# *When and why do IPO firms manage earnings?*

# When and why do IPO firms manage earnings?[*]

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**Abstract:** There is significant disagreement about whether, when, and why IPO firms manage earnings. We precisely identify the timing and motives behind earnings management by IPO firms. The period around an IPO is characterized by two events: the IPO itself and the lockup expiration. Both the raising of capital at the IPO and the exit by pre-IPO shareholders at lockup expiration create incentives for firms to manage earnings. To disentangle the effect of these events, we examine quarterly, rather than annual, abnormal accruals. We find no evidence of income-increasing earnings management before the IPO. However, IPO firms exhibit positive abnormal accruals in the quarter before and the quarter of the lockup expiration. Positive abnormal accruals are concentrated in less scrutinized firms and firms with high selling by pre-IPO shareholders. Moreover, we find that these accruals subsequently reverse and that such reversals contribute to long-run IPO underperformance.

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## 1. Introduction

Following their initial public offerings (IPO), firms tend to underperform in the long run, suggesting that informed shareholders can benefit from transferring ownership to (less informed) new investors at an opportune time (Ritter 1991; Derrien 2005; Field and Lowry 2009). In an influential study, Teoh, Welch and Wong (1998a) document high abnormal accruals in the year firms go public, link these accruals to long-run underperformance, and interpret their findings as evidence of earnings management to inflate the issue price. Nevertheless, almost 20 years after this paper, there is still significant disagreement about whether, when, and why IPO firms manage earnings.

It is crucial to recognize that there are two distinct events within a short period around the IPO where earnings management could result in wealth transfers from new investors. First, the firm sells shares to investors at the time of the IPO. Second, about six months after the IPO, pre-IPO shareholders significantly reduce their stake in the firm when the lockup period expires. Because of the strong selling incentives of pre-IPO owners, firms have incentives to manage earnings in anticipation of the lockup expiration. Given the proximity of the IPO and the lockup expiration date, *annual* accruals studied elsewhere cannot be used to discern which of the two events result in earnings management. In this paper, we examine quarterly accruals and provide evidence that IPO firms manage earnings not before the IPO but before the lockup expiration to inflate the selling price for pre-IPO shareholders. This result is distinct from previously documented effects of working capital investments on accruals (Ball and Shivakumar 2008; Armstrong, Foster, and Taylor 2016).

Lockup agreements are voluntary contracts between the underwriter and pre-IPO shareholders that restrict the ability of pre-IPO shareholders to sell their shares in the IPO firm for a specified period after the offering, typically 180 days. Following lockup expiration, trading

volume increases (permanently) by 40%, on average, reflecting a significant reduction of ownership by pre-IPO shareholders (Field and Hanka 2001). Pre-IPO shareholders' selling gains depend on the stock price around lockup expiration. Thus income increasing earnings management prior to lockup expiration can benefit these shareholders.

While large pre-IPO shareholders prefer selling their shares at favorable prices, it is not obvious that managers oblige with income-increasing accruals. Because lockup expiration dates are publicly known and anticipated, there is significant market scrutiny at that point in time. The resulting threat of litigation and potential loss of reputation can deter earnings management. Moreover, managers may not be motivated enough to manipulate earnings because they simply do not care about the stock price at which pre-IPO shareholders sell shares.

There are, however, at least two reasons why managers might overstate earnings at lockup expiration. First, reporting strong performance and a rosy outlook around lockup expiration can help them ensure adequate demand for the stock and thus avoid the price pressure from large-scale selling by pre-IPO shareholders (Field and Hanka 2001). Second, pre-IPO shareholders can influence managers to take actions that benefit such shareholders (Ertimur, Sletten, and Sunder 2014). Pre-IPO shareholders typically play an active role in start-up firms by providing funding and advice, resulting in lasting relationships with management. Holding significant ownership stakes and board seats in IPO firms enables pre-IPO shareholders to appoint and dismiss managers as well as set their compensation to align them with these investors' horizons.[1] Furthermore, despite significant share sales around lockup expiration, some pre-IPO shareholders continue to hold ownership stakes in the IPO firms for an extended period, retaining an influence in the firm even after lockup expiration (Gompers and Lerner 2004;

[1] See, for example, Barry, Muscarella, Peavy, and Vetsuypens (1990); Lerner (1995); Hellmann and Puri (2002); Gompers and Lerner (2004); Morsfield and Tan (2006); and Cadman and Sunder (2014).

Wongsunwai 2013). Finally, CEOs of IPO firms are often serial entrepreneurs and therefore have repeated interactions with these investors, creating incentives for the managers to help them reduce their stakes on favorable terms.

In addition, some institutional features are likely to encourage earnings management by reducing the probability of detection and litigation. First, some pre-IPO shareholders are exempt from disclosing their sales to the SEC.[2] Second, given that pre-IPO shareholders are restricted from selling shares for a significant period prior to lockup expiration, it is difficult to distinguish between information and liquidity motives for their sales after the lockup expires. Third, information asymmetry between informed parties (managers and large pre-IPO shareholders) and any potential investors is particularly acute at IPO firms, making earnings management more difficult to detect.

In deciding whether to report income-increasing accruals, managers trade the costs of detection against the benefits of ceding to pressure from pre-IPO shareholders. Thus we do not expect earnings management in anticipation of lockup expiration to be uniformly pervasive. Instead, it is likely to be stronger when pre-IPO shareholders with the ability to influence management have strong selling incentives and weaker when firms are subject to high scrutiny or litigation risk.

Our empirical approach has four distinct features. First, we focus on *quarterly* abnormal accruals around *both* the IPO and the lockup expiration to pinpoint the timing of abnormal accruals. Second, our time-series research design with firm fixed effects captures whether accruals in suspect quarters depart from normal levels for a given firm. Third, we relate the

[2] Shares in IPO firms are held by a variety of shareholders, many of whom are not required to report changes in ownership to the SEC on Form 4. The requirement to file Form 4 is limited to insiders, i.e., officers, non-executive directors, and beneficial owners of 10 percent or more of shares outstanding. Furthermore, VC firms often distribute their shares to partners, rather than selling them on the open market, circumventing the requirement to file Form 4.

abnormal accruals before lockup expiration to selling incentives of pre-IPO shareholders other than managers. Fourth, we control for IPO proceeds to capture the economic effect of cash infusion on working capital.

To examine whether managers overstate earnings prior to the IPO, we use a comprehensive sample of IPOs over the 1990–2013 period and first identify the quarter preceding the IPO. We use the modified Jones model, with accruals derived from the cash flow statement, to measure earnings management.[3] Consistent with prior research (Ball and Shivakumar 2008; Venkataraman, Weber, and Willenborg 2008), we do not find evidence of positive abnormal accruals in that quarter.

Turning attention to the lockup expiration, using the same sample and the same measure of abnormal accruals, we find positive abnormal accruals in the quarter preceding and the quarter of the lockup expiration. To reconcile our results with prior studies, we also examine annual accruals while distinguishing between fiscal years with and without the lockup expiration event. We find that abnormal accruals in the fiscal year before the IPO are significantly negative. In the fiscal year that includes the IPO, we find significantly positive abnormal accruals only when lockup expiration falls in the same fiscal year as the IPO. We conclude that IPO year abnormal accruals are in fact related to lockup expiration, rather than to the IPO event, as has been suggested by prior research.

In multivariate analyses, using a panel dataset of firm-quarters that start after the IPO and span the lockup expiration quarter, we compare abnormal accruals around the lockup expiration with those from other quarters. Consistent with our univariate analyses, we find significant positive abnormal accruals in the quarter before and the quarter of the lockup expiration. We

[3] Ball and Shivakumar (2008) argue that strong growth in assets in young IPO firms introduces a small denominator problem when total assets as of the beginning of the fiscal period are used as a deflator. To address this concern, when estimating discretionary accruals, we deflate by the average total assets for the quarter.

include firm-fixed effects, which alleviate the concern that our results are driven by firm or IPO characteristics. Moreover, our evidence suggests that abnormal accruals reverse, which is consistent with earnings management as discussed by Dechow, Hutton, Kim, and Sloan (2012).

We next focus on cross-sectional variation in the intensity of earnings management prior to lockup expiration. We expect earnings management to be less pronounced for firms that are subject to stronger scrutiny and more pronounced if pre-IPO shareholders have strong selling incentives. We measure scrutiny using analyst following and litigation risk, and we construct an ex ante measure of selling incentives, based on a model proposed by Field and Hanka (2001).[4] This measure, predicted abnormal trading volume upon lockup expiration, is based on factors known to managers when they decide whether to manage earnings and eliminates the need for using actual post-lockup sales by pre-IPO shareholders, which are not readily available. It also mitigates reverse-causality concerns associated with actual sales (i.e., pre-IPO shareholders sell shares when inflated earnings result in higher stock price).

Our results indicate that abnormal accruals increase significantly in the quarter before lockup expiration among firms less heavily followed by analysts and those with lower litigation risk. We also find positive abnormal accruals only when pre-IPO shareholders are predicted to sell. In robustness tests, we confirm that these results hold when we use a noisier ex post measure of selling: realized abnormal trading volume upon lockup expiration. Thus we establish that both investor scrutiny and selling incentives influence manager's earnings management decisions.[5]

[4] Field and Hanka (2001) attribute the additional trading volume after lockup expiration to selling of previously locked up shares. Thus predicted abnormal trading volume is an appropriate proxy for selling incentives.

[5] Further tests show that investors do not unravel earnings management before lockup expiration: the stock price response to earnings is not significantly different if earnings are inflated with abnormal accruals.

In additional analyses, we find that abnormal accruals in the quarter before lockup expiration are positively related to the incidences of net selling by non-executive directors and beneficial owners, as long as officers do not sell shares themselves. Thus managers do not seem to inflate earnings to personally benefit from the trades, perhaps because of particularly high litigation risk associated with "pumping and dumping." Instead, their decision to inflate earnings is likely influenced by large, powerful pre-IPO shareholders and by the desire to maintain a positive outlook for the firm at the time of expected high selling pressure (Ertimur et al. 2014).[6,7]

Next, we examine two possible explanations for earnings management in the lockup expiration quarter. First, firms may continue to inflate earnings in the lockup expiration quarter so that earnings management does not unravel too quickly and attract scrutiny. However, we find a negative autocorrelation between abnormal accruals in the quarter before and the quarter of the lockup expiration, which is inconsistent with this explanation. Second, firms may manage earnings in the lockup expiration quarter only when pre-IPO shareholders cannot sell enough shares between the lockup expiration date and the next quarterly earnings announcement because of "blackout" restrictions on trading by insiders.[8] Consistent with this conjecture, we find that

[6] Morsfield and Tan (2006) show that VC-backed firms have lower abnormal accruals than non-VC-backed firms do. Our results do not contradict these findings and instead suggest that the incentives to report strong performance in anticipation of selling temporarily dominate the disciplining role of these investors with respect to financial reporting quality. In untabulated tests, we confirm that, on average across all quarters, VC-backed firms report lower abnormal accruals than non-VC-backed ones do. However, the former display the same inter-temporal pattern with a significant spike in accruals in the quarter before and the quarter of lockup expiration as the latter do. This is not to say that the effect pertains to all VC-backed firms—Wongsunwai (2013) finds that firms backed by highly reputable VCs do not manage earnings after the IPO.

[7] Consistent with pre-IPO shareholders' ability to influence managers' career outcomes, even after lockup expiration, in untabulated univariate analysis, we find that the likelihood of CEO turnover is significantly greater for firms with lower lockup expiration returns. In particular, based on a subsample of 468 firms covered by ExecuComp, the CEO turnover rate over the year following the lockup expiration is 7.9% for the subsample with lockup expiration returns in the bottom quartile, relative to 4.5% for the subsample with returns in the top three quartiles.

[8] Blackout restrictions typically prohibit insiders from selling shares starting, at a minimum, at the end of the fiscal period-end until the earnings announcement (Jagolinzer, Larcker, and Taylor 2011). During that period, insiders are privy to information about quarterly performance not yet released to the public. We define the period in which selling is restricted accordingly.

firms with trading restrictions have positive abnormal accruals in the lockup expiration quarter, which highlights the importance of selling incentives for earnings management.

In our final tests, we re-examine the role of earnings management in explaining long-run IPO underperformance (Teoh et al. 1998a). If high abnormal accruals before lockup expiration stem from earnings management, we expect the accruals to eventually reverse, leading to long-run negative abnormal returns. We partition firms into two groups, based on the magnitude of abnormal accruals in the quarter before lockup expiration. Based on traditional and bootstrapped p-values that adjust for distributional biases with long-run returns, we find that firms with high accruals earn significantly negative value-weighted buy-and hold returns (adjusted for size, industry, and market-to-book) over the one-, two-, and three-year windows following lockup expiration. Firms with low accruals do not experience significantly negative returns, and the difference in returns between the two groups is significant over all windows.[9]

An alternative nonmutually exclusive explanation for positive abnormal accruals in newly public firms is that firms invest the IPO proceeds or other sources of financing in growing the firm, and the associated increases in working capital manifest as higher abnormal accruals. While we control for IPO proceeds and for pre-IPO financing cash flows throughout our multivariate tests, we cannot rule out that investments in working capital affect the magnitudes of abnormal accruals we report, because we cannot control for the actual uses of IPO proceeds quarter by quarter due to data limitations.

Nevertheless, many of our time-series and cross-sectional results cannot be attributed to the investments in working capital. For example, we find reversals of abnormal accruals four quarters after the lockup expiration. We also find similar earnings management patterns in

[9] These results persist after we consider the effect of low cash flows on long-run underperformance, documented by Armstrong et al. (2016).

nonworking capital accruals: IPO firms report negative special items in all quarters except the quarter before the lockup expiration. While these items are subject to managerial discretion, they do not rely on abnormal accrual estimations. Finally, our cross-sectional results and the link between high abnormal accruals and long-run IPO underperformance also point to earnings management in anticipation of lockup expiration as opposed to a growth in accruals due to an investment of IPO proceeds.

Our paper makes several contributions to the literature. First, our study adds to the literature on earnings management, particularly to the stream of studies that examine accruals management around equity issues (e.g., Teoh et al. 1998a; Teoh et al. 1998b; DuCharme, Malesta, and Sefcik 2004; Katz 2009; Wongsunwai 2013; Fedyk, Singer, and Soliman 2017—see Healy and Wahlen (1999) and Dechow, Ge, and Schrand (2010) for an overview of this literature). We document that managers inflate earnings around the lockup expiration, resulting in a wealth transfer from less informed new investors to relatively better-informed pre-IPO shareholders, as is evidenced by the subsequent long-run underperformance.

Second, we unify the seemingly contradictory findings in the literature on earnings management around the IPO. Almost 20 years after the publication of the seminal paper by Teoh, Welch and Wong (1998a), there is still significant disagreement about whether, when, and why IPO firms manage earnings. Ball and Shivakumar (2008) and Venkataraman et al. (2008) find no evidence of earnings management *prior to* the IPO, casting doubt on earnings management to inflate the issue price. Armstrong et al. (2016) document positive abnormal accruals *in the IPO year*. They also find a relation between abnormal accruals and SEC Enforcement Actions, suggesting that at least some firms are managing earnings. Yet they do not find a link between the IPO year accruals and any incentives they study. They emphasize that the

absence thus far of conclusive evidence linking abnormal accruals to incentives has been the primary limitation of the earnings management explanation. We fill this gap in the literature by pinpointing the timing of abnormal accruals and relating it to trading incentives of pre-IPO shareholders.

Finally, we contribute to the literature on the role of lockup periods. Lockups are typically perceived as means to reduce information asymmetry between pre-IPO owners and new, less informed investors in public firms (Brav and Gompers 2003). Our study shows that lockups can create perverse incentives when they expire: pre-IPO shareholders exploit the information asymmetry by inflating earnings and selling shares at a more beneficial price.

## 2. Earnings management by IPO firms: literature and predictions

Teoh et al. (1998a and 1998b) provide evidence of high abnormal accruals in the year firms go public. They propose that earnings management at the time of the offering results in buyers paying too much, and, as more information about the firm is released over time, the firm experiences a price correction. In their study, Teoh et al. (1998a and 1998b) recognize that it would be ideal to measure accruals using pre-IPO data. However, data availability forces them to focus on the IPO year accruals. Subsequent studies confirm that accruals are abnormally high in the IPO year and also attribute these accruals to managers' incentives to manipulate earnings *before* stock issues (e.g., DuCharme et al. 2004).

Other studies question the typical interpretation of the findings in Teoh et al. (1998a and 1998b). The results of these studies suggest that intense scrutiny of firms' prospectuses makes firms report less, not more, aggressively in the year *prior to* IPO (Ball and Shivakumar 2008; Venkataraman et al. 2008). Note that researchers continue to document abnormal accruals in the IPO year and that these accruals are correlated with SEC enforcement actions (Armstrong et al.

2016). Moreover, while there does not appear to be a significant association between abnormal accruals in the IPO year and the issue price or trading by officers and directors, these abnormal accruals can be partly explained by strong growth experienced by the IPO firms (Armstrong et al. 2016).[10] Consequently, without clearly documented incentives for earnings management, the interpretation of positive abnormal accruals is ambiguous (Dechow et al. 2010).

Teoh et al. (1998a and 1998b) provide a number of potential reasons why firms might *maintain* earnings management after the IPO, including share sales by original entrepreneurs. They also mention that motivation to maintain earnings management might arise from (1) pressure to meet optimistic earnings projections made during road shows, (2) preventing the unraveling of earnings management to avoid lawsuits, or (3) pressure from investment bankers to report high earnings. Yet Teoh et al. (1998a and 1998b) do not empirically examine any of these explanations, leaving unanswered why IPO firms manage earnings in the IPO year. Wongsunwai (2013) studies the monitoring role of high reputation VCs and shows that firms backed by high quality VCs do not record positive abnormal accruals after the IPO. Wongsunwai (2013) also recognizes the importance of the lockup expiration, as he studies accruals over four phases, each encompassing multiple quarters, with the second phase ending before lockup expiration. However, the second phase includes all quarters after the IPO and before the lockup expiration. Thus any of the incentives to manage earnings discussed by Teoh et al. (1998a and 1998b) as well as the economic effects of post-IPO cash infusion can affect accruals from this period.[11] We

[10] The growth is fueled by the investment of IPO proceeds in the working capital, which, in turn, can be reflected in the measures of abnormal accruals.

[11] Wongsunwai (2013) focuses on the monitoring role of high reputation VCs and partitions his sample based on shareholder profiles of IPO firms, rather than on the selling incentives at lockup expiration. He interprets his finding that firms backed by large, reputable VCs exhibit lower abnormal accruals as evidence that high quality VCs constrain earnings management. However, this finding is also consistent with the alternative explanation that abnormal accruals result from strong post-IPO growth in working capital due to cash infusion from IPO proceeds. Specifically, IPO firms not backed by high quality VCs are more likely to invest their IPO proceeds in working capital, giving the appearance of earnings management. In contrast, firms backed by high quality VCs have better

contribute to the literature by clearly identifying the timing of abnormal accruals and linking these accruals to pre-IPO shareholders' selling incentives while controlling for the effect of the investment of IPO proceeds in the working capital.

Pre-IPO shareholders enter into voluntary lockup agreements that restrict their ability to sell shares for a specific period after the IPO. Most lockups expire 180 days after the IPO, and expiration is followed by intense selling by pre-IPO shareholders.[12] These sales by pre-IPO shareholders generate a large spike in trading volume (Field and Hanka 2001; Bradley, Jordan, Roten, and Yi 2001).[13]

We posit that the large-scale selling by pre-IPO shareholders, once the lockup expires, provide incentives for firms to manage earnings. These shareholders prefer that the firm present a positive financial performance in anticipation of the lockup expiration. Furthermore, many large pre-IPO shareholders, such as angel investors, private equity firms, and venture capitalists, exert lasting influence over managers and can pressure them to inflate accruals before lockup expiration. These shareholders provide funding and advice and often occupy board positions, influencing managerial compensation and career outcomes (Hellmann and Puri 2000, 2002; Cadman and Sunder 2014). In fact, standard contract terms between these investors and the firm frequently include provisions related to their access to detailed reporting as well as the right to hire and dismiss management (Barry et al. 1990; Gompers and Lerner 2004). Moreover, while these shareholders reduce their stakes after lockup expiration, they often maintain some ownership in the IPO firms as well as board positions for an extended period after the lockup

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access to capital pre-IPO, and their working capital accruals are less sensitive to the post-IPO cash infusion (Carpenter and Petersen 2002; Bertoni, Colombo, and Croce 2010).

[12] Lockup agreements are widespread and over time their length has been standardized to 180 days after the IPO. Brav and Gompers (2003) find lockup agreements in 99% of the firms in their sample of 2,871 IPOs. Field and Hanka (2001) report that the fraction of firms with a 180-day lockup period increased from 43% in 1988 to 91% in 1996.

[13] Volume initially increases to 185% of the previous average volume and eventually settles at a level approximately 40% higher than the lockup period volume.

expiration, making it likely that managers respond to their pressure (Gompers and Lerner 2004; Wongsunwai 2013).

Consistent with pre-IPO shareholders' ability to influence management, Ertimur, Sletten, and Sunder (2014) provide evidence that managers delay disclosure of bad news to enable pre-IPO shareholders to sell their shares at more favorable prices upon lockup expiration. These results indicate that strong selling incentives can temporarily dominate the monitoring role some of these pre-IPO shareholders play with respect to disclosure and financial reporting quality (Morsfield and Tan 2006).

Even in the absence of pre-IPO shareholders' direct influence, managers may choose to inflate earnings because it helps ensure sufficient demand from new shareholders to absorb the dramatic increase in the supply of shares at lockup expiration. While the managers also have incentives to sell their stock after the IPO, insider trading laws likely prevent them from managing earnings for personal gain (Ertimur et al. 2014). Thus earnings management, if any, is likely to be present at firms with significant selling by pre-IPO shareholders other than officers.

The incentive to manage earnings around lockup expiration is likely mitigated by scrutiny from investors, regulators, and financial intermediaries. Earnings management at firms followed by many analysts can be detected more easily, and so the costs of inflating financial performance for these firms likely outweigh the benefits. Furthermore, high litigation risk deters earnings management (Hopkins 2017). Consequently, we do not expect to find evidence of earnings management at firms most intensely followed by analysts and subject to high litigation risk.

## 3. Sample

To construct a sample of IPO companies, we first retrieve all IPOs from SDC over the 1990–2013 period.[14] We obtain offer dates from the "founding date" dataset provided by Jay Ritter. We retain IPOs with issue/offer dates within 30 days of the start date of price data on CRSP. As do Loughran and Ritter (2004), we focus on IPOs with an offer price of at least $5.00 and exclude ADRs, unit offers, closed-end funds, REITs, banks, S&Ls, and stocks not listed on CRSP. We obtain lockup expiration dates from SDC and supplement them with dates hand-collected from EDGAR filings when SDC indicates that an IPO is subject to a lockup but lists the lockup expiration date as missing. We impose the following additional sample selection criteria: (1) an earnings announcement cannot fall within the three days starting on the lockup expiration date, and (2) the lockup period does not exceed two years. To correctly identify the quarter that we expect to be subject to earnings management, we require the earnings announcement date for the quarter immediately preceding lockup expiration.

We use the modified cross-sectional Jones (1991) model (Dechow, Sloan, and Sweeney 1995) to measure abnormal accruals. First, we estimate the following specification for each industry (based on two-digit SIC codes), fiscal quarter, and fiscal year[15]:

$$\frac{Accruals_{i,q,t}}{Average\ TA_{i,q,t}} = \beta_0 \frac{1}{Average\ TA_{i,q,t}} + \beta_1 \frac{\Delta \mathrm{REV}_{i,q,t}}{Average\ TA_{i,q,t}} + \beta_2 \frac{PPE_{i,q,t}}{Average\ TA_{i,q,t}} + \varepsilon_{1,q,t}.$$

$Accruals_{i,q,t}$ is defined as earnings before extraordinary items (Compustat item *IBCY*) less cash flow from operations (Compustat item *OANCFY* minus Compustat item *XIDOCY*).[16] $\Delta REV_{i,q,t}$ is the change in total revenues (Compustat item *SALEQ*) between quarter *q-1* and

[14] We begin our sample period in 1990, as our measures of abnormal accruals are based on the information derived from the cash flow statement (Hribar and Collins 2002; Ball and Shivakumar 2008) and cash flow statement for interim periods (i.e., quarterly) was only required for the fiscal years ending after July 15, 1989.
[15] We exclude firms that had an IPO in the previous five years from the estimation.
[16] Because *IBCY*, *OANCFY*, and *XIDOCY* are year-to-date values, for fiscal quarters two through four, we adjust the values as the reported value in quarter *q* less the reported value in quarter *q-1*.

quarter *q*. $PPE_{i,q,t}$ is gross property, plant, and equipment (Compustat item *PPEGTQ*). Ball and Shivakumar (2008) point out that pre-IPO assets do not reflect the impact of IPO proceeds on total assets and therefore scaling by the pre-IPO total assets "artificially" inflates scaled post-IPO accruals. To alleviate this problem, we use average total assets (*Average* $TA_{i,q,t}$, Compustat item *ATQ*) over quarters *q* and *q-1*, instead of lagged assets, to scale all variables.

Next, we calculate expected and abnormal accruals for our sample firms as follows:

$$Expected\ Accruals_{i,q,t} = \widehat{\beta_0}\frac{1}{Average\ TA_{i,q,t}} + \widehat{\beta_1}\frac{\Delta \mathrm{REV}_{i,q,t} - \Delta \mathrm{REC}_{i,q,t}}{Average\ TA_{i,q,t}} + \widehat{\beta_2}\frac{PPE_{i,q,t}}{Average\ TA_{i,q,t}}$$

$$Abnormal\ Accruals_{i,q,t} = \frac{Accruals_{i,q,t}}{Average\ TA_{i,q,t}} - \ Expected\ Accruals_{i,q,t}.$$

$\Delta REC_{i,q,t}$ is the change in total receivables (Compustat item *RECTQ*) between quarter *q-1* and quarter *q*. To include a given firm quarter in our analyses, we require the availability of abnormal accruals, our primary variable of interest. This restriction results in an initial sample of 16,558 firm-quarters (corresponding to 3,495 IPOs), starting from the quarter before the IPO to four quarters after the lockup expiration.

Our univariate examination of abnormal accruals around the IPO issue date includes quarters starting from the quarter before the IPO quarter and ending four quarters after the IPO quarter (11,065 firm-quarters, corresponding to 3,417 IPOs). We identify the "announcement quarter" in which the IPO falls, $Quarter_{IPO}$, and define event quarters relative to $Quarter_{IPO}$.[17] Using announcement quarters, rather than fiscal quarters, allows us to determine which quarter's earnings information is publicly known at the time of the event of interest (i.e., IPO or lockup expiration). Figure 1 depicts the timeline of event quarters relative to the IPO.

In our primary analyses, we focus on the lockup expiration date and renumber the event

[17] An announcement quarter starts on the earnings announcement date of quarter *t-1* and ends on the day before the earnings announcement date of quarter *t*.

quarters, relative to that event (rather than the IPO). From the initial sample, we retain post-IPO announcement quarters starting from two quarters before and ending four quarters after the lockup expiration quarter. This allows us to examine abnormal accruals around the lockup expiration for the entire sample of IPO firms, no matter how many announcement quarters fall between the IPO and the lockup expiration.[18] After we require the availability of all control variables necessary for our multivariate analyses, the final number of announcement quarters in this sample is 10,726 (corresponding to 2,648 IPOs). Figure 2 depicts the timeline of event quarters, relative to the lockup expiration.

We provide descriptive statistics on the sample characteristics in Table 1. The average quarterly abnormal accruals scaled by average total assets are positive at 0.001, but we observe significant variation from -0.028 at the first quartile to 0.033 at the third quartile. The IPO firms in our sample are small growth firms, with median total assets of $68 million, return on assets of 2.9%, and book-to-market of 0.461. The average IPO proceeds are 90% of average assets, and 43% of the sample is backed by venture capitalists.

## 4. Research design and results

### *4.1. Timing of earnings management in IPO firms*

To reconcile with prior research, we begin by examining quarterly abnormal accruals around the IPO issue date. If IPO firms manage earnings to maximize IPO proceeds, we will observe income-increasing accruals in $Quarter_{IPO-1}$. This is because for earnings management to

[18] Ideally, we would number quarters relative to both the IPO and the lockup expiration and conduct a single set of univariate analysis. This, however, is not possible because the number of announcement quarters between the IPO quarter and the lockup quarter varies depending on (i) the length of the lockup period and (ii) when the issue date and the lockup expiration date fall relative to earnings announcements. While for the majority of IPO firms (52%), the lockup expires in $Quarter_{IPO+2}$, for 31% of the IPOs the lockup expires in $Quarter_{IPO+3}$, with the remaining 17% of lockup expirations falling in other event quarters, relative to the IPO. In additional tests in Section 4.1, to provide evidence on accruals quarter-by-quarter from before the IPO to after the lockup expiration in the same test, we use the most common case: the subsample of firms with lockup expiration in $Quarter_{IPO+2}$.

influence investors' assessment of the firm value at the time of the offering, earnings must be publicly announced by the issue date. In contrast, earnings for $Quarter_{IPO}$ are announced only after the issue date, by which time it is too late to influence the IPO price.

Table 2, Panel A, reports mean and median quarterly abnormal accruals from $Quarter_{IPO-1}$ to $Quarter_{IPO+4}$ for the full sample as well as a constant sample of firms represented in all quarters we analyze.[19] We find no evidence of upward earnings management in $Quarter_{IPO-1}$. Median abnormal accruals are not significantly different from zero at conventional levels, and mean abnormal accruals are significantly *negative* with a p-value less than 0.05. The results are thus inconsistent with IPO firms inflating earnings to secure a higher issue price. Our conclusion from the analysis of quarterly accruals is in line with the findings of Ball and Shivakumar (2008), Venkataraman et al. (2008), and Wongsuwai (2013), who compute accruals over more extended pre-IPO fiscal periods and do not find positive abnormal accruals before the IPO.

Interestingly, we observe positive and statistically significant (p-value less than 0.01 and 0.05 for the full and constant samples, respectively) mean and median abnormal accruals in $Quarter_{IPO+1}$ and $Quarter_{IPO+2}$. A typical lockup period lasts for 180 days from the issue date, and 83% of the lockup periods in our sample expire in $Quarter_{IPO+2}$ or $Quarter_{IPO+3}$. Thus the large abnormal accruals in $Quarter_{IPO+1}$ and $Quarter_{IPO+2}$ are consistent with earnings management occurring in anticipation of lockup expiration. We further analyze the subsample of firms for which the lockup expiration falls in $Quarter_{IPO+2}$ (52% of our sample), which allows us to precisely identify quarters, relative to both the IPO and the lockup expiration. Table 2, Panel B, reports the results. Consistent with our prior inferences, we observe negative mean abnormal accruals before the IPO ($Quarter_{IPO-1}$). Interestingly, we also find significant positive abnormal

[19] There are fewer observations for the $Quarter_{IPO-1}$ and $Quarter_{IPO}$ primarily because computing abnormal accruals for any quarter *t* using the cash flow statement approach requires data for both quarter *t* and quarter *t-1* and not all firms report cash flows for $Quarter_{IPO-1}$ and $Quarter_{IPO-2}$.

accruals in $Quarter_{IPO+1}$ (which corresponds to $Quarter_{Lockup-1}$) and $Quarter_{IPO+2}$ (which corresponds to $Quarter_{Lockup}$). This analysis provides preliminary evidence for our hypothesis that the timing of upward earnings management is in anticipation of lockup expiration.

Next, we turn our attention to quarterly abnormal accruals around the IPO lockup expiration date. We create two samples of firms: one that has data available for each firm in the sample in every period (Constant Sample) and one that removes this restriction (Full sample). We denote the announcement quarter in which the lockup expiration falls as $Quarter_{Lockup}$ (see Figure 2). Our focus is abnormal accruals in $Quarter_{Lockup-1}$. The earnings for this quarter are the last earnings information investors observe before the expiration of the lockup period.

Table 2, Panel C, reports the results. As expected, we find significant positive mean abnormal accruals in $Quarter_{Lockup-1}$. Median abnormal accruals are positive and significantly different from zero only for our full sample of firm-quarters. As in Panel B, we also observe significant positive abnormal accruals in $Quarter_{Lockup}$. Finally, we note significant negative abnormal accruals in $Quarter_{Lockup+4}$, suggesting that accruals reverse around that time. Overall, our univariate tests indicate that there is no upward earnings management in the quarter before the IPO but that young public firms manage earnings around lockup expiration.

A natural question is how our results reconcile with the original findings of Teoh et al. (1998a) and Armstrong et al. (2016). One possible explanation is that the positive abnormal accruals observed in the IPO year are driven by firms whose lockup expiration falls in the fiscal year of the IPO. To test this possibility, we measure annual abnormal accruals in the IPO year (as do Armstrong et al. (2016) and Teoh et al. (1998a)) over the same sample period of Armstrong et al. (1987–2006) and condition the analysis on whether the lockup expiration falls in the fiscal

year of the IPO.[20] We find that, when the lockup expires in the year after the IPO, the average abnormal accruals in the IPO year are not significantly different from zero (-0.001, with p-value of 0.81). However, when the lockup expires in the IPO year, the abnormal accruals are on average positive and significant (0.019, with p-value of 0.01). This suggests that abnormal accruals in the IPO year are at least partly driven by incentives created by the lockup expiration.

We next examine abnormal accruals around the lockup expiration in a multivariate framework:

$$\textit{Abnormal Accruals} = \beta_0 + \beta_1 \textit{Quarter}_{\textit{Lockup-1}} + \beta_2 \textit{Quarter}_{\textit{Lockup}} + \beta_{3\text{-}9} \textit{Controls} + \textit{Fixed Effects} + \varepsilon. \quad (1)$$

*Abnormal Accruals* denotes quarterly abnormal accruals obtained from the cross-sectional modified Jones model and adjusted for the growth in total assets, as explained in Section 3. $Quarter_{Lockup-1}$ is an indicator variable, which takes the value of one for the quarter prior to lockup expiration and zero otherwise. $Quarter_{Lockup}$ is an indicator variable, which takes the value of one for the quarter in which the lockup expiration date falls and zero otherwise. We single out these two quarters based on our univariate evidence that IPO firms display positive abnormal accruals both in the quarter before and the quarter of the lockup expiration. The intercept captures the other quarters ($Quarter_{Lockup-2}$, and $Quarter_{Lockup+1}$ through $Quarter_{Lockup+4}$ relative to lockup expiration). Thus the intercept is the benchmark we use to evaluate whether accruals depart from normal levels in time-series and not just vary in the cross-section.

We control for a number of variables that are likely to affect accruals: firm size, book-to-market ratio, and profitability (Fairfied, Whisenant, and Yohn 2003; Francis, LaFond, Olsson,

[20] While it would be ideal to compute annual accruals over the sample period used by Teoh et al., the annual cash flow statement was only required starting from 1987, precluding computation of cash-flow-statement-based accruals for the years prior to 1987. As explained by Hribar and Collins (2002), the balance sheet approach to computing accruals is problematic.

and Schipper 2005; Ashbaugh-Skaife, Collins, Kinney, and LaFond 2008). We also control for the fourth fiscal quarter because financial reporting attracts much more attention from financial intermediaries and investors in the fourth quarter and a firm's ability to manage earnings is likely to be more limited in that quarter (Baginski and Hasell 1990; Roychowdhury and Sletten 2012). To capture any other potential seasonality in accruals, we also include indicator variables for the first and second fiscal quarters, with the intercept capturing the third fiscal quarter. We also control for VC backing (Morsfield and Tan 2006; Wongsunwai 2013) and for IPO proceeds, to address the concerns that high abnormal accruals post-IPO can result from the investment of IPO proceeds in working capital (Ball and Shivakumar 2008; Armstrong et al. 2016). Since this same concern can also apply to pre-IPO financing cash flows, we also control for pre-IPO financing cash flows in our regressions.

We estimate two sets of regressions. In the first set, we include industry fixed effects and control for both time-variant and time-invariant variables described above. In the second set of regressions, we include firm fixed effects and control for the time-variant variables. In these regressions, firm fixed effects capture any other time-invariant firm characteristics, including VC-backing, IPO proceeds, and pre-IPO financing cash flows. In all regressions, we cluster standard errors by firm. See Appendix A for detailed descriptions of control variables.

Table 3 presents results from the estimation of equation (1). We first tabulate results without any control variables other than fixed effects. Next, we augment these specifications with the control variables described above. We find that the coefficients on $Quarter_{Lockup-1}$ and on $Quarter_{Lockup}$ are positive and statistically significant at the 1% level in all four specifications. Abnormal accruals are thus significantly higher in these two quarters than in other quarters, consistent with firms inflating earnings around lockup expiration. The coefficient on

*Quarter*$_{Lockup\text{-}1}$ suggests that, depending on the specification, abnormal accruals are inflated in this quarter, relative to other quarters, by about 0.7 to 1% of average total assets. The magnitude we document is thus both plausible and economically meaningful.

Control variables are generally significant and in the expected direction: larger firms, those with higher book to market ratios, and those backed by VCs have lower levels of abnormal accruals. The fourth fiscal quarter is characterized by lower abnormal accruals. Finally, IPO proceeds and pre-IPO financing cash flows are positively related to abnormal accruals, indicating that there is a link between the investments in the working capital and the measures of abnormal accruals. Importantly, even after controlling for that link, there is evidence of higher accruals in the quarter prior to and the quarter of lockup expiration.

*4.2. Effect of analysts' scrutiny and litigation risk on IPO firms' earnings management*

If the positive abnormal accruals in the quarter before and the quarter of the lockup expiration stem from earnings management, we expect the documented patterns to be less pronounced for firms where the costs of earnings management are relatively larger. We argue that firms with high analyst following or firms subject to greater litigation risk are likely to have larger costs associated with earnings management.

To measure these costs, we classify a firm-quarter as characterized by *High Analyst Following* if the firm's analyst following as of *Quarter*$_{Lockup\text{-}1}$ is in the top quartile of the distribution and as *Low Analyst Following* otherwise. We estimate a modified version of Equation (1) in which we replace *Quarter*$_{Lockup\text{-}1}$ with two terms: *High Analyst Following* x *Quarter*$_{Lockup\text{-}1}$ and *Low Analyst Following* x *Quarter*$_{Lockup\text{-}1}$. The results of this estimation are reported in Table 4, Panel A. The coefficients on *Low Analyst Following* x *Quarter*$_{Lockup\text{-}1}$ are positive and significant at the 1% level (Panel A of Table 4). In contrast, abnormal accruals in

firms subject to high analyst scrutiny (captured by the coefficient on *High Analyst Following* x $Quarter_{Lockup-1}$) are not significantly different from zero. Moreover, the coefficients on *High Analyst Following* x $Quarter_{Lockup-1}$ and *Low Analyst Following* x $Quarter_{Lockup-1}$ are significantly different from each other before imposing firm fixed effects.

We then repeat this process using *High Litigation* and *Low Litigation*. *High Litigation* (*Low Litigation*) takes the value of one (zero) if the predicted value from Kim and Skinner's (2012) litigation-risk model as of $Quarter_{Lockup-1}$ is in the top quartile of the distribution. The results of the partition on litigation risk are reported in Table 4, Panel B. We observe positive and statistically significant coefficients on *Low Litigation*, while the coefficients on *High Litigation* are not significantly different from zero. The evidence of positive abnormal accruals is thus concentrated in those firms that are not subject to high litigation risk. Overall, these results suggest that firms subject to less scrutiny from financial analysts and lower litigation risk are more likely to manage earnings before lockup expiration.

*4.3. The role of selling incentives*

We conjecture that the positive abnormal accruals in the quarter preceding lockup expiration result from earnings management to benefit pre-IPO shareholders who significantly reduce their share-holdings upon lockup expiration. If that is indeed the case, we should observe a positive relation between accruals in the quarter preceding lockup expiration and the intensity of selling incentives of pre-IPO shareholders.

In our analyses so far, we use event time indicators to proxy for the presence of selling incentives. In this section, we allow for cross-sectional variation in the intensity of selling incentives. The main empirical challenge we face is the potential endogenous relation between earnings management and post-lockup-expiration sales by pre-IPO shareholders. Managers who

anticipate sales by pre-IPO shareholders may inflate earnings announced right before lockup expiration. At the same time, pre-IPO shareholders are likely to sell shares after lockup expiration only when the latest earnings announcement was favorable enough to secure a high price for the shares, that is, earnings management was successful in inflating the stock price. To address this issue, we first use an ex ante measure of selling incentives: predicted abnormal trading volume upon lockup expiration.[21]

Our abnormal volume prediction model is based on the work of Field and Hanka (2001) and Ertimur et al. (2014) and uses independent variables known prior to lockup expiration. We estimate this model for the sample of IPO firms for which all the above variables are available—see Appendix B for the estimation results and Appendix A for a description of variables. We use the coefficients from this model to construct predicted abnormal trading volume for each firm in our final sample.

To examine whether positive abnormal accruals in the quarter before lockup expiration are related to selling incentives, we modify equation (1) and split $Quarter_{Lockup-1}$ into two groups: those with positive predicted abnormal trading volume (*High Selling Incentives* x $Quarter_{Lockup-1}$) and those with zero or negative predicted abnormal trading volume (*Low Selling Incentives* x $Quarter_{Lockup-1}$). If there is a link between selling incentives at lockup expiration and abnormal accruals in the quarter leading up to it, we expect to find significant positive abnormal accruals for *High Selling Incentives* x $Quarter_{Lockup-1}$ but not for *Low Selling Incentives* x $Quarter_{Lockup-1}$.

The results in Table 5, Panel A, are consistent with our expectations—the coefficient on *High Selling Incentives* x $Quarter_{Lockup-1}$ is positive and significant and the coefficient on *Low Selling Incentives* x $Quarter_{Lockup-1}$ is insignificant. The two coefficients are significantly

[21] The IPO literature considers abnormal trading volume shortly after lockup expiration as arising from the sales by pre-IPO shareholders (Field and Hanka 2001; Bradley et al. 2001; Ertimur et al. 2014).

different from each other, with a p-value of less than 0.05. These results point to a link between positive abnormal accruals in the quarter before lockup expiration and selling incentives of pre-IPO shareholders.

In robustness tests, we replace predicted abnormal trading volume with realized abnormal trading volume. We split $Quarter_{Lockup-1}$ into two groups: those with positive abnormal trading volume (*High Trading Volume* x $Quarter_{Lockup-1}$) and those with zero or negative abnormal trading volume (*Low Trading Volume* x $Quarter_{Lockup-1}$). The results of this test are presented in Table 5, Panel B. Consistent with our inferences from Panel A, we find significant positive abnormal accruals in the quarter before lockup expiration only for the *High Trading Volume* subsample. The Wald tests, however, fall short of finding the difference between the coefficients.[22]

In our last set of tests on selling incentives, we investigate whether abnormal accruals in the quarter before lockup expiration are related to sales by officers, nonexecutive directors, and beneficial owners of at least 10 percent of shares outstanding who are required to file Form 4 with the SEC. As discussed before, given particularly high litigation risk associated with "pumping and dumping," we do not expect officers to benefit personally from inflating the stock price around lockup expiration (Ertimur et al. 2014; Armstrong et al. 2016). As for the nonexecutive directors and beneficial owners, their sales create incentives to inflate earnings before lockup expiration but are subject to insider trading regulations, so whether their sales are linked to abnormal accruals is ultimately an empirical question.

We obtain Form 4 data from Thomson Reuters. Using this data, we interact $Quarter_{Lockup-1}$ with the following indicator variables: (1) sales by officers but no sales by nonexecutive

[22] Note realized abnormal trading volume is subject to significant look ahead bias and is a much nosier measure of selling incentives, reducing the power of our tests.

directors and beneficial owners in the lockup quarter (*Officer Only Sales*), (2) sales by nonexecutive directors and beneficial owners but not officers in the lockup quarter (*Ben. Own. & Non-Exec. Dir. Only Sales*), (3) sales by officers and nonexecutive directors and beneficial owners in the lockup quarter (*Officer and Ben. Own. & Non-Exec. Dir. Sales*), and (4) no sales filed on Form 4 for the lockup quarter (*No Form 4 Sales*).

The results, reported in Table 6, provide evidence of significant positive abnormal accruals in the quarter before lockup expiration when there are sales by beneficial owners or non-executive directors but no officer selling. $Quarter_{Lockup-1}$ x *Ben. Own. & Non-Exec. Dir. Only Sales* is positive and significant at the 5% level. Furthermore, the coefficients on $Quarter_{Lockup-1}$ x *Officer Only Sales* and on $Quarter_{Lockup-1}$ x *Officer and Ben. Own. & Non-Exec. Dir. Sales* are not significantly different from zero, suggesting that the threat of litigation prevents managers from managing earnings when they sell shares themselves. Finally, we find a significant positive coefficient on $Quarter_{Lockup-1}$ *x No Form 4 Sales*. This coefficient captures abnormal accruals when there were no insider sales reported to the SEC on Form 4. Such cases include sales by those pre-IPO shareholders that hold and sell significant stakes in the firm as long as their holdings account for less than 10 percent of shares outstanding. In these cases, incentives to inflate earnings are still present while litigation risk is mitigated.

Overall, we find support for the link between high abnormal accruals in $Quarter_{Lockup-1}$ and the selling by pre-IPO shareholders. The evidence also indicates that personal gain of officers is unlikely to explain positive abnormal accruals in $Quarter_{Lockup-1}$.

*4.4. Earnings management in the quarter of lockup expiration*

Consistent with our expectations, so far we have provided evidence of positive abnormal accruals in the quarter before lockup expiration. In addition, we document positive abnormal

accruals in the quarter of lockup expiration, a result that warrants further investigation. In this section, we examine two possible explanations for this finding: (1) firms continue to inflate earnings in the quarter of lockup expiration to prevent the prior quarter earnings management from unraveling too quickly and attracting scrutiny, and (2) firms manage earnings in the quarter of lockup expiration when pre-IPO shareholders cannot sell shares between lockup expiration date and the next quarterly earnings announcement.

To test the first explanation, we analyze the relation between abnormal accruals in the quarter before and the quarter of lockup expiration. If earnings management observed in the quarter after the lockup expires is to prevent prior earnings management from becoming apparent, we would expect to find a positive association between abnormal accruals from these two adjacent quarters. To test this hypothesis, we re-estimate equation (1) with one modification: we split the indicator variable for the lockup quarter ($Quarter_{Lockup}$) into two groups depending on whether the abnormal accruals in the quarter before lockup expiration are in the top quartile of the distribution. The coefficient on *High Lag Accruals* x $Quarter_{Lockup}$ (*Low Lag Accruals* x $Quarter_{Lockup}$) captures abnormal accruals in the lockup expiration quarter for firms with abnormal accruals in the previous quarter falling in (below) the top quartile of the distribution.

Table 7, Panel A, presents the results.[23] We find no support for the explanation that firms that engage in earnings management in the quarter before lockup expiration continue to do so in the quarter of lockup expiration. The coefficient on *High Lag Accruals* x $Quarter_{Lockup}$ is negative, while that on *Low Lag Accruals* x $Quarter_{Lockup}$ is positive and highly statistically significant, indicating that firms that did not manage earnings up in $Quarter_{Lockup-1}$ display positive abnormal accruals in $Quarter_{Lockup}$. The coefficients corresponding to the two groups of

[23] Because we require the availability of accruals from quarter minus one in addition to our regular set of control variables, our sample declines to 8,556 observations.

firms are significantly different from each other. (See Wald test reported in Panel A.) Overall, the results from this test suggest a substitution between earnings management in $Quarter_{Lockup-1}$ and $Quarter_{Lockup}$.

We try to understand this substitution further by relating the timing of abnormal accruals to selling restrictions. First, insider sales are subject to volume limitations of Rule 144.[24] Second, diversifying shareholders may prefer to execute a number of smaller trades, potentially spread over more than one quarter, to avoid a negative price impact from their sales. Finally, many firms have blackout provisions which prevent insiders from selling shares when in possession of material private information, typically between the fiscal period-end and the earnings announcement (Jagolinzer, Larcker, and Taylor 2011). These provisions may not apply to all pre-IPO shareholders, but many influential shareholders, such as VCs and angel, private equity, and institutional investors, are represented on boards and are thus potentially prevented from selling during blackouts. To the extent that the trading window in the lockup expiration quarter is shortened by blackout restrictions, pre-IPO shareholders will shift (some of) their trades to the subsequent quarter ($Quarter_{Lockup+1}$). This would make the lockup quarter earnings relevant for influencing the stock price at which pre-IPO shareholders sell in the subsequent quarter.

To examine this explanation empirically, we create two indicator variables, *Trading Restricted* and *Trading Not Restricted*, which partition firm-lockup quarter observations based on pre-IPO shareholders' ability to sell shares in the lockup expiration quarter. *Trading Restricted* (*Trading Not Restricted*) takes the value of one (zero) if there are seven or fewer (more than seven) days between the lockup expiration date and the fiscal period end-date of the lockup

[24] Under Rule 144, in any quarter an insider is prohibited from selling shares that exceed the greater of 1 percent of the total shares outstanding or the average weakly trading volume.

quarter and there are no sales by insiders.[25,26] We then modify equation (1) by replacing $Quarter_{Lockup-1}$ and $Quarter_{Lockup}$ with the following interaction terms: *Trading Not Restricted* x $Quarter_{Lockup-1}$ and *Trading Restricted* x $Quarter_{Lockup-1}$, *Trading Not Restricted* x $Quarter_{Lockup}$ and *Trading Restricted* x $Quarter_{Lockup}$.

The results of this estimation, reported in Table 7, Panel B, show that abnormal accruals are positive and significant in $Quarter_{Lockup-1}$ only when trading is not restricted in the period immediately following lockup expiration. However, when trading is restricted after lockup expiration, abnormal accruals are positive and significant in the lockup expiration quarter, consistent with some pre-IPO shareholders delaying sales until after the lockup quarter earnings announcement. The coefficients on *Trading Restricted* x $Quarter_{Lockup-1}$ and *Trading Not Restricted* x $Quarter_{Lockup-1}$ are significantly different from each other at the 5% level in the first model. However, the difference between the coefficient on *Trading Not Restricted* x $Quarter_{Lockup}$ and *Trading Restricted* x $Quarter_{Lockup}$ is not statistically significant. Because data on the specific blackout periods for each company is not available, our proxy captures trading restrictions with some measurement error. Overall, our findings indicate that IPO firms inflate earnings ahead of the quarter when pre-IPO shareholder sales are likely.

## 5. Robustness tests and additional analyses

### *5.1. Alternative measures of abnormal accruals*

In this section, we describe our results based on four alternative measures of abnormal accruals: (1) accruals reversal measure proposed by Dechow, Hutton, Kim, and Sloan (2012), (2) performance-matched discretionary accruals (Kothari, Leone, and Wasley 2005), (3) size-age-

[25] Note that earnings from $Quarter_{Lockup-1}$ are less salient as the earnings announcement of $Quarter_{Lockup}$ approaches.
[26] Our results are qualitatively similar when using one, three, and five days as alternative thresholds.

growth-adjusted accruals (Armstrong et al. 2016), and (4) abnormal accruals based on the model proposed by Dechow and Dichev (2002) and McNichols (2002).

The accrual reversal measure alleviates the concern that the modified Jones model suffers from low power (Dechow, Hutton, Kim, and Sloan 2012), which biases against finding evidence of earnings management in anticipation of the lockup expiration. It is difficult to know exactly when accruals reverse. Following Dechow et al. (2012) we assume that accruals reverse one year (four quarters) from the quarter in which earnings management took place. This assumption seems justified, given our univariate evidence (Table 2, Panel C) of negative abnormal accruals four quarters after the lockup expiration quarter. We thus re-estimate our main model after adding two indicator variables: $Quarter_{Lockup+3}$ and $Quarter_{Lockup+4}$. We then subtract the sum of the coefficients on $Quarter_{Lockup+3}$ and $Quarter_{Lockup+4}$ from the sum of the coefficients on $Quarter_{Lockup}$ and $Quarter_{Lockup-1}$ and test whether the resulting number is different from zero. We find the difference is significantly positive with p-value less than 0.01.

We next focus on performance-matched and size-age-growth-matched abnormal accruals. For these two measures of abnormal accruals, we match each observation in our IPO sample with a non-IPO firm based on fiscal year, fiscal quarter, two-digit SIC code, and the relevant firm-characteristic(s) (i.e., earnings before extraordinary items scaled by average total assets, in the case of performance-matched accruals, and a propensity score based on average total assets, the number of years since the firm was founded, and sales growth in the case of size-age-growth-matched accruals).[27] We then calculate accruals as the difference in modified Jones model accruals between the IPO firm and its matched control. Using these matching procedures results

[27] Similar to Armstrong et al. (2016), for performance-matched accruals, we exclude observations where the absolute difference in earnings before extraordinary items scaled by average total assets between an IPO firm and its matched control is more than 0.10. For size-age-growth-matched accruals, we follow the matching algorithm described on p. 1326 of Armstrong et al. (2016), i.e., we keep the match that minimizes the squared difference in propensity scores between the IPO firm-quarter and the non-IPO firm-quarter.

in significantly smaller samples but still yields $Quarter_{Lockup-1}$ significantly positive in three out of four of our main models for both performance- and size-age-growth-matched accruals.

Finally, we repeat our tests using abnormal accruals based on the model proposed by Dechow and Dichev (2002) and McNichols (2002). In these tests, we expand the modified Jones model to include contemporaneous as well as lagged and lead quarterly cash flows. We find that our multivariate results are fully robust to using this alternative measure of abnormal accruals. In summary, the spike in quarterly abnormal accruals before lockup expiration is detectable using various discretionary accrual models and cannot be attributed to one particular model.[28]

*5.2. Earnings management and earnings announcement returns*

Earnings management prior to lockup expiration is beneficial only if investors do not unravel it and if inflated earnings translate to higher stock valuations. We therefore examine whether the stock price response to earnings (earnings response coefficient or ERC) differs between firms that report high accruals in the quarter before lockup expiration versus other firms. We regress abnormal returns in the three-day window around earnings announcement for $Quarter_{Lockup-1}$ on the earnings surprise (*Earnings Surprise*) and an interaction of earnings surprise and an indicator variable capturing abnormal accruals in the top quartile of the distribution in $Quarter_{Lockup-1}$ (*High Accruals*). The number of observations in this analysis declines as a result of requiring IBES data to compute *Earnings Surprise*. The results are reported in Table 8. We find that the coefficient on earnings surprise is positive and significant, as expected, while the coefficient on the interaction terms is indistinguishable from zero. Thus

[28] Recent literature expresses concerns about the two-stage approach to estimating abnormal accruals (Chen, Hribar, Malessa 2017). To address these concerns, we follow the procedure suggested by Chen et al. (2017) and regress the residual from the first-step of the modified Jones model on the combination of all independent variables from Table 3 as well as all the first-step regressors (including *industry*quarter* fixed effects). Our results are robust to this correction.

investors do not appear to see through the earnings management. Instead, they value earnings of all firms in $Quarter_{Lockup-1}$ similarly, regardless of the extent of abnormal accruals.

*5.3. Earnings management and long-run stock performance*

To the extent that high abnormal accruals cause the stock price at the time of lockup expiration to be overstated, relative to its fundamental value, then over time, as information about the firm's true earnings arrives, the stock price will decline, resulting in negative long-run returns. Using two subsamples split on the median level of abnormal accruals in $Quarter_{Lockup-1}$, we compute the long-run abnormal buy-and-hold returns over 12, 24, and 36 months, starting in the month following the lockup expiration. We compute the abnormal returns as the value-weighted average monthly size- and book-to-market-adjusted buy-and-hold returns.[29]

Table 9, Panel A, reports these returns. We find negative abnormal buy-and-hold returns over the one-, two-, and three-year windows after lockup expiration for firms with high abnormal accruals in $Quarter_{Lockup-1}$. These returns are statistically significant using both standard and bootstrapped p-values.[30] In contrast, abnormal returns over the 24- and 36-month periods are not significantly different from zero for the subsample of firms with low abnormal accruals and significantly positive over the 12-month period using standard p-values. Finally, long-run returns for firms with high and low abnormal accruals are significantly different from each other. In unreported tests, we use calendar-time portfolios as recommended by Mitchell and Stafford (2000). We group firms in each of the subsamples based on abnormal accruals in $Quarter_{Lockup-1}$ into portfolios by event month. A given firm enters the portfolio for all months that fall in the window for long-run returns computation. We regress the calendar portfolio excess returns (value-weighted monthly returns) on the momentum and three Fama-French factors. We find that

[29] Inferences are unchanged when we use equal-weighted average abnormal buy-and-hold returns (not tabulated).
[30] We describe our bootstrapping procedure in Table 9.

the portfolio alpha is negative and significant for the first 12 months following the lockup expiration, but it is not significant over the 24- and 36-month horizon.

Finally, we address the concern that the relation between high accruals and negative long-run returns is driven by low cash flows generated by firms with high accruals (Armstrong et al. 2016). We split the subsample of firms with high accruals into two groups based on the median cash flow from operations. If the documented negative long-run returns is driven by cash flows alone, we would find significant negative returns for firms with high accruals only in the subsample with below median cash flows. Instead, as reported in Table 9, Panel B, we find significant negative long-run returns both in the high-cash-flow and in the low-cash-flow group, providing reassurance that high accruals in $Quarter_{Lockup-1}$ indeed affect the long-run returns after lockup expiration. For completeness, we also report the results for the subsample of firms with below median accruals. We do not observe any significant abnormal returns in that subsample.

*5.4. Special items and restructuring charges*

All of our results so far have relied on abnormal accruals to capture managers' discretion in financial reporting. In supplemental tests, we examine patterns in special items and restructuring charges, which can also be subject to managerial discretion but do not rely on the estimation of discretionary accruals and are less susceptible to being affected by firm growth. For example, managers can time inventory write-offs or restructuring charges to avoid these negative charges before lockup expiration. In Table 10, we report the mean *Special Items and Restructuring Charges* by quarter, relative to the lockup expiration date. $Quarter_{Lockup-1}$ is the only quarter for which we do not observe significantly negative *Special Items and Restructuring Charges*. Interestingly, the magnitude of these items is particularly high about one year later, in

quarters $Quarter_{Lockup+3}$ and $Quarter_{Lockup+4.}$ These findings confirm the tenor of our results with a measure that does not rely on the computation of abnormal accruals.

## 6. Conclusion

We examine quarterly abnormal accruals of newly public firms around the IPO and the lockup expiration dates. Our findings show that, while firms do not display positive abnormal accruals in anticipation of the IPO issue date, they manage earnings in the quarter before and the quarter of the lockup expiration. Our analyses establish a link between earnings management by IPO firms and the selling incentives of pre-IPO shareholders. Using the lockup expiration event to capture the incidence of selling incentives and the predicted volume of share sales by pre-IPO shareholders to proxy for the intensity of selling incentives, we find evidence consistent with firms managing earnings ahead of anticipated selling. Furthermore, firms report positive abnormal accruals before lockup expiration when influential pre-IPO shareholders (non-executive directors and beneficial owners) sell shares.

We find positive abnormal accruals around the lockup expiration only at less scrutinized firms, consistent with attention from investors, intermediaries, and regulators mitigating firms' incentives to manage earnings. Finally, we document that long-run IPO underperformance relates to abnormal accruals reported at the time of lockup expiration. Firms with high accruals in the quarter before lockup expiration subsequently experience significant negative abnormal returns over 12-, 24-, and 36-month windows following the lockup expiration. In contrast, long-run returns in firms with low abnormal accruals are not significantly different from zero. While it is beyond the scope of our paper to examine mechanisms that enable this predictability in long-run returns to persist, short-sales constraints likely play a role (Patatoukas, Sloan, and Wang 2017).

Overall, our evidence speaks to the exact timing and motivation behind earnings management at IPO firms: firms attempt to inflate the stock price in anticipation of selling by pre-IPO shareholders. Our research addresses seemingly contradicting conclusions from the literature. While Teoh et al. (1998a) find positive abnormal accruals in the IPO year and link these accruals to long-run IPO underperformance, Ball and Shivakumar (2008) argue that IPO year accruals affect earnings that are announced after the IPO—too late to influence the issue price. Instead of managerial discretion, they attribute abnormal accruals in the year of the IPO to economic growth and investment of IPO proceeds in working capital. In addition, Ball and Shivakumar (2008) and Venkataraman et al. (2008) find that firms report *conservatively* in the year before the IPO. Consistent with these studies, we find no positive abnormal accruals in the quarter preceding the IPO. However, even after controlling for the investment of IPO proceeds, we find evidence of positive abnormal accruals in the year of the IPO—in the quarter before and the quarter of lockup expiration. Linking these accruals to selling incentives of pre-IPO shareholders and showing that they are mitigated by market scrutiny allows us to conclude that at least some of these accruals reflect managerial discretion. Thus we unify the seemingly contradictory findings in the literature and contribute to the debate on whether firms manage earnings around the IPO.

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**Appendix A – Variable Definitions**

| Variable Name | Variable Definition |
|---|---|
| *Abnormal Accruals* | Quarterly abnormal accruals from the modified cross-sectional Jones model. Accruals are obtained from the statement of cash flows and the model is further modified to deflate by average total assets in quarter t, rather than total assets at the end of quarter t-1. Source: Compustat. |
| *Abnormal Volume* | The average daily abnormal trading volume multiplied by the number of days in the trading window (lockup expiration day and the following day). The average daily abnormal trading volume is the difference between the average volumes over the trading window and days -50 to -6, relative to the lockup expiration, scaled by shares outstanding. Source: CRSP. |
| *Analyst Following* | Number of analysts that issue at least one one-quarter-ahead earnings forecast for the firm during the announcement quarter. Source: IBES. |
| *Ben. Own. & Non-Exec. Dir. Only Sales* | An indicator variable that equals one if the number of shares sold by company beneficial owners and non-executive directors in the following quarter (*Quarter* $_{Lockup}$) exceeds the number of shares purchased by these owners and if there are no net sales by officers over the same period. Source: Thomson Financial. |
| *Book-to-Market* | Book value of equity scaled by market capitalization for a given quarter. Source: Compustat. |
| *Buy -Hold Abnormal Returns* | Buy-and-hold abnormal returns over 12, 24, and 36 months starting in the month following the lockup expiration. The abnormal returns are computed as the value-weighted average monthly size- and book-to-market-adjusted buy-and-hold returns. Source: CRSP. |
| *CAR around EA Quarter*$_{Lockup-1}$ | The market-adjusted cumulative abnormal returns over the [-1,+1] window around the earnings announcement in *Quarter*$_{Lockup-1}$. Source: CRSP. |
| *Earnings Surprise* | Actual earnings less median one-quarter ahead analyst forecast (for *Quarter*$_{Lockup-1}$) scaled by the absolute value of the actual earnings. At least two analysts are required to compute the median forecast. Source: IBES. |
| *High Lag Accruals* | An indicator variable that takes the value of one if abnormal accruals in *Quarter* $_{Lockup-1}$ are in the top quartile, zero otherwise. |
| *High Analyst Following* | An indicator variable that takes the value of one if *Analyst Following* are in the top quartile, zero otherwise. Source: IBES. |
| *High Litigation Risk* | An indicator variable that takes the value of one if *Litigation Risk* in *Quarter* $_{Lockup-1}$ is in the top quartile, zero otherwise. Source: Compustat, CRSP. |
| *High Selling Incentives* | An indicator variable that takes the value of one if predicted abnormal volume is greater than zero. |

| | |
|---|---|
| *High Trading Volume* | An indicator variable that takes the value of one if realized abnormal volume is greater than zero. |
| *High Tech* | An indicator variable that equals one for firms in the following SIC industries: 2833, 2834, 2835, 2836, 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, and 7373. Source: Compustat. |
| *Litigation Risk* | Predicted value from the litigation risk model in Kim and Skinner (2012). Predicted value is based on model (3) reported in Table 7 on p. 302. Source: Compustat, CRSP. |
| *Lockup Length* | Number of days between the issue date and the lockup expiration date. Source: SDC. |
| *Low Analyst Following* | An indicator variable that takes the value of one if *Analyst Following* is below the top quartile, zero otherwise. Source: IBES. |
| *Low Lag Accruals* | An indicator variable that takes the value of one if abnormal accruals in *Quarter* $_{Lockup-1}$ are below the top quartile. |
| *Low Litigation Risk* | An indicator variable that takes the value of one if *Litigation Risk* in *Quarter* $_{Lockup-1}$ is below the top quartile, zero otherwise. Source: Compustat, CRSP. |
| *Low Selling Incentives* | An indicator variable that takes the value of one if predicted abnormal volume is equal to or less than zero. |
| *Low Trading Volume* | An indicator variable that takes the value of one if realized abnormal volume is equal to or less than zero. |
| *% of Shares Locked* | One minus the percentage of shares outstanding sold in the IPO, following Field and Hanka (2001). Source: SDC. |
| *No Form 4 Sales* | An indicator variable that equals one if no officers or beneficial owners and non-executive directors reported net sales of shares in the following quarter (*Quarter* $_{Lockup}$). Source: Thomson Financial. |
| *Officer Only Sales* | An indicator variable that equals one if the number of shares sold by company officers in the following quarter (*Quarter* $_{Lockup}$) exceeds the number of shares purchased by the officers. Source: Thomson Financial. |
| *Officer and Ben. Own. & Non-Exec. Dir. Sales* | An indicator variable that equals one if both officers and beneficial owners or non-executive directors had net sales of shares in the following quarter (*Quarter* $_{Lockup}$). Source: Thomson Financial. |
| *Predicted Abnormal Volume* | Predicted value from the abnormal volume model in Appendix B. |
| *Pre-IPO Financing CF* | Financing cash flow from the year before the IPO deflated by average total assets. Source: Compustat. |
| *Proceeds* | IPO proceeds divided by average total assets for the fiscal year encompassing the IPO. Source: SDC, Compustat. |
| *Quarter 1* | An indicator variable that equals one for the first fiscal quarter, zero for the remaining fiscal quarters. Source: Compustat. |

| | |
|---|---|
| *Quarter 2* | An indicator variable that equals one for the second fiscal quarter, zero for the remaining fiscal quarters. Source: Compustat. |
| *Quarter 4* | An indicator variable that equals one for the fourth fiscal quarter, zero for the remaining fiscal quarters. Source: Compustat. |
| *Quarter* $_{Lockup-1}$ | An indicator variable that equals one for the last announcement quarter for which earnings announcement precedes lockup expiration. SOURCE: SDC, Compustat. |
| *Quarter* $_{Lockup}$ | An indicator variable that equals one for the announcement quarter that encompassed lockup expiration date. SOURCE: SDC, Compustat. |
| *Return on Assets* | Income before extraordinary items for a given year scaled by the average total assets for the year. Source: Compustat. |
| *Run-up* | Natural logarithm of one plus market adjusted buy-and-hold returns over the window starting five days after the issue date of the IPO and ending on the fiscal quarter end-date of the quarter before lockup expiration. Source: CRSP. |
| *Size* | Log of total assets at the beginning of quarter t. Source: Compustat. |
| *Special Items & Rst. Charges* | The sum of special items (Compustat item SPIQ) and restructuring charges (Compustat item RCPQ) for quarter t scaled by average total assets for the quarter. We assume zero in place of missing values. Source: Compustat. |
| *Top-tier Underwriter* | An indicator variable that equals one if the underwriter for the IPO has a modified Carter-Manaster rank of 9.1 (Carter and Manaster 1990; Loughran and Ritter 2004). We thank Jay Ritter for making the data available at http://bear.cba.ufl.edu/ritter/ipolink.htm. |
| *Trading Restricted* | An indicator variable that takes the value of one if there are seven or fewer days between the lockup expiration date and the fiscal period end-date of the lockup quarter and there are no insider sales in that period. Source: SDC, Compustat. |
| *Trading Not Restricted* | An indicator variable that takes the value of one if there are more than seven days between the lockup expiration date and the fiscal period end-date of the lockup quarter or there are fewer than seven days but there are insider sales during that period. Source: SDC, Compustat. |
| *Venture Capital Backed* | An indicator variable that equals one if the firm is venture capital backed, zero otherwise. Source: SDC. |

## Appendix B – Abnormal Trading Volume Prediction Model

The following table presents the results from an OLS regression in which *Abnormal Volume* is the dependent variable. The sample consists of 3,011 IPO-firm-lockup expiration quarters over the 1990–2013 period. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. All variables are defined in Appendix A.

| | *Dependent Variable = Abnormal Volume* | | |
|---|---|---|---|
| **Variable** | **Coefficient** | | **t-statistic** |
| *Intercept* | -0.0779 | *** | -2.37 |
| *Run-up* | 0.0242 | *** | 3.39 |
| *Venture Capital Backed* | 0.0464 | *** | 6.21 |
| *% of Shares Locked* | 0.0007 | *** | 3.26 |
| *Top-tier Underwriter* | 0.0097 | | 1.32 |
| *High Tech Firm* | 0.0395 | *** | 5.09 |
| *Lockup Length* | -0.0001 | * | -1.69 |
| Observations | 3,011 | | |
| Adjusted $R^2$ | 6.41% | | |

## Table 1 Descriptive Statistics

Table 1 reports descriptive statistics for our final sample of 10,726 firm-quarter observations. Q1 and Q3 denote the first and the third quartile, respectively. All variables are defined in Appendix A.

| | N | Mean | Q1 | Median | Q3 | Std. Dev. |
|---|---|---|---|---|---|---|
| *Abnormal Accruals* | 10,726 | 0.001 | -0.028 | 0.001 | 0.033 | 0.084 |
| *Assets (in millions)* | 10,726 | 375.4 | 29.8 | 67.6 | 176.3 | 3206.0 |
| *Size* | 10,726 | 4.334 | 3.395 | 4.214 | 5.172 | 1.467 |
| *Book-to-Market* | 10,726 | 0.519 | 0.279 | 0.461 | 0.694 | 0.326 |
| *ROA* | 10,726 | -0.107 | -0.173 | 0.029 | 0.091 | 0.450 |
| *Quarter 1* | 10,726 | 0.191 | 0.000 | 0.000 | 0.000 | 0.393 |
| *Quarter 2* | 10,726 | 0.209 | 0.000 | 0.000 | 0.000 | 0.407 |
| *Quarter 4* | 10,726 | 0.382 | 0.000 | 0.000 | 1.000 | 0.486 |
| *Proceeds* | 10,726 | 0.899 | 0.432 | 0.754 | 1.224 | 0.659 |
| *Pre-IPO Year Financing CF* | 10,726 | 0.105 | -0.013 | 0.041 | 0.180 | 0.215 |
| *VC-Backed* | 10,726 | 0.427 | 0.000 | 0.000 | 1.000 | 0.495 |

## Table 2 Univariate Analyses of Abnormal Accruals

Table 2 reports descriptive statistics on abnormal accruals. Panel A provides these statistics by quarter relative to the IPO. Panel B provides them by quarter, relative to the IPO and the lockup expiration, for the subsample of firms where the lockup expiration falls in $Quarter_{IPO+2}$. (See Section 3 for a more detailed explanation.) Panel C provides them by quarter, relative to the lockup expiration, for the final sample after imposing all data restrictions. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. Quarters relative to the IPO and to the lockup expiration are outlined in Figures 1 and 2, respectively. Abnormal accruals are defined in Appendix A.

## Panel A Abnormal Accruals around the IPO Date

| | Full Sample | | | | | Constant Sample | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean *Abnormal Accruals* | t-statistic | Median *Abnormal Accruals* | z-statistic | N | Mean *Abnormal Accruals* | t-statistic | Median *Abnormal Accruals* | z-statistic |
| $Quarter_{IPO-1}$ | 623 | -0.007 ** | -2.01 | -0.004 | -1.56 | 320 | -0.0124 ** | -2.36 | -0.0013 | -0.34 |
| $Quarter_{IPO}$ | 1,632 | 0.001 | 0.26 | -0.001 | -0.89 | 320 | 0.0024 | 0.46 | -0.0017 | -0.47 |
| $Quarter_{IPO+1}$ | 2,159 | 0.010 *** | 4.97 | 0.005 *** | 3.42 | 320 | 0.0128 ** | 2.44 | 0.0114 *** | 3.39 |
| $Quarter_{IPO+2}$ | 2,237 | 0.010 *** | 5.33 | 0.006 *** | 5.44 | 320 | 0.0116 ** | 2.22 | 0.0068 * | 1.90 |
| $Quarter_{IPO+3}$ | 2,141 | 0.003 | 1.47 | 0.002 | 1.49 | 320 | -0.0009 | -0.18 | -0.0008 | -0.36 |
| $Quarter_{IPO+4}$ | 2,273 | -0.002 | -1.16 | -0.001 | -0.58 | 320 | 0.0006 | 0.12 | 0.0005 | 0.16 |

## Panel B Abnormal Accruals around the IPO Date and the Lockup Expiration Date (Subsample Analysis)

| | Final Sample | | | | | Constant Sample | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean *Abnormal Accruals* | t-statistic | Median *Abnormal Accruals* | z-statistic | N | Mean *Abnormal Accruals* | t-statistic | Median *Abnormal Accruals* | z-statistic |
| $Quarter_{IPO-1}$ | 473 | -0.011 *** | -2.71 | -0.0042 | -1.38 | 242 | -0.0169 *** | -2.93 | -0.0001 | -0.02 |
| $Quarter_{IPO}$ | 1,071 | -0.002 | -0.59 | -0.0046 ** | -2.41 | 242 | -0.0038 | -0.66 | -0.0075 ** | -2.13 |
| $Quarter_{IPO+1} = Quarter_{Lockup-1}$ | 1,119 | 0.013 *** | 4.97 | 0.0078 *** | 4.10 | 242 | 0.0106 * | 1.84 | 0.0095 ** | 2.53 |
| $Quarter_{IPO+2} = Quarter_{Lockup}$ | 1,239 | 0.010 *** | 3.81 | 0.0074 *** | 5.20 | 242 | 0.0114 * | 1.98 | 0.0085 ** | 2.27 |
| $Quarter_{IPO+3} = Quarter_{Lockup+1}$ | 1,094 | 0.004 | 1.42 | 0.0022 * | 1.66 | 242 | -0.0025 | -0.44 | -0.0004 | -0.16 |
| $Quarter_{IPO+4} = Quarter_{Lockup+2}$ | 1,159 | -0.008 *** | -2.95 | -0.0028 * | -1.88 | 242 | -0.0056 | -0.96 | -0.0025 | -0.76 |

**Panel C Abnormal Accruals around the Lockup Expiration Date**

| | Final Sample | | | | | Constant Sample | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean *Abnormal Accruals* | t-statistic | Median *Abnormal Accruals* | z-statistic | N | Mean *Abnormal Accruals* | t-statistic | Median *Abnormal Accruals* | z-statistic |
| $Quarter_{Lockup-2}$ | 1,080 | 0.0011 | 0.45 | -0.0015 | -0.78 | 561 | 0.0047 | 1.4 | 0.0006 | 0.29 |
| $Quarter_{Lockup-1}$ | 1,571 | 0.0080 *** | 3.80 | 0.0028 * | 2.24 | 561 | 0.0091 *** | 2.70 | 0.0028 | 1.36 |
| $Quarter_{Lockup}$ | 1,783 | 0.0050 ** | 2.53 | 0.0041 *** | 3.40 | 561 | 0.0080 ** | 2.39 | 0.0046 * | 2.08 |
| $Quarter_{Lockup+1}$ | 1,667 | 0.0011 | 0.51 | 0.0011 | 0.83 | 561 | -0.0021 | -0.63 | -0.0017 | 0.90 |
| $Quarter_{Lockup+2}$ | 1,578 | -0.0040 * | -1.89 | -0.0013 | -1.03 | 561 | 0.0006 | 0.17 | 0.0017 | 1.07 |
| $Quarter_{Lockup+3}$ | 1,500 | 0.0008 | 0.36 | 0.0022 | 1.61 | 561 | 0.0029 | 0.86 | 0.0021 | 0.99 |
| $Quarter_{Lockup+4}$ | 1,547 | -0.0086 *** | -4.06 | -0.0031 ** | -2.52 | 561 | -0.0062 * | -1.85 | -0.0030 | -1.41 |

## Table 3 Abnormal Accruals around Lockup Expiration – Multivariate Evidence

Table 3 reports results from an OLS estimation of equation (1). The dependent variable is *Abnormal Accruals*, quarterly abnormal accruals from the modified cross-sectional Jones model. Accruals are obtained from the statement of cash flows, and the model is further modified to deflate by average total assets in quarter *t*, rather than total assets at the end of quarter *t-1*. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. Industry and firm fixed effects are not reported. Standard errors are clustered by firm. All explanatory variables are defined in Appendix A.

| | Dependent Variable = *Abnormal Accruals* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Coeff.** | **t-stat.** | **Coeff.** | **t-stat.** | **Coeff.** | **t-stat.** | **Coeff.** | **t-stat.** |
| $Quarter_{Lockup-1}$ | 0.0105 *** | 4.64 | 0.0073 *** | 3.26 | 0.0104 *** | 4.46 | 0.0066 *** | 2.69 |
| $Quarter_{Lockup}$ | 0.0072 *** | 3.36 | 0.0069 *** | 3.26 | 0.0083 *** | 3.76 | 0.0064 *** | 2.87 |
| *Size* | | | -0.0049 *** | -6.32 | | | 0.0011 | 0.42 |
| *Book-to-Market* | | | -0.0053 * | -1.87 | | | -0.0120 ** | -2.49 |
| *ROA* | | | 0.0460 *** | 7.38 | | | 0.0671 *** | 6.02 |
| *Quarter 1* | | | -0.0012 | -0.50 | | | -0.0010 | -0.40 |
| *Quarter 2* | | | -0.0016 | -0.70 | | | -0.0024 | -1.02 |
| *Quarter 4* | | | -0.0080 *** | -3.71 | | | -0.0079 *** | -3.21 |
| *Proceeds* | | | 0.0047 ** | 2.27 | | | | |
| *Pre-IPO Year Financing CF* | | | 0.0107 * | 1.88 | | | | |
| *VC-Backed* | | | -0.0092 *** | -5.05 | | | | |
| *Intercept* | 0.0305 | 1.03 | 0.0700 ** | 2.02 | -0.0023 *** | -4.21 | 0.0108 | 0.92 |
| Fixed Effects | Industry | | Industry | | Firm | | Firm | |
| N | 10,726 | | 10,726 | | 10,726 | | 10,726 | |
| Adjusted $R^2$ | 1.92% | | 7.19% | | | | | |
| Within $R^2$ | | | | | 0.35% | | 2.38% | |

## Table 4 Abnormal Accruals around Lockup Expiration – Role of Scrutiny

Table 4, Panels A and B, report results from an OLS estimation of equation (1), interacting $Quarter_{Lockup-1}$ and $Quarter_{Lockup}$ with two mutually exclusive indicators: (*i*) *High Analyst Following* and *Low Analyst Following* in Panel A and (*ii*) *High Litigation* and *Low Litigation* in Panel B. The dependent variable is *Abnormal Accruals*, quarterly abnormal accruals from the modified cross-sectional Jones model. Accruals are obtained from the statement of cash flows, and the model is further modified to deflate by average total assets in quarter *t*, rather than total assets at the end of quarter *t-1*. $^{***}$, $^{**}$, and $^{*}$ denote p-values less than 0.01, 0.05, and 0.1, respectively. Industry and firm fixed effects are not reported. Standard errors are clustered by firm. All explanatory variables are defined in Appendix A.

### Panel A Analyst Following as a Proxy for Scrutiny

| | Dependent Variable = *Abnormal Accruals* | | | |
|---|---|---|---|---|
| | **Coeff.** | **t-stat.** | **Coeff.** | **t-stat.** |
| $Quarter_{Lockup-1}$ *x High Analyst Following* | -0.0001 | -0.03 | 0.0006 | 0.14 |
| $Quarter_{Lockup-1}$ *x Low Analyst Following* | 0.0091 *** | 3.61 | 0.0080 *** | 2.91 |
| $Quarter_{Lockup}$ | 0.0069 *** | 3.25 | 0.0064 *** | 2.89 |
| *Size* | -0.0038 *** | -4.38 | 0.0013 | 0.49 |
| *Book-to-Market* | -0.0062 ** | -2.16 | -0.0121 ** | -2.51 |
| *ROA* | 0.0459 *** | 7.45 | 0.0671 *** | 6.02 |
| *Quarter 1* | -0.0012 | -0.50 | -0.0011 | -0.45 |
| *Quarter 2* | -0.0016 | -0.67 | -0.0024 | -1.04 |
| *Quarter 4* | -0.0080 *** | -3.69 | -0.0081 *** | -3.29 |
| *Proceeds* | 0.0052 ** | 2.53 | | |
| *Pre-IPO Year Financing CF* | 0.0102 * | 1.80 | | |
| *VC-Backed* | -0.0090 *** | -4.91 | | |
| *High Analyst Following* | -0.0070 *** | -3.16 | | |
| *Intercept* | 0.0645 * | 1.83 | 0.0101 | 0.86 |
| Fixed Effects | Industry | | Firm | |
| N | 10,694 | | 10,694 | |
| Adjusted $R^2$ | 7.32% | | | |
| Within $R^2$ | | | 2.42% | |

| **Wald Tests** | **Coeff.** | **$\chi^2$** | **p-value** | **Coeff.** | **$\chi^2$** | **p-value** |
|---|---|---|---|---|---|---|
| $Quarter_{Lockup-1}$ *x Low Analyst Following vs. QuarterLockup-1 x High Analyst Following* | 0.0092 | 3.42 | 0.065 | 0.0074 | 2.01 | 0.1565 |

**Panel B Litigation Risk as a Proxy for Scrutiny**

| | Dependent Variable = *Abnormal Accruals* | | | | | |
|---|---|---|---|---|---|---|
| | **Coeff.** | | **t-statistic** | **Coeff.** | | **t-statistic** |
| *Quarter$_{Lockup-1}$ x High Litigation* | 0.0057 | | 1.53 | 0.0039 | | 0.94 |
| *Quarter$_{Lockup-1}$ x Low Litigation* | 0.0085 | *** | 3.20 | 0.0073 | ** | 2.57 |
| *Quarter$_{Lockup}$* | 0.0070 | *** | 3.25 | 0.0062 | *** | 2.77 |
| *Size* | -0.0037 | *** | -3.71 | 0.0007 | | 0.28 |
| *Book-to-Market* | -0.0070 | ** | -2.49 | -0.0125 | ** | -2.57 |
| *ROA* | 0.0445 | *** | 7.32 | 0.0695 | *** | 6.07 |
| *Quarter 1* | -0.0016 | | -0.64 | -0.0012 | | -0.47 |
| *Quarter 2* | -0.0023 | | -1.00 | -0.0028 | | -1.19 |
| *Quarter 4* | -0.0080 | *** | -3.68 | -0.0078 | *** | -3.15 |
| *Proceeds* | 0.0052 | ** | 2.49 | | | |
| *Pre-IPO Year Financing CF* | 0.0122 | ** | 2.17 | | | |
| *VC-Backed* | -0.0094 | *** | -5.16 | | | |
| *High Litigation* | -0.0059 | ** | -2.28 | | | |
| *Intercept* | 0.0644 | * | 1.84 | 0.0130 | | 1.09 |
| Fixed Effects | | Industry | | | Firm | |
| N | | 10,482 | | | 10,482 | |
| Adjusted $R^2$ | | 7.10% | | | | |
| Within $R^2$ | | | | | 2.54% | |

| **Wald Tests** | **Coeff.** | **$\chi^2$** | **p-value** | **Coeff.** | **$\chi^2$** | **p-value** |
|---|---|---|---|---|---|---|
| *Quarter$_{Lockup-1}$ x Low Litigation vs. Quarter$_{Lockup-1}$ x High Litigation* | 0.0028 | 0.38 | 0.537 | 0.0034 | 0.53 | 0.467 |

## Table 5 Abnormal Accruals around Lockup Expiration – Role of Selling Incentives

Table 5 reports results from an OLS estimation of equation (1), interacting $Quarter_{Lockup-1}$ with two mutually exclusive indicators *High Selling Incentives* and *Low Selling Incentives*. The proxy for selling incentives is predicted abnormal trading volume and actual trading volume in Panels A and B, respectively. The dependent variable is *Abnormal Accruals*, quarterly abnormal accruals from the modified cross-sectional Jones model. Accruals are obtained from the statement of cash flows, and the model is further modified to deflate by average total assets in quarter t, rather than total assets at the end of quarter t-1. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. Industry and firm fixed effects are not reported. Standard errors are clustered by firm. All explanatory variables are defined in Appendix A.

### Panel A Predicted Abnormal Trading Volume as a Proxy for Selling Incentives

| | Dependent Variable = *Abnormal Accruals* | | | |
|---|---|---|---|---|
| | **Coeff.** | **t-stat.** | **Coeff.** | **t-stat.** |
| $Quarter_{Lockup-1}$ x *High Selling Incentives* | 0.0099 *** | 4.17 | 0.0093 *** | 3.59 |
| $Quarter_{Lockup-1}$ x *Low Selling Incentives* | -0.0029 | -0.51 | -0.0044 | -0.74 |
| $Quarter_{Lockup}$ | 0.0070 *** | 3.28 | 0.0064 *** | 2.88 |
| *Size* | -0.0047 *** | -5.98 | 0.0012 | 0.45 |
| *Book-to-Market* | -0.0047 | -1.61 | -0.0119 ** | -2.47 |
| *ROA* | 0.0461 *** | 7.33 | 0.0671 *** | 6.01 |
| *Quarter 1* | -0.0013 | -0.51 | -0.0011 | -0.44 |
| *Quarter 2* | -0.0017 | -0.73 | -0.0025 | -1.06 |
| *Quarter 4* | -0.0082 *** | -3.80 | -0.0079 *** | -3.21 |
| *Proceeds* | 0.0087 | 1.54 | | |
| *Pre-IPO Year Financing CF* | 0.0047 ** | 2.26 | | |
| *High Selling Incentives* | -0.0034 | -1.31 | | |
| *Intercept* | 0.0721 ** | 2.06 | 0.0104 | 0.89 |
| Fixed Effects | Industry | | Firm | |
| N | 10,726 | | 10,726 | |
| Adjusted $R^2$ | 6.99% | | | |
| Within $R^2$ | | | 2.45% | |

| **Wald Tests** | **Coeff.** | **$\chi^2$** | **p-value** | **Coeff.** | **$\chi^2$** | **p-value** |
|---|---|---|---|---|---|---|
| $Quarter_{Lockup-1}$ x *High Selling Incentives* vs. $Quarter_{Lockup-1}$ x *Low Selling Incentives* | 0.0128 | 4.32 | 0.038 | 0.0137 | 4.70 | 0.030 |

**Panel B Actual Trading Volume as a Proxy for Selling Incentives**

| | Dependent Variable = *Abnormal Accruals* | | | | | |
|---|---|---|---|---|---|---|
| | **Coeff.** | | **t-statistic** | **Coeff.** | | **t-statistic** |
| *Quarter*$_{Lockup-1}$ x *High Trading Volume* | 0.0063 | ** | 2.04 | 0.0060 | * | 1.81 |
| *Quarter*$_{Lockup-1}$ x *Low Trading Volume* | 0.0034 | | 0.83 | -0.0003 | | -0.07 |
| *Quarter*$_{Lockup}$ | 0.0044 | | 1.48 | 0.0058 | * | 1.91 |
| *Size* | -0.0047 | *** | -5.93 | 0.0005 | | 0.18 |
| *Book-to-Market* | -0.0057 | ** | -2.00 | -0.0131 | *** | -2.74 |
| *ROA* | 0.0459 | *** | 7.37 | 0.0674 | *** | 6.04 |
| *Quarter 1* | -0.0014 | | -0.58 | -0.0013 | | -0.51 |
| *Quarter 2* | -0.0019 | | -0.81 | -0.0026 | | -1.11 |
| *Quarter 4* | -0.0086 | *** | -3.97 | -0.0082 | *** | -3.36 |
| *Proceeds* | 0.0045 | ** | 2.19 | | | 1.32 |
| *Pre-IPO Year Financing CF* | 0.0090 | | 1.61 | | | |
| *High Trading Volume* | -0.0047 | ** | -2.44 | | | |
| *Intercept* | 0.0732 | ** | 2.02 | 0.0151 | | 1.32 |
| Fixed Effects | Industry | | | Firm | | |
| N | 10,726 | | | 10,726 | | |
| Adjusted $R^2$ | 6.95% | | | | | |
| Within $R^2$ | | | | 2.32% | | |

| **Wald Tests** | **Coeff.** | **$\chi^2$** | **p-value** | **Coeff.** | **$\chi^2$** | **p-value** |
|---|---|---|---|---|---|---|
| *Quarter*$_{Lockup-1}$ x *High Trading Volume* vs. *Quarter*$_{Lockup-1}$ x *Low Trading Volume* | 0.0029 | 0.28 | 0.594 | 0.0063 | 1.22 | 0.270 |

## Table 6 Abnormal Accruals around Lockup Expiration – Role of Insider Trades

Table 6 reports results from an OLS estimation of equation (1) modified to include mutually exclusive variables that capture insider trading activity: *Quarter*$_{Lockup-1}$ x *Officer Only Sales*, *Quarter*$_{Lockup-1}$ x *Ben. Own. & Non-Exec. Dir. Only Sales*, *Quarter*$_{Lockup-1}$ x *No Form 4 Sales*, *Quarter*$_{Lockup-1}$ x *Officer and Ben. Own. & Non-Exec. Dir. Sales*. The dependent variable is *Abnormal Accruals*, quarterly abnormal accruals from the modified cross-sectional Jones model. Accruals are obtained from the statement of cash flows, and the model is further modified to deflate by average total assets in quarter *t*, rather than total assets at the end of quarter *t-1*. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. Industry and firm fixed effects are not reported. Standard errors are clustered by firm. All explanatory variables are defined in Appendix A.

| | Dependent Variable = *Abnormal Accruals* | | | |
|---|---|---|---|---|
| | **Coeff.** | | **t-stat.** | **Coeff.** | | **t-stat.** |
| *Quarter*$_{Lockup-1}$ x *Officer Only Sales* | 0.0067 | | 1.10 | 0.0063 | | 0.95 |
| *Quarter*$_{Lockup-1}$ *x Ben. Own. & Non-Exec. Dir. Only Sales* | 0.0253 | ** | 2.54 | 0.0269 | ** | 2.50 |
| *Quarter*$_{Lockup-1}$ *x No Form 4 Sales* | 0.0069 | *** | 2.79 | 0.0060 | ** | 2.21 |
| *Quarter*$_{Lockup-1}$ x *Officer and Ben. Own. & Non-Exec. Dir. Sales* | 0.0097 | | 1.14 | 0.0125 | | 1.32 |
| *Quarter*$_{Lockup}$ | 0.0068 | *** | 3.22 | 0.0065 | *** | 2.89 |
| *Size* | -0.0047 | *** | -5.89 | 0.0012 | | 0.46 |
| *Book-to-Market* | -0.0061 | ** | -2.12 | -0.0123 | ** | -2.55 |
| *ROA* | 0.0459 | *** | 7.29 | 0.0658 | *** | 5.92 |
| *Quarter 1* | -0.0015 | | -0.60 | -0.0012 | | -0.47 |
| *Quarter 2* | -0.0018 | | -0.75 | -0.0024 | | -1.03 |
| *Quarter 4* | -0.0080 | *** | -3.71 | -0.0078 | *** | -3.19 |
| *Proceeds* | 0.0044 | ** | 2.16 | | | |
| *Pre-IPO Year Financing CF* | 0.0107 | * | 1.87 | | | |
| *VC-Backed* | -0.0087 | *** | -4.71 | | | |
| *Officer Only Sales* | -0.0010 | | -0.34 | | | |
| *Ben. Own. & Non-Exec. Dir. Only Sales* | -0.0085 | * | -1.72 | | | |
| *Officer and Ben. Own. & Non-Exec. Dir. Sales* | -0.0073 | ** | -2.30 | | | |
| *Intercept* | 0.0698 | ** | 2.01 | 0.0103 | | 0.88 |
| Fixed Effects | Industry | | | Firm | | |
| N | 10,630 | | | 10,630 | | |
| Adjusted $R^2$ | 7.23% | | | | | |
| Within $R^2$ | | | | 2.39% | | |

## Table 7 Abnormal Accruals in the Quarter of Lockup Expiration

Table 7 reports results from an OLS estimation of equation (1) modified to examine abnormal accruals in $Quarter_{Lockup}$. In Panel A, we interact $Quarter_{Lockup}$ with two mutually exclusive indicators: *High Lag Accruals* and *Low Lag Accruals*. In Panel B, we interact both $Quarter_{Lockup-1}$ and $Quarter_{Lockup}$ with mutually exclusive indicators *Trading Not Restricted/ Trading Restricted*. The dependent variable is *Abnormal Accruals*, quarterly abnormal accruals from the modified cross-sectional Jones model. Accruals are obtained from the statement of cash flows, and the model is further modified to deflate by average total assets in quarter *t*, rather than total assets at the end of quarter *t-1*. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. Industry and firm fixed effects are not reported. Standard errors are clustered by firm. All explanatory variables are defined in Appendix A.

### Panel A Role of Abnormal Accruals in in the Quarter before Lockup Expiration

| | Dependent Variable = *Abnormal Accruals* | | | |
|---|---|---|---|---|
| | **Coeff.** | **t-statistic** | **Coeff.** | **t-statistic** |
| $Quarter_{Lockup-1}$ | 0.0074 *** | 3.29 | 0.0070 *** | 2.83 |
| $Quarter_{Lockup}$ x *High Lag Accruals* | -0.0096 * | -1.79 | -0.0113 ** | -2.08 |
| $Quarter_{Lockup}$ x *Low Lag Accruals* | 0.0109 *** | 4.47 | 0.0102 *** | 4.08 |
| *Size* | -0.0032 *** | -3.80 | 0.0027 | 0.97 |
| *Book-to-Market* | -0.0069 ** | -2.32 | -0.0149 *** | -2.95 |
| *ROA* | 0.0411 *** | 7.45 | 0.0588 *** | 5.22 |
| *Quarter 1* | -0.0017 | -0.66 | -0.0013 | -0.50 |
| *Quarter 2* | -0.0018 | -0.76 | -0.0021 | -0.88 |
| *Quarter 4* | -0.0069 *** | -2.90 | -0.0074 *** | -2.91 |
| *Proceeds* | 0.0046 ** | 2.27 | | |
| *Pre-IPO Year Financing CF* | 0.0141 *** | 2.63 | | |
| *VC-Backed* | -0.0089 *** | -4.71 | | |
| *High Lag Accruals* | 0.0319 *** | 13.13 | | |
| *Intercept* | 0.0444 * | 1.80 | 0.0049 | 0.40 |
| Fixed effects | Industry | | Firm | |
| N | 8,556 | | 8,556 | |
| Adjusted $R^2$ | 9.47% | | | |
| Within $R^2$ | | | 2.30% | |

| **Wald Tests** | **Coeff.** | **$\chi^2$** | **p-value** | **Coeff.** | **$\chi^2$** | **p-value** |
|---|---|---|---|---|---|---|
| $Quarter_{Lockup}$ x *High Lag Accruals* vs. $Quarter_{Lockup}$ x *Low Lag Accruals* | -0.0205 | 12.55 | 0.000 | -0.0215 | 13.48 | 0.0002 |

**Panel B Role of Trading Restrictions in the Lockup Expiration Quarter**

| | Dependent Variable = *Abnormal Accruals* | | | |
|---|---|---|---|---|
| | **Coeff.** | **t-stat.** | **Coeff.** | **t-stat.** |
| *Quarter*$_{Lockup-1}$ x *Trading Not Restricted* | 0.0110 *** | 4.26 | 0.0094 *** | 3.44 |
| *Quarter*$_{Lockup-1}$ x *Trading Restricted* | 0.0014 | 0.34 | 0.0017 | 0.37 |
| *Quarter*$_{Lockup}$ x *Trading Not Restricted* | 0.0042 | 1.54 | 0.0044 | 1.57 |
| *Quarter*$_{Lockup}$ x *Trading Restricted* | 0.0111 *** | 3.30 | 0.0094 *** | 2.62 |
| *Size* | -0.0050 *** | -6.38 | 0.0005 | 0.18 |
| *Book-to-Market* | -0.0053 * | -1.87 | -0.0118 ** | -2.44 |
| *ROA* | 0.0460 *** | 7.35 | 0.0668 *** | 5.99 |
| *Quarter 1* | -0.0017 | -0.70 | -0.0015 | -0.58 |
| *Quarter 2* | -0.0016 | -0.69 | -0.0024 | -1.03 |
| *Quarter 4* | -0.0080 *** | -3.70 | -0.0079 *** | -3.21 |
| *Proceeds* | 0.0106 * | 1.86 | | |
| *Pre-IPO Year Financing CF* | 0.0046 ** | 2.22 | | |
| *VC-Backed* | -0.0092 *** | -5.06 | | |
| *Trading Not Restricted* | -0.0007 | -0.36 | | |
| *Intercept* | 0.0711 ** | 2.05 | 0.0135 | 1.12 |
| Fixed effects | Industry | | Firm | |
| N | 10,726 | | 10,726 | |
| Adjusted $R^2$ | 7.24% | | | |
| Within $R^2$ | | | 2.43% | |

| **Wald Tests** | **Coeff.** | **$\chi^2$** | **p-value** | **Coeff.** | **$\chi^2$** | **p-value** |
|---|---|---|---|---|---|---|
| *Quarter*$_{Lockup-1}$ x *Trading Not Restricted* | | | | | | |
| vs. *Quarter*$_{Lockup-1}$ x *Trading Restricted* | 0.0096 | 4.06 | 0.044 | 0.0077 | 2.15 | 0.143 |
| *Quarter*$_{Lockup}$ x *Trading Not Restricted* | | | | | | |
| vs. *Quarter*$_{Lockup}$ x *Trading Restricted* | -0.0069 | 2.61 | 0.106 | -0.005 | 1.23 | 0.268 |

## Table 8 Abnormal Accruals and Earnings Announcement Returns

Table 8 reports results from an OLS estimation of returns around the earnings announcement in $Quarter_{Lockup-1}$. The dependent variable is *CAR around EA* $Quarter_{Lockup-1}$, the market-adjusted cumulative abnormal returns over the [-1,+1] window around the earnings announcement in $Quarter_{Lockup-1}$. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. Standard errors are clustered by firm. All explanatory variables are defined in Appendix A.

| | Dependent Variable = *CAR around EA* $Quarter_{Lockup-1}$ | | |
|---|---|---|---|
| | **Coefficient** | | **t-statistic** |
| *Earnings Surprise* | 0.0221 | *** | 2.93 |
| *High Accruals* | 0.0044 | | 0.45 |
| *Earnings Surprise x High Accruals* | 0.0231 | | 1.37 |
| *Size* | 0.0021 | | 0.57 |
| *Book-to-Market* | -0.0216 | | -1.07 |
| *Number of Analysts* | 0.0005 | | 0.23 |
| *Quarter 1* | -0.0051 | | -0.43 |
| *Quarter 2* | -0.0070 | | -0.57 |
| *Quarter 4* | -0.0269 | ** | -2.51 |
| *Intercept* | 0.0043 | | 0.29 |
| N | 737 | | |
| Adjusted $R^2$ | 3.55% | | |

## Table 9 Long-Run Underperformance

Table 9 reports buy-and-hold abnormal returns over 12, 24, and 36 months starting in the month following the lockup expiration. The abnormal returns are computed as the value-weighted average monthly size- and B/M-adjusted buy-and-hold returns. We calculate the boot-strapped p-values using an empirical distribution of average buy-and-hold returns from 1,000 control samples matched on year and size and book-to-market to each of our lockup quarter observations. The bootstrapped one-sided p-value represents the proportion of buy-and-hold returns from the control samples that are larger in magnitude, but of the same sign as the buy-and-hold returns of the event sample. In Panel A, we compute and report buy-and-hold abnormal returns for two subsamples, based on whether the abnormal accruals in $Quarter_{Lockup-1}$ are above or below the median. In Panel B, we compute and report buy-and-hold abnormal returns for the two subsamples of firms based on median *Abnormal Accruals* in $Quarter_{Lockup-1}$, further splitting it into subsamples with cash flow from operations (CFO) above and below the median in $Quarter_{Lockup-1}$.

### Panel A Abnormal Accruals and Long-Run Underperformance

| Window | | Buy-and-Hold Abnormal Returns | Standard p-value | Bootstrap p-value |
|---|---|---|---|---|
| 12 Months | Above Median *Abnormal Accruals* | -12.04 | <.0001 | 0.0080 |
| | Below Median *Abnormal Accruals* | 6.23 | 0.0127 | 0.6230 |
| | Difference | -18.27 | <.0001 | 0.0450 |
| 24 Months | Above Median *Abnormal Accruals* | -18.50 | <.0001 | 0.0080 |
| | Below Median *Abnormal Accruals* | 3.69 | 0.3112 | 0.7070 |
| | Difference | -22.19 | <.0001 | 0.0030 |
| 36 Months | Above Median *Abnormal Accruals* | -21.08 | 0.0000 | 0.0020 |
| | Below Median *Abnormal Accruals* | 7.05 | 0.3752 | 0.6140 |
| | Difference | -28.13 | 0.0015 | <.0001 |

## Panel B Abnormal Accruals, CFO and Long-Run Underperformance

| Window | | Buy-and-Hold Abnormal Returns | Standard p-value | Bootstrap p-value |
|---|---|---|---|---|
| **Above Median *Abnormal Accruals*** | | | | |
| 12 Months | Above Median *CFO* | -8.27 | 0.0035 | 0.0880 |
| | Below Median *CFO* | -18.26 | 0.0000 | 0.0010 |
| | Difference | 9.99 | 0.0250 | 0.1870 |
| 24 Months | Above Median *CFO* | -15.36 | 0.0003 | 0.0170 |
| | Below Median *CFO* | -23.69 | 0.0000 | <.0001 |
| | Difference | 8.33 | 0.1810 | 0.1140 |
| 36 Months | Above Median *CFO* | -18.58 | 0.0004 | 0.0220 |
| | Below Median *CFO* | -25.20 | 0.0000 | <.0001 |
| | Difference | 6.62 | 0.4039 | 0.3180 |
| **Below Median *Abnormal Accruals*** | | | | |
| 12 Months | Above Median *CFO* | 7.33 | 0.0340 | 0.5830 |
| | Below Median *CFO* | 5.16 | 0.1537 | 0.5790 |
| | Difference | 2.17 | 0.6644 | 0.5020 |
| 24 Months | Above Median *CFO* | 1.59 | 0.7438 | 0.7390 |
| | Below Median *CFO* | 5.73 | 0.2914 | 0.2500 |
| | Difference | -4.14 | 0.5699 | 0.2980 |
| 36 Months | Above Median *CFO* | 6.25 | 0.3751 | 0.6260 |
| | Below Median *CFO* | 7.83 | 0.5813 | 0.5020 |
| | Difference | -1.58 | 0.9208 | 0.4270 |

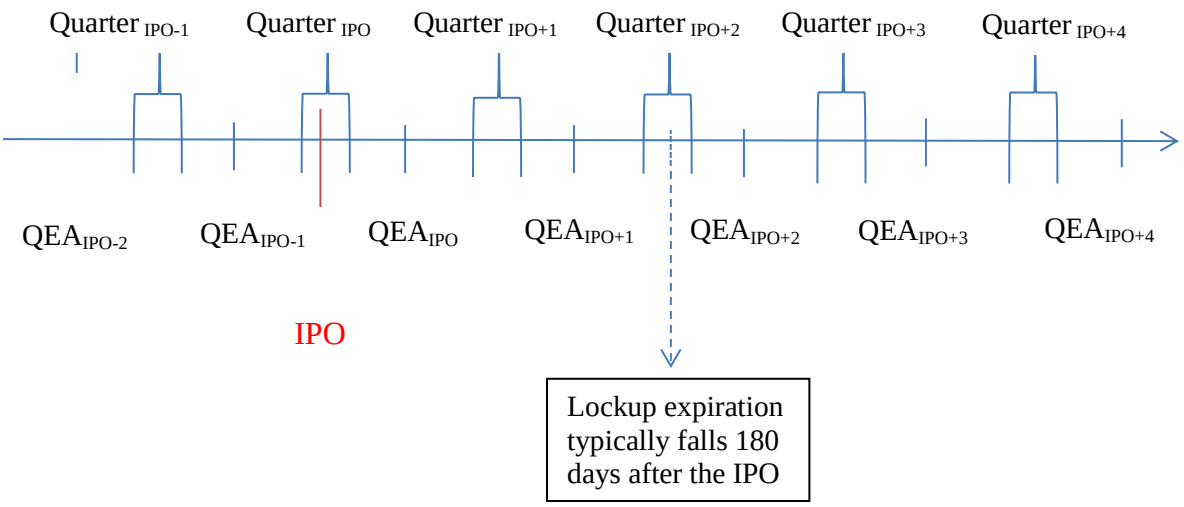
**Table 10 Special Items and Restructuring Charges around the Lockup Expiration Date**

Table 10 reports the mean special items and restructuring charges scaled by average total assets by quarter, relative to the lockup expiration. ***, **, and * denote p-values less than 0.01, 0.05, and 0.1, respectively. Quarters relative to the lockup expiration are outlined in Figure 2. *Special Items & Rst. Charges* are defined in Appendix A.

| | N | Mean Special Items and Restructuring Charges | | t-statistic |
|---|---|---|---|---|
| $Quarter_{Lockup-2}$ | 1,080 | -0.0108 | ** | -2.50 |
| $Quarter_{Lockup-1}$ | 1,571 | -0.0053 | | -1.47 |
| $Quarter_{Lockup}$ | 1,783 | -0.0102 | *** | -3.02 |
| $Quarter_{Lockup+1}$ | 1,667 | -0.0112 | *** | -3.21 |
| $Quarter_{Lockup+2}$ | 1,578 | -0.0148 | *** | -4.15 |
| $Quarter_{Lockup+3}$ | 1,500 | -0.0264 | *** | -7.19 |
| $Quarter_{Lockup+4}$ | 1,547 | -0.0235 | *** | -6.51 |

## Figure 1 – Timeline of Announcement Quarters Relative to IPO

Figure 1 depicts how announcement quarters relate to the initial public offering (IPO). QEA stands for quarterly earnings announcement.




## Figure 2 – Timeline of Announcement Quarters Relative to Lockup Expiration

Figure 2 depicts how announcement quarters relate to lockup expiration. QEA stands for quarterly earnings announcement.