the-money options to restore the intended incentives (Carter and Lynch 2001).

We examine how the weaker incentives provided by cheap stock are associated with risk-taking post-IPO, which we measure using investment activity. We define the *Investment* variable as the sum of capital expenditures, acquisitions, research and development, and a portion of selling,

general, and administrative expense (SG&A) scaled by lagged assets. Like Peters and Taylor (2017), we assume a portion of SG&A represents an investment. Roughly, we include 30% of SG&A, after excluding R&D expense, in our investment variable. We examine this investment over several different time windows following the IPO.

Table 7 presents our analysis of how the degree of moneyness in a firm's stock options at the IPO is associated with post-IPO investment. The results show that moneyness is negatively and statistically associated with investment over various time windows following the IPO. These findings are consistent with the more deeply in-the-money options providing weaker risk-taking incentives in these newly public firms.

[Insert Table 7]

Among the control variables, larger boards tend to have higher future investment, indicating that board size is a mechanism that increases future investment. *Big4* is positive and significant, indicating that when a Big Four accounting firm audits an IPO firm, the firm has higher future investment, consistent with higher accounting quality mitigating underinvestment problems (Biddle et al. 2009). Venture-backed IPO firms (*VC backed*) have a similar but stronger effect than Big Four auditors. IPO firms with greater assets (*ln(Assets)*) tend to have lower future investment, perhaps indicating that they are more mature. Finally, there is strong evidence that IPO proceeds, as measured by *ln(Proceeds)*, are positively associated with investment levels in the quarter of the IPO. Thus firms that raise more capital make more immediate investments. Finally, technology firms (*Tech*) exhibit a significantly positive relationship with future investment.

Return Performance

Table 8 presents an analysis of post-IPO returns for firms sorted by how deeply in-the-money their stock option grants were at the time of the IPO. In Table 8, we sort our sample into quintiles based on *Moneyness*. We then report average first-day returns (i.e., underpricing), 90-day market-adjusted buy-hold returns (BHARs), 180-day BHARs, and one-year BHARs within each quintile. The post-IPO lockup period is typically 180 days, so insiders looking to cash out may be most concerned about market performance in this window (Ertimur et al. 2014). However, the agency conflicts manifesting in higher CEO compensation and lower investment may result in lower long-horizon returns.

[Insert Table 8]

The results of Table 8 show a reliable association between underpricing and cheap stock options. Firms with more deeply in-the-money stock options at the IPO experience significantly higher first-day returns, that is, greater underpricing. Specifically, the day one stock return (*Day1Ret*) for the top quintile of *Moneyness_ExPrc* is 29.33% compared to only 9.95% in the bottom quintile. This difference is statistically significant and indicates greater underpricing for those firms with greater cheap stock.

Over longer horizons, while the returns in the highest quintile of *Moneyness* tend to be more negative than those in the lowest quintile, we do not find these differences in returns are statistically significant. The insignificant differences are difficult to interpret but could be consistent with no difference in the firms' performance relative to investors' expectations, or a lack of statistical power.

Financial Reporting Quality and CEO Turnover

Finally, we examine how cheap stock is associated with financial statement quality (i.e., accounting restatements) and CEO turnover. Firms that use cheap stock to report potentially understated compensation expenses may also make other financial reporting choices that could result in restatements. As for CEO turnover, more deeply in-the-money options could result in less powerful incentives. The lower investment documented in Table 7 is consistent with this possibility. These CEOs may choose to "cash out" and voluntarily leave the company or be terminated. Alternatively, it may be that powerful CEOs extract the benefits of cheap stock grants, and these same CEOs are also less susceptible to turnover due to their entrenchment.

Panel A of Table 9 examine the association between cheap stock and a non-reliance, or "Big R," restatements occurring within the first one, two, three or five years following the IPO. The results show *ln(Moneyness)* is positively associated with significant restatements occurring in the first year following the IPO, consistent with cheap stock being correlated with lower overall financial reporting quality.

Panel B of Table 9 show the results for CEO turnover. Our variable of interest, *ln(Moneyness)*, is negatively associated with turnover at the CEO position within the first one, two, and three years. Again, this is consistent with more entrenched CEOs benefiting from cheap stock and being less susceptible to turnover.

[Insert Table 9]

VI. CONCLUSION

We examine the prevalence, determinants, and consequences of firms granting stock options to employees pre-IPO that are in-the-money relative to the IPO price, commonly referred

to as cheap stock options. Regulators monitor cheap stock, as understating the value of the firm's stock also understates the firm's share-based compensation expense. We find that a firm's IPO price is often several times the exercise price of recently granted options. In our sample, the average firm granting options in the fiscal year prior to the IPO went public with a stock price that was 5.25 times the exercise price of these options.

We find that variables related to firm growth are associated with the degree of cheap stock. However, motivations related to earnings management, IPO incentives, and managerial power are also significantly associated with cheap stock. For consequences, we find a negative association between cheap stock and post-IPO investment, consistent with deeply in-the-money options providing weaker risk-taking incentives. However, we find little evidence that cheap stock is associated with the long-run stock performance of the firm. We find that cheap stock is positively associated with IPO underpricing. Finally, our results indicate that cheap stock is associated with lower post-IPO financial reporting quality and lower CEO turnover. Taken together, our study illustrates the factors that influence cheap stock and the impact cheap stock has on the firm in the post-IPO period.

