

# Accrual Manipulations during IPO Lockup Expiration and the Monitoring Role of Auditors

Lizhong Hao  
University of Portland

Minna Yu  
Monmouth University

*This paper examines the presence of accrual manipulations during initial public offerings (IPOs) lockup period. We predict that insiders (mainly venture capitalists) inflate earnings around the lockup period to increase share price and maximize personal wealth from selling shares at lockup expiration. Consistent with our prediction, we find evidence that IPO firms engage in income-increasing current accruals manipulation in the lockup period. We also examine the impact of auditor quality in this unique setting. We find that IPO firms that hire prestigious auditors experience less earnings management in the lockup period than firms with lower-quality auditors, after controlling for the monitoring role of venture capitalist and underwriter reputation. In addition, IPO firms experience lower levels of earnings management during the fiscal year-end quarters when their financial statements are audited than in the interim quarters when their financials are reviewed.*

## INTRODUCTION

In this paper, we investigate whether insiders manage earnings to increase share price during the IPO lockup period. Almost all initial public offerings (IPOs) have a share lockup provision. A lockup provision is an agreement between an issuing firm and its underwriter, prohibiting insiders and other pre-IPO shareholders from selling shares for a specified period, usually six months after the offer. Lockup information is disclosed in the IPO prospectus, under a heading such as “Shares Eligible for Future Sale.” This section typically specifies the number of shares subject to lockup and the expiration date of the lockup period. IPO lockups are not required by law in the US. However, investment banks underwriting IPOs always require issuers to have the lockup agreement to prevent insider selling right after IPOs.

The lockup expiration day represents the first opportunity for a firm’s founders and other initial investors to cash out their ownership stake in the firm. As soon as the lockup period expires, insiders are suddenly allowed to sell.<sup>1</sup> Prior research has already documented that insiders, especially venture capitalists, do use this opportunity to cash out their shares and lock their personal wealth. For example, Field and Hanka (2001) and Bradley et al. (2001) document significantly negative abnormal returns and positive abnormal trading volume around the IPO unlock date. They conclude that the price decline is due to insider sales, and that significant insider selling creates an overwhelming supply of shares to the market, which depresses the market prices.

One primary reason to select the lockup period is the significant insider sales at lockup expiration. Compared to the number of shares offered at IPOs, significantly more shares are held by company insiders and these shares are restricted from selling until the lockup ends. Hence insiders who hold large shares and plan to cash out after IPOs may have strong incentive to manage earnings upward before selling. And the reversal nature of accrual accounting prevents insiders from managing earnings via accruals across a different accounting period when they can only cash out their ownership after the lockup expires.

We test our hypotheses based on a sample of 7,500 firm-quarter observations representing 744 unique IPO firms. Prior studies on earnings management mainly use annual data. However, using annual data may underestimate the magnitude of earnings management around IPOs, because earnings inflation and subsequent accrual reversal may occur in the same fiscal year. We use quarterly data to examine earnings management behavior during the IPO lockup period. Using quarterly data may provide a sharper estimate of earnings management behavior and thus increase the likelihood of detecting earnings manipulation (Jeter and Shivakumar, 1999). Furthermore, since financial information for interim quarters is not audited, managers have greater discretion over interim financial reporting than annual reporting. The lockup agreements typically specify a lockup period of 180 days; therefore, two quarterly earnings announcements are released in the lockup period. We use discretionary current accruals (DCA) and discretionary total accruals (DTA) as proxies for earnings management and predict that IPO firms experience abnormal levels of earnings management during the lockup period. Consistent with our hypotheses, we find evidence that IPO firms engage in income-increasing earnings management in the pre-IPO and lockup periods, mainly through current accruals manipulation.

In addition, we explore the role of auditor quality around IPO lockup expiration. One of the characteristics of IPO firms is the information asymmetry between insiders and outsider investors. Information asymmetry may lead to market inefficiencies and high cost of capital. Therefore, the monitoring role of third-party specialists and their ability to reduce information asymmetry is critical to IPO firms, investors and regulators. Going public through an IPO is an important event for the issuer. The IPOs may enable the issuer to raise additional capital to fund potential profitable projects and to borrow money on more favorable terms in a more liquid market relative to debt financing.

We use auditor size as a proxy for auditor quality and partition the sample into Big-Four and Non-Big-Four groups. We find that IPO firms that hire prestigious auditors experience less earnings management in the lockup period than firms with lower-quality auditors, after controlling for the monitoring role of venture capitalist and underwriter reputation.

Our paper contributes to the IPO and earnings management literature. Earnings management is costly to investors as it allows for opportunistic behavior by management in order to maximize their personal wealth at the expense of external investors. Extant studies on earnings management at IPO only focus on the earnings management behavior prior to IPO or during the IPO year (Friedlan, 1994; Teoh et al., 1998c). Different from prior research, we investigate earnings management surrounding the lockup period. A concurrent paper by Sletten et al. (2018) also examines the same setting and find similar results. However, our paper further investigates whether high quality auditors mitigate earnings management in the IPO lockup context.

Second, our paper contributes to the auditing literature by examining whether auditor reputation plays a monitoring role in the IPO lockup setting. Our paper extends the finding of Yonca et al. (2014) who find that managers have litigation concerns in their voluntary disclosure decisions.

The rest of this paper is organized as follows. Section 2 reviews prior research on IPO and IPO lockups. Section 3 describes our motivation, theory and hypotheses development. Research design are presented in Section 4 and sample selection process is described in Section 5. We present the empirical results and robustness tests in Section 6 and provide summary, conclusion and limitations of our research in Section 7.

## LITERATURE REVIEW

### Market Reaction to IPO Lockups

An extensive body of research in finance and financial press has found significant price decline and trading volume increase around the date of lockup expiration, indicating that the price decline at lockup expiration is due to substantial insider sales (i.e. Field and Hanka, 2001; Bradley et al., 2001; Brau et al., 2004). However, the significant market reactions around lockup expiration documented in prior research are somewhat surprising and irrational, as the markets are reacting to anticipated information.

### Monitoring Role of Venture Capitalists, Underwriters, and Auditors

Extant studies also examine the monitoring role of venture capitalists and underwriters in the IPO process. For example, Megginson and Weiss (1991) find that venture capital backing results in significantly lower underpricing and underwriting spreads. Morsfield and Tan (2006) demonstrate that venture-backed IPOs are associated with lower IPO-year abnormal accruals (indicating less earnings management). Another related stream of work examines how underwriters resolve the asymmetric information inherent in the IPO process (DeAngelo, 1981a; Beatty and Ritter, 1986; Titman and Trueman, 1986; Carter and Manaster, 1990; Brav and Gompers, 2003; Chang et al., 2010).

### Earnings Management Around IPOs

Early studies primarily investigate whether firms manage earnings in the pre-IPO years or during the IPO year and the results are somewhat mixed. For example, Aharony et al. (1993) use a sample of 229 industrial IPOs and find weak support for the earnings management hypothesis prior to IPOs. Friedlan (1994) documents strong evidence of earnings management before the initial offering (one year prior to IPOs). Teoh et al. (1998c) report evidence that IPO firms select abnormal accruals aggressively to report high earnings during the IPO year.

On the contrary, Beneish (2001) argues that, although equity offerings create situations in which managers have strong incentives to manipulate earnings, it may be premature to conclude intentional earnings management based on changes in discretionary accruals. Ball and Shivakumar (2008) examine a sample of UK IPOs and document high earnings quality (more conservative) for financials in IPO prospectuses than financials prepared when the firms in private status. They attribute this to the higher quality reporting demand of public firms by financial statement users, auditors, boards, analysts, and greater regulatory scrutiny.

Prior research also investigates the association between the long-run underperformance of IPO firms and earnings management. For example, Teoh et al. (1998a) find evidence that issuers with higher discretionary accruals have poorer stock return performance in the subsequent three years. DuCharme et al. (2001) find that abnormal accruals during the offer year (and the preceding year) are negatively related to subsequent stock returns. Fan (2007) reports that discretionary accruals in the IPO year and have strong predictive power per IPO firms' subsequent decline in operating performance. Cotton (2008) also finds evidence that earnings management contributes to the long-run underperformance of IPOs.

## HYPOTHESES DEVELOPMENT

Information asymmetry at IPOs is common and has been well documented in prior research (Leland and Pyle, 1977; Hughes, 1986; Titman and Trueman, 1986; Brau et al., 2005). IPO lockup period is particularly vulnerable to earnings management. Brau et al. (2004) argue that the information asymmetry at the time of lockup expiration is even stronger than that at the IPO date because, at the lockup expiration date, the actual number of shares to be sold by insiders is unknown to the market, whereas at the IPO date the number of secondary shares for sale must be disclosed in the prospectus. Therefore, insiders may take advantage of the opportunities to exercise discretion when preparing financial information and conceal adverse information because doing so will allow them to sell securities at a higher price.

Furthermore, insider managers have incentives to report high earnings during the lockup period to influence market price favorably when they plan to sell their ownership shares at lockup expiration. When firms go public, the number of shares offered in the IPOs is a relatively small portion of the overall ownership. The majority of shares are pre-owned by the company's initial investors such as the founders and venture capitalists. Insiders are prohibited from selling immediately after the IPO due to the share lockup provision. On the day of lockup expiration, insiders are suddenly allowed to sell. Prior studies have well documented that insiders, particularly venture capitalists, sell their shares at lockup expiration as they are not long-term, buy-and-hold investors (Rajan and Servaes, 1997; Bradley et al., 2001).

The lockup expiration day represents the first opportunity for firm founders and other initial investors to cash out their ownership stake in the firm. Insiders planning or considering the sale of personal shares at lockup expiration have incentives to choose income-increasing earnings management and withhold negative information strategically to maximize personal wealth (Brau et al., 2004). In general, high reported earnings increase share price, and the greater the share price, the greater will be the insiders' cash proceeds from cashing out shares (Aharony et al., 1993). The fact that increased share price enhances personal wealth provides insiders the incentive to manage earnings through accounting discretion.

Therefore, we predict that insiders planning or considering selling personal shares at lockup expiration will manage earnings upward to keep their stock price high before they cash out at lockup expiration. Specifically, insiders may increase current accruals by advancing recognition of revenues with credit sales and/or by delaying recognition of expenses to achieve high reported earnings. Hence, our first hypothesis states as follows:

We further explore whether insiders start inflating earnings in the pre-IPO period and continue managing earnings in the IPO lockup period due to the incentive to cash out at higher price at lockup expiration. Whereas during the post-lockup expiration period, we predict lower level of earnings management due to the absence of insider selling incentives. We compare earnings