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Appendix A: Variable definitions

Moneyness.....The IPO price divided by the weighted-average exercise price of options granted in the most recent fiscal year ending prior to the IPO date.

Assets.....Total assets as of the fiscal year ended prior to IPO, in millions.

Sales.....Sales for fiscal year ended prior to IPO, in millions.

Proceeds.....Proceeds from the offering, in millions.

SalesGrowth.....Percent sales growth from two fiscal years prior to the IPO to the fiscal year ended prior to the IPO. In cases where both current and lagged annual sales are zero, this variable is set to zero. In cases where sales increases from zero to a positive amount, this variable is set to one (see also *Pre-Revenue* variable below) The scaled decile rank of this variable, *Rank_SalesGrowth*, taking values from 0.1 to 1.0, is used in analyses.

Pre-Revenue.....An indicator variable taking a value of one if the IPO firm had zero revenue in the fiscal ending two years prior to the IPO year and zero otherwise (see also the *SalesGrowth* variable above).

Tech.....An indicator variable taking a value of one if the firm is a technology firm, as defined by Loughran and Ritter (2004).

Age.....The age of the firm, in years (source: Jay Ritter's website).

VC Backed.....Indicator variable for the firm being backed by venture capital (source: SDC).

IPO RptDt Lag.....The number of days between the IPO date and reporting date of the fiscal year ended prior to the IPO.

Peer Volatility.....The average standard deviation of returns during the fiscal year ended prior to the IPO for the IPO firm's ten closest industry peers by market capitalization.

#Options Granted.....The number of options granted in the most recent fiscal year ending prior to the IPO (in millions).

#RS Granted.....The number of restricted stock shares granted in the most recent fiscal year ending prior to the IPO (in millions).

CEO Holdings.....The number of shares held by the CEO prior to the offering scaled by the number of shares outstanding upon the offering's completion.

Block Holdings.....The number of shares held by certain beneficial owners (Item 403 of Regulation S-K) prior to the offering scaled by the number of shares outstanding upon the offering's completion.

CEO Selling .....The number of shares held by the CEO prior to the offering less the number of shares held after the offering scaled by the number of shares outstanding upon the offering's completion.

Block Selling .....The number of shares held by certain beneficial owner prior to the offering less the number of shares held after the offering scaled by the number of shares outstanding upon the offering's completion.

Board Size.....The number of people sitting on the board of directors.

Independ. Dir. %.....The percentage of board members who are independent directors.

CEO-Chair.....An indicator variable taking the value of one if the CEO is also the Chairman of the board and zero otherwise.

Fin. Expert .....An indicator variable taking the value of one if any board member holds a Certified Public Accounting (CPA) certificate and zero otherwise.

Big4.....Indicator variable for a Big4 auditor.

TopUW.....Indicator variable for the underwriter of the offering ranking as high reputation (Carter and Manaster 1990; Loughran and Ritter 2004).

IndVal.....Indicator variable for the firm receiving an independent third-party valuation of the firm when granting options pre-IPO (e.g. Stuart and Willis 2020).

GDP Growth.....GDP growth over prior four quarters.

Industry Return .....Average value-weighted return for the firm's Fama-French 48-industry over prior year.

#IPOs last 3mo.....Number of IPOs in the last 3 months (source: Jay Ritter's website).

Avg. Underpricing.....Average first day return of IPOs in the last 3 months (source: Jay Ritter's website).

Fin. Crisis .....An indicator variable taking the value of one if the IPO was completed during the years 2007-2009 and zero otherwise.

Investment .....Total investment divided by lagged assets. Total investment is defined as capital expenditures, research and development, acquisitions, and 30% of SG&A after excluding R&D (e.g. Peters and Taylor, 2017).

Day1Ret..... The percent return from the IPO price to the closing pricing on the first day of trading (i.e. underpricing).

BHAR90 ..... The market-adjusted buy-hold abnormal return over the 90 calendar days beginning on the close of the IPO date.

BHAR180 ..... The market-adjusted buy-hold abnormal return over the 180 calendar days beginning on the close of the IPO date.

BHAR_1yr ..... The market-adjusted buy-hold abnormal return over the one-year period beginning on the close of the IPO date.

Appendix B: Example

In the following, we provide an illustration of how we construct various variables used in the paper's analyses. The following are excerpts from Rocket Fuel, Inc's final prospectus:

	Number of Shares Outstanding	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (Years)	Aggregate Intrinsic Value (in thousands)
Balance at January 1, 2011	1,797,283	$ 0.20	9.2	$ 135
Options granted (weighted average fair value of $0.75 per share)	1,799,350	0.92		
Options exercised	(339,354)	0.59		
Options forfeited	(449,917)	0.68		
Balance at December 31, 2011	2,807,362	$ 0.55	8.9	$ 4,212
Options granted (weighted average fair value of $5.32 per share)	3,962,055	5.20		
Options exercised	(747,658)	1.02		
Options forfeited	(189,054)	1.64		
Balance at December 31, 2012	5,832,705	$ 3.65	9.1	$ 44,073

	Year Ended December 31,	
	2011	2012
Expected term (years)	5.4–6.1	5.3–7.3
Volatility	56.1%–66.7%	61.2%–63.4%
Risk-free interest rate	1.1%–3.1%	0.7%–1.2%
Dividend yield	—	—

Rocket Fuel's IPO was completed on September 19, 2013 at an offer price of $29.00 per share, raising a total of $116,000,000.

Cheap Stock Calculation:

We calculate our main measure of cheap stock as the IPO price divided by the exercise price of options granted in the fiscal year ending prior to the IPO. For Rocket Fuel, this is $29.00/$5.20 = 5.58.

Compensation Expense Calculation:

In Table 3, we summarize a measure of the compensation expense avoided by using cheap stock. For this measure, we estimate a compensation expense using the options granted during the current year multiplied by the stated fair value of these options. Then we divide by four, reflecting an estimated vesting period of four years.

For Rocket Fuel, this estimated compensation is:

(3,962,055 options granted x $5.32 fair value per option) / 4 years = $5,269,533

We then compare this estimated compensation expense to a recalculated compensation expense where we compute the fair value of options using the IPO price as the fair value of the stock. We compute this value

using a Black-Scholes model. For inputs other than the stock price (i.e., exercise price, maturity, risk-free rate, volatility, dividend yield), we use the values provided by the company. When the company provides ranges for these assumptions, we use the midpoint of the range. For Rocket Fuel, this yields a fair value per option of $25.07.

We when use this recalculated option fair value to recalculated compensation:

(3,962,055 options granted x $25.07 fair value per option) / 4 years = $24,832,180

This is a difference of compensation expense of $24,832,180 − $5,269,533 = $19,562,647.

This compares to Rocket Fuel's total assets of $75,189,000 (i.e., avoided compensation expense is 26% of assets).With 32,493,777 share outstanding upon the offering's completion, the avoided compensation expense is $0.60 per share.

Note this avoided compensation expense is likely understated, as it ignores options outstanding at the beginning of the fiscal year, which are likely continuing to vest, resulting in additional compensation expense. These options outstanding at the beginning of the year also likely had even lower fair values on their grant date.

Foregone Cash Calculation:

In Table 3, we also report a measure of foregone cash, or option exercise proceeds foregone due to the exercise price being below the offer price. For Rocket Fuel, this foregone cash is:

($29 offer price – $5.20 exercise price) x 3,962,055 options granted = $94,296,909

This compares to IPO proceeds of 116,000,000 (i.e., foregone cash is 81.3% of proceeds).

Recalculated CEO Compensation Calculation:

Finally, in Table 6 we compare actuall CEO compensation to a recalculated CEO compensation.

We can see the compensation for Rocket Fuel's CEO from the summary compensation table in the prospectus:

Name and Principal Position	Salary ($)	Bonus ($)(1)	Option Awards ($)(2)	Non-Equity Incentive Plan Compensation ($)	Total ($)
George H. John, *Chief Executive Officer*	300,000	25,000	3,289,280	150,000(3)	3,764,280

Given the granted options have a stated fair value of $5.32, this implies 618,286 options underlie the option award (i.e., $3,289,280/$5.32)

The recalculated option fair value (see above) implies these options are worth 618,286 x 25.07 = $15,500,430.

This implies recalculated CEO total compensation of $15,975,430.

Table 1: IPO's by Year

Year	# IPOs	Percent	Cumulative Percent
2007	80	11.89	11.89
2008	9	1.34	13.22
2009	21	3.12	16.34
2010	55	8.17	24.52
2011	47	6.98	31.50
2012	52	7.73	39.23
2013	79	11.74	50.97
2014	95	14.12	65.08
2015	58	8.62	73.70
2016	43	6.39	80.09
2017	60	8.92	89.00
2018	74	11.00	100.00
Total	673	100.00	

This table tabulates by year IPO's that satisfy our sample selection criteria.

Table 2: Summary Statistics

	N	Mean	Std. Dev.	p10	p25	Median	p75	p90
Moneyness	673	5.25	12.66	0.94	1.40	2.33	4.40	9.32
ln(Moneyness)	673	0.96	1.07	-0.06	0.33	0.85	1.48	2.23
Assets	673	365.03	1,018.87	12.76	32.03	67.13	182.90	762.81
Sales	673	329.41	1,367.68	0.00	2.48	58.33	167.88	519.02
Proceeds	673	147.90	208.75	45.00	64.75	93.50	150.00	263.50
SalesGrowth	673	2.83	32.22	-0.06	0.00	0.29	0.74	1.56
Pre-Revenue	673	0.19	0.39	0.00	0.00	0.00	0.00	1.00
Tech	673	0.37	0.48	0.00	0.00	0.00	1.00	1.00
Age	673	13.67	16.60	4.00	6.00	10.00	14.00	23.00
VC Backed	673	0.74	0.44	0.00	0.00	1.00	1.00	1.00
IPO RptDt Lag	673	185.08	97.49	42.00	105.00	179.00	273.00	318.00
Peer Volatility	673	0.54	0.17	0.36	0.42	0.52	0.64	0.77
#Options Granted	673	1.71	2.36	0.10	0.34	0.90	1.95	4.37
#RS Granted	673	0.16	0.72	0.00	0.00	0.00	0.00	0.21
CEO Holdings	673	0.13	0.32	0.01	0.02	0.04	0.08	0.28
Block Holdings	673	0.80	0.95	0.32	0.47	0.59	0.71	1.00
CEO Selling	673	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Block Selling	673	0.01	0.09	-0.03	0.00	0.00	0.01	0.08
Board Size	673	7.43	1.61	5.00	6.00	7.00	8.00	9.00
Independ. Dir. %	673	0.81	0.09	0.67	0.75	0.86	0.88	0.89
CEO-Chair	673	0.35	0.48	0.00	0.00	0.00	1.00	1.00
Fin. Expert	673	0.49	0.50	0.00	0.00	0.00	1.00	1.00
Big4	673	0.83	0.38	0.00	1.00	1.00	1.00	1.00
TopUW	673	0.81	0.40	0.00	1.00	1.00	1.00	1.00
IndVal	673	0.68	0.47	0.00	0.00	1.00	1.00	1.00
GDP Growth	673	2.07	1.20	1.26	1.57	2.22	2.80	3.18
Industry Return	673	18.72	14.55	1.34	9.16	19.96	28.52	35.88
#IPOs last 3mo	673	32.19	13.85	17.00	22.00	29.00	45.00	51.00
Avg. Underpricing	673	15.45	5.84	7.20	11.51	15.27	19.80	23.38
Fin. Crisis	673	0.16	0.37	0.00	0.00	0.00	0.00	1.00

Appendix A provides all variable definitions.

Table 3: Avoided Compensation Expense and Foregone Cash by Quintile of Moneyness

Panel A: Avoided Compensation by Quintile of Moneyness

	Avoided Comp ($millions)	% of Assets	$ Per Share
Min	-0.05	-0.14	0.00
2	1.66	1.42	0.05
3	3.66	3.72	0.13
4	4.41	6.90	0.16
Max	7.20	21.76	0.24
Total	3.40	6.80	0.12

Panel B: Foregone Cash by Quintile of Moneyness

	Foregone Cash ($millions)	IPO Proceeds ($millions)	% of Proceeds
Min	-0.87	134.24	-0.72
2	8.16	183.83	6.05
3	18.04	150.05	12.28
4	20.37	117.11	15.77
Max	42.01	154.30	21.80
Total	17.51	147.90	11.02

In Panel A, we estimate *Avoided Compensation* as option-based compensation valued using the IPO price less an estimate of actual option-based compensation. Appendix B provides an example of this variable's construction. The last two columns of Panel A present this quantity as a percentage of assets and on a per-share bias.

In Panel B, we define *Foregone Cash* as the difference between the IPO price and weighted-average exercise price of options granted in the fiscal year prior to the IPO, multiplied by the number of options granted in the fiscal year prior to the IPO. Note that the last column of Panel B does not equal the quotient of the prior two columns, as the last column takes the mean of the ratio within each firm. Appendix B provides an example of these calculations.

Table 4: Determinants of Cheap Stock

	(1)	(2)	(3)	(4)	(5)
Firm Characteristics					
ln(Assets)	-0.24***	-0.26***	-0.22***	-0.23***	-0.24***
	(-4.47)	(-4.84)	(-4.01)	(-4.31)	(-4.29)
ln(Sales)	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***
	(-3.17)	(-3.14)	(-3.23)	(-3.03)	(-3.08)
ln(Proceeds)	0.34***	0.28***	0.36***	0.34***	0.27**
	(3.92)	(2.94)	(3.74)	(3.81)	(2.56)
Rank_SalesGrowth	0.51***	0.43**	0.51***	0.51**	0.44**
	(2.60)	(2.34)	(2.72)	(2.50)	(2.38)
Pre-Revenue	-0.26	-0.24	-0.27	-0.25	-0.25
	(-1.55)	(-1.48)	(-1.60)	(-1.47)	(-1.52)
Tech	-0.12	-0.19**	-0.13	-0.12	-0.20**
	(-1.40)	(-2.03)	(-1.39)	(-1.40)	(-2.08)
ln(Age)	-0.07	-0.04	-0.08	-0.07	-0.05
	(-0.80)	(-0.50)	(-0.85)	(-0.81)	(-0.59)
VC Backed	0.23*	0.20*	0.23*	0.23*	0.18
	(1.94)	(1.74)	(1.86)	(1.90)	(1.46)
ln(IPO RptDt Lag)	0.17***	0.16***	0.16***	0.17***	0.14***
	(3.67)	(3.32)	(3.29)	(3.63)	(2.83)
Peer Volatility	-0.31	-0.14	-0.25	-0.26	-0.05
	(-1.22)	(-0.53)	(-0.92)	(-0.95)	(-0.19)
Compensation/Ownership					
#Options Granted		0.09***			0.09***
		(3.80)			(3.84)
#RS Granted		0.05			0.06
		(1.02)			(1.21)
CEO Holdings		0.04			0.03
		(0.27)			(0.20)
Block Holdings		-0.09**			-0.10**
		(-2.47)			(-2.35)
CEO Selling		-6.12			-5.16
		(-0.82)			(-0.69)
Block Selling		1.33***			1.24**
		(2.66)			(2.33)
Monitoring					
ln(Board Size)			-0.21		-0.30
			(-0.93)		(-1.38)
Independ. Dir. %			0.22		0.47

Table 4 (continued): Determinants of Cheap Stock

			(0.42)		(1.03)
CEO-Chair			0.03		-0.01
			(0.37)		(-0.15)
Fin. Expert			0.02		0.04
			(0.21)		(0.50)
Big4			-0.16		-0.12
			(-1.23)		(-0.91)
TopUW			0.01		0.06
			(0.07)		(0.40)
IndVal			0.14		0.14
			(1.51)		(1.47)
Macro Environment					
GDP Growth				0.03	0.03
				(0.76)	(0.90)
Industry Return				0.00	0.00
				(0.68)	(0.63)
#IPOs last 3mo				-0.00	-0.00
				(-0.33)	(-0.81)
Avg. Underpricing				0.00	0.00
				(0.16)	(0.12)
Fin. Crisis				0.08	0.15
				(0.57)	(1.13)
Constant	-1.32	0.02	-1.59	-1.46	0.07
	(-1.10)	(0.01)	(-1.09)	(-1.14)	(0.04)
N	673	673	673	673	673
Adj. R^2	0.1958	0.2247	0.1953	0.1911	0.2211

* p<0.10 ** p<0.05 *** p<0.01

The dependent variable in all models is *ln(Moneyness)*, where *Moneyness* is the IPO price divided by the weighted-average exercise price of options granted in the most recent fiscal year ending prior to the IPO date. Full variable definitions are given in Appendix A.

Table 5: Blockholder Selling

Net blockholder selling in window:	At IPO	[IPO, IPO+30]	[IPO+31, Lockup-1]	[Lockup, Lockup+30]	[Lockup+31, Lockup+180]
ln(Moneyness)	0.01**	43.17	9.37	0.03	27.69**
	(2.25)	(1.55)	(0.74)	(0.01)	(2.58)
ln(Assets)	0.00	19.03	3.83	1.01	13.94
	(1.06)	(0.78)	(0.25)	(0.20)	(1.08)
ln(Sales)	0.00***	24.47***	-0.95	-0.58	-0.73
	(3.53)	(3.01)	(-0.21)	(-0.51)	(-0.21)
ln(Proceeds)	0.00	82.35**	50.07*	6.31	28.48
	(0.52)	(2.11)	(1.96)	(0.70)	(1.17)
Rank_SalesGrowth	-0.03**	-158.14	86.48	-5.55	36.59
	(-2.03)	(-1.45)	(1.27)	(-0.28)	(0.77)
Pre-Revenue	0.02*	53.63	-39.16	-15.63	8.31
	(1.89)	(0.43)	(-0.95)	(-1.10)	(0.17)
Tech	0.01*	151.16***	-4.02	12.97	17.89
	(1.87)	(3.60)	(-0.10)	(0.97)	(0.63)
ln(Age)	0.01	-2.26	21.34	6.18	67.55**
	(0.82)	(-0.05)	(0.60)	(0.51)	(2.46)
VC Backed	-0.00	-239.94***	-68.68	-15.41	-52.39*
	(-0.02)	(-5.03)	(-1.62)	(-1.02)	(-1.66)
ln(IPO RptDt Lag)	0.00	-27.77	9.83	1.81	17.13
	(0.23)	(-0.96)	(0.56)	(0.25)	(1.26)
Peer Volatility	-0.03	-158.42	-135.84	-56.31*	-245.61***
	(-0.76)	(-1.05)	(-1.37)	(-1.69)	(-3.85)
#Options Granted	-0.00	-8.79	-15.35**	-3.12	-16.09***
	(-1.55)	(-1.03)	(-2.18)	(-1.37)	(-3.20)
#RS Granted	-0.00*	-21.49	1.37	-7.88**	-22.79
	(-1.65)	(-1.22)	(0.07)	(-2.01)	(-1.57)
CEO Holdings	0.01	98.47	-95.74***	4.15	-86.43***
	(0.67)	(1.59)	(-3.27)	(0.11)	(-3.06)
Block Holdings	0.02**	2.75	9.76	0.28	7.54
	(2.27)	(0.12)	(0.93)	(0.06)	(0.87)
Fin. Crisis	0.03***	223.89***	80.11	-22.72	-96.91***
	(3.80)	(4.30)	(1.31)	(-1.64)	(-3.04)
Constant	-0.18*	-1953.79***	-893.48**	-69.12	-751.62**
	(-1.66)	(-3.42)	(-2.01)	(-0.56)	(-2.14)
N	673	673	673	673	673
Adj. R^2	0.1417	0.2188	0.0353	-0.0013	0.0746

* p<0.10 ** p<0.05 *** p<0.01

Table 5 (continued): Blockholder Selling

The dependent variables measure net selling by blockholders in various windows following the IPO. In the first column, the net selling is variable is *Block Selling*, defined as number of shares held by certain beneficial owner after the offering less the number of shares held prior to the offering scaled by the number of shares outstanding upon the offering's completion. In the remaining columns, net selling is defined as sales by shareholders who are subject to Form 4 filing requirements at the IPO as a percentage of shares outstanding, measured in basis points. [IPO, IPO+30] captures net selling in the first 30 days following the IPO. [IPO+31, Lockup-1] captures net selling from 31 days post-IPO to one day prior to the lockup period expiration. [Lockup, Lockup+30] captures net selling in the 30 days following the IPO. [Lockup+31, Lockup+180] captures net selling from 31 days post-lockup to 180 days post-lockup expiration. *ln(Moneyness)* is the logarithm of *Moneyness*, where *Moneyness* is the IPO price divided by the weighted-average exercise price of options granted in the most recent fiscal year ending prior to the IPO date. Full variable definitions are given in Appendix A.

Table 6: CEO Total Compensation

Dependent Variable	*CEO Total Comp.*	*CEO Recalc. Comp.*
ln(Moneyness)	-0.22***	0.29***
	(-5.62)	(4.88)
#Options Granted	0.13***	0.18***
	(6.63)	(6.03)
#RS Granted	0.33***	0.19**
	(4.58)	(2.21)
CEO Holdings	0.11	-0.00
	(0.38)	(-0.01)
Block Holdings	0.04	-0.03
	(0.48)	(-0.27)
CEO Selling	11.97	8.67
	(1.12)	(0.72)
Block Selling	-0.76	-1.32**
	(-1.58)	(-2.15)
ln(Board Size)	-0.10	-0.51***
	(-0.44)	(-2.62)
Independ. Dir. %	0.73	0.19
	(1.37)	(0.28)
CEO-Chair	0.10	0.22*
	(1.23)	(1.75)
Fin. Expert	0.06	0.17
	(0.82)	(1.62)
Big4	0.15	-0.08
	(1.40)	(-0.54)
TopUW	0.13	0.36***
	(1.51)	(2.95)
IndVal	0.12	0.15
	(1.37)	(1.21)
ln(Assets)	0.12***	0.16***
	(3.02)	(3.07)
ln(Sales)	0.00	0.01
	(0.06)	(0.42)
ln(Proceeds)	0.07	0.14
	(1.00)	(1.45)
Rank_SalesGrowth	-0.14	0.03
	(-0.92)	(0.14)
Pre-Revenue	-0.02	0.28
	(-0.15)	(0.88)

Table 6 (continued): CEO Total Compensation

Tech	-0.21**	-0.23*
	(-2.43)	(-1.96)
ln(Age)	-0.03	-0.02
	(-0.39)	(-0.16)
VC Backed	-0.30**	-0.20
	(-2.58)	(-1.23)
ln(IPO RptDt Lag)	-0.06	-0.04
	(-1.25)	(-0.64)
Peer Volatility	-0.61**	-0.61**
	(-2.50)	(-2.07)
Fin. Crisis	-0.54***	-0.96***
	(-6.04)	(-7.63)
Constant	10.95***	9.80***
	(8.31)	(5.97)
N	384	384
Adj. R^2	0.5465	0.4790

* p<0.10 ** p<0.05 *** p<0.01

This table reports regressions of CEO compensation on our measure of moneyness for IPOs where the CEO received option-based compensation in the fiscal year preceding the IPO. *ln(Moneyness)* is the logarithm of *Moneyness*, where *Moneyness* is the IPO price divided by the weighted-average exercise price of options granted in the most recent fiscal year ending prior to the IPO date. *CEO Total Comp.* is as-reported CEO compensation and *CEO Recalc. Comp.* is total CEO compensation where we recalculate the value of the option award component using the IPO issue price. Appendix B provides an example of this calculation. Full variable definitions are given in Appendix A.

Table 7: Investment Following IPO

Quarter relative to IPO	Q0	Q1	Q4	Q8	Q12
ln(Moneyness)	-0.16***	-0.17***	-0.15***	-0.16***	-0.13***
	(-4.33)	(-4.74)	(-5.34)	(-4.76)	(-3.62)
ln(Assets)	-0.55***	-0.21***	-0.21***	-0.20***	-0.22***
	(-12.01)	(-4.76)	(-4.73)	(-4.62)	(-4.79)
ln(Sales)	-0.01	0.00	0.00	-0.00	0.01
	(-0.69)	(0.36)	(0.38)	(-0.16)	(0.52)
ln(Proceeds)	0.25***	-0.05	-0.05	-0.01	0.04
	(3.54)	(-0.80)	(-0.76)	(-0.21)	(0.60)
Rank_SalesGrowth	-0.24	-0.17	-0.18	-0.09	-0.21
	(-1.62)	(-1.20)	(-1.31)	(-0.63)	(-1.47)
Pre-Revenue	-0.16	-0.05	-0.04	0.04	0.09
	(-0.98)	(-0.32)	(-0.29)	(0.24)	(0.58)
Tech	0.36***	0.32***	0.21***	0.24***	0.21***
	(5.52)	(5.00)	(3.68)	(3.87)	(3.15)
ln(Age)	-0.04	-0.09	-0.12**	-0.06	-0.06
	(-0.61)	(-1.48)	(-2.14)	(-1.01)	(-0.91)
VC Backed	0.33***	0.31***	0.24***	0.32***	0.30***
	(3.93)	(3.53)	(2.93)	(4.04)	(3.54)
ln(IPO RptDt Lag)	0.02	0.03	-0.01	-0.04	-0.07*
	(0.43)	(0.91)	(-0.16)	(-1.25)	(-1.89)
Peer Volatility	0.24	0.32	0.32*	0.59***	0.52**
	(1.16)	(1.56)	(1.69)	(2.81)	(2.29)
#Options Granted	0.04***	0.03**	0.03***	0.03***	0.01
	(3.34)	(2.56)	(2.61)	(2.73)	(0.73)
#RS Granted	0.04	0.03	0.03	0.00	-0.03
	(0.75)	(0.46)	(0.57)	(0.07)	(-0.44)
CEO Holdings	-0.05	-0.02	-0.10	-0.08	-0.03
	(-0.52)	(-0.18)	(-1.07)	(-0.78)	(-0.27)
Block Holdings	0.11***	0.08**	0.06*	0.03	0.03
	(3.58)	(2.57)	(1.80)	(0.80)	(0.74)
CEO Selling	-1.10	5.02	6.09*	3.80	5.37
	(-0.27)	(1.13)	(1.67)	(1.10)	(1.45)
Block Selling	-0.64	0.14	0.10	0.21	-0.20
	(-1.60)	(0.40)	(0.32)	(0.63)	(-0.56)
ln(Board Size)	0.36***	0.26**	0.12	0.01	0.13
	(2.99)	(2.33)	(1.27)	(0.09)	(0.82)
Independ. Dir. %	-0.06	0.21	-0.01	-0.13	-0.18
	(-0.17)	(0.58)	(-0.03)	(-0.36)	(-0.43)

Table 7 (continued): Investment Following IPO

CEO-Chair	-0.08	-0.10	-0.07	-0.10*	-0.08
	(-1.17)	(-1.49)	(-1.20)	(-1.67)	(-1.17)
Fin. Expert	-0.06	-0.02	-0.05	0.00	-0.03
	(-1.02)	(-0.37)	(-0.95)	(0.06)	(-0.48)
Big4	0.17**	0.19**	0.12	0.13	0.27***
	(2.02)	(2.31)	(1.44)	(1.58)	(3.07)
TopUW	-0.03	0.03	0.06	-0.01	-0.11
	(-0.31)	(0.39)	(0.73)	(-0.16)	(-1.26)
IndVal	0.06	0.09	0.09	0.07	0.07
	(0.78)	(1.17)	(1.30)	(0.94)	(0.95)
Fin. Crisis	-0.12	-0.04	-0.03	0.05	0.11
	(-1.41)	(-0.39)	(-0.32)	(0.53)	(1.36)
Constant	8.18***	6.97***	8.21***	7.98***	7.55***
	(7.57)	(6.66)	(8.28)	(8.11)	(7.83)
N	672	672	659	624	542
Adj. R^2	0.5961	0.3220	0.3221	0.3204	0.3262

* p<0.10 ** p<0.05 *** p<0.01

The dependent variable in all models is the logarithm of *Investment*, where *Investment* is defined as capital expenditures (capx), research and development (xrd), acquisitions (aqc), and 30% of SG&A (xsga) after excluding R&D, scaled by lagged assets (e.g. Peters and Taylor, 2017). In column Q0, *Investment* is measured in the quarter of the IPO. In columns Q1, Q4, Q8, and Q12, we measure cumulative *Investment* from the IPO quarter though the end of the quarter ending 4, 8, or 12 months following the IPO, respectively. *ln(Moneyness)* is the logarithm of *Moneyness*, where *Moneyness* is the IPO price divided by the weighted-average exercise price of options granted in the most recent fiscal year ending prior to the IPO date. Full variable definitions are given in Appendix A.

Table 8: Returns by Quintile of Moneyness

	Day1Ret	BHAR90	BHAR180	BHAR_Yr1	Mean(Moneyness)
Min	9.95	4.85	3.60	2.54	0.86
2	20.71	11.54	1.10	-1.89	1.56
3	18.85	2.97	-2.76	0.95	2.34
4	19.02	6.64	9.03	-0.38	3.97
Max	29.33	7.84	-0.35	-4.94	17.61
Max - Min	19.38***	3.00	-3.95	-7.48	16.74***

* p<0.10 ** p<0.05 *** p<0.01

This table provides mean stock returns in various time windows and the mean of *Moneyness* by quintile of *Moneyness. Moneyness* is the IPO price divided by the weighted-average exercise price of options granted in the most recent fiscal year ending prior to the IPO date. Day1Ret is the return from the IPO offer price to the closing price on the IPO date (i.e. IPO underpricing). BHAR90, BHAR180, and BHAR_Yr1 are the buy-and-hold returns for the 90 days, 180 days, or year following the IPO, respectively, less the buy-and-hold market return measured over the same time windows.

Table 9: Restatements and CEO Turnover

Panel A: Restatements

Dependent Variable	Restate by Year 1	Restate by Year 2	Restate by Year 3	Restate by Year 5
ln(Moneyness)	0.31*	0.18	0.02	0.08
	(1.86)	(1.58)	(0.21)	(0.70)
Constant	3.39	-1.30	-1.96	-2.93
	(0.77)	(-0.45)	(-0.69)	(-0.95)
Controls	Yes	Yes	Yes	Yes
N	673	639	573	390
Pseudo R^2	0.2556	0.1311	0.0692	0.0951

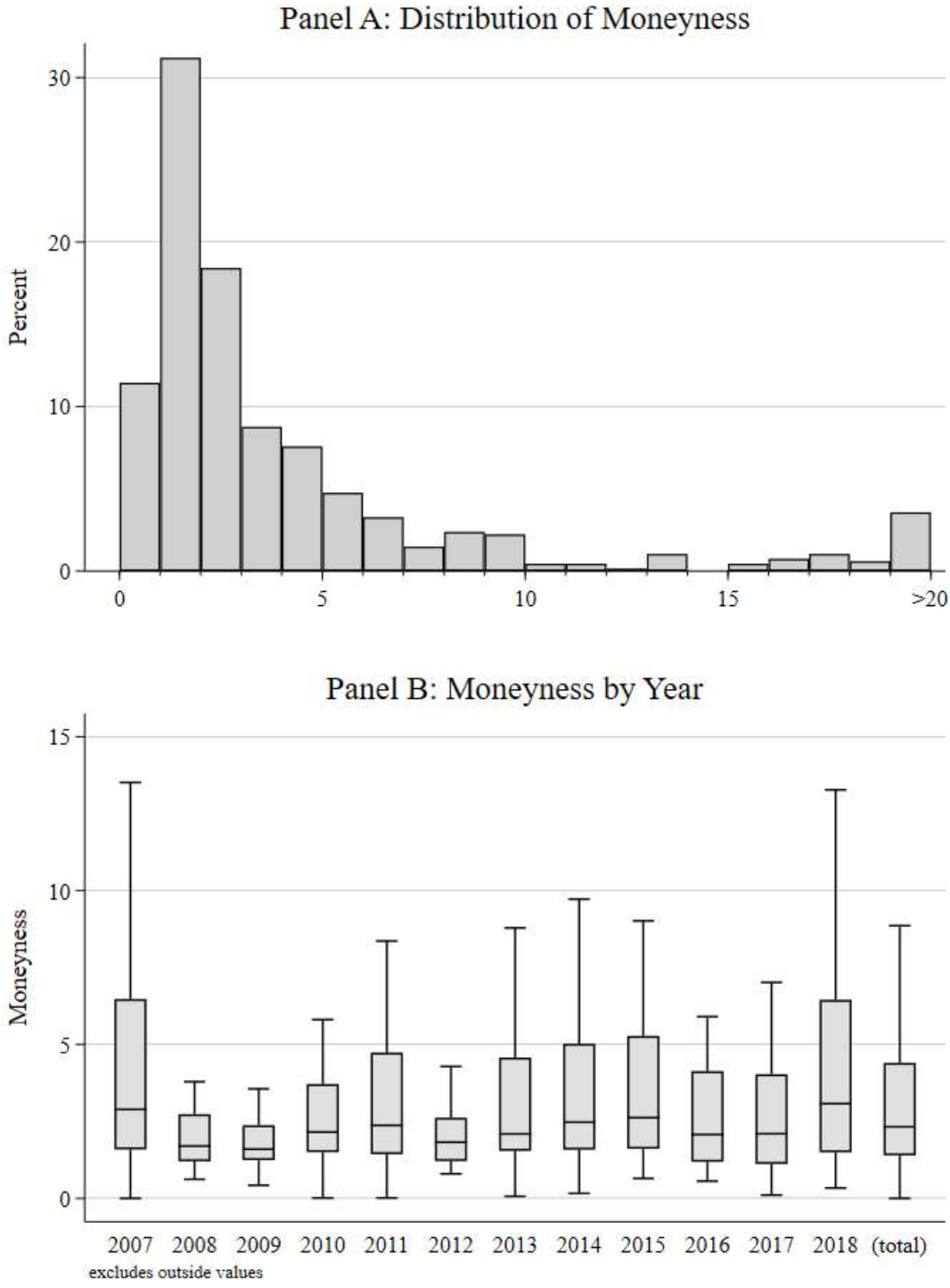
Pane B: CEO Turnover

Dependent Variable	Turnover by Year 1	Turnover by Year 2	Turnover by Year 3	Turnover by Year 5
ln(Moneyness)	-0.31***	-0.12*	-0.14**	-0.08
	(-3.50)	(-1.92)	(-1.98)	(-1.10)
Constant	5.29*	0.65	3.62*	3.01
	(1.78)	(0.31)	(1.82)	(1.39)
Controls	Yes	Yes	Yes	Yes
N	673	639	573	390
Pseudo R^2	0.1654	0.0295	0.0404	0.0405

* p<0.10 ** p<0.05 *** p<0.01

Panel A reports the results of probit regressions of indicators for restatements on *ln(Moneyness)*, where *Moneyness* is the IPO price divided by the weighted-average exercise price of options granted in the most recent fiscal year ending prior to the IPO date. Restate by Year 1, Restate by Year 2, Restate by Year 3, and Restate by Year 5 are indicator variables taking a value of one if the firm issues non-reliance restatement (i.e. a "Big R" restatement) within one, two, three, or five years of the IPO, respectively. Panel B repots the results of probit regressions of indicators for CEO turnover on *ln(Moneyness)*. Turnover by Year 1, Turnover by Year 2, Turnover by Year 3, and Turnover by Year 5 are indicator variables taking a value of one if the firm has turnover at the CEO position within one, two, three, or five years of the IPO, respectively. In both panels, firms that delist prior to the end of the year examined are excluded from the analysis. *Controls* indicates *ln(Assets)*, *ln(Sales)*, *ln(Proceeds)*, *Rank_SalesGrowth*, *Pre-Revenue*, *Tech*, *ln(Age)*, *VC Backed*, *ln(IPO RptDt Lag)*, *Peer Volatility*, *ln(Board Size)*, *Independ. Dir. %*, *CEO-Chair*, *Fin. Expert*, *Big4*, *TopUW*, *IndVal*, and *Fin Crisis*. Full variable definitions are given in Appendix A.

Figure 1: Distribution of Moneyness



Note: In panel B, the top and bottom of box represent 75th and 25th percentiles, respectively. The line inside the box represents the median. The whiskers represent the last values within 1.5 interquartile ranges of the 75th or 25th percentiles. Values outside of this are not plotted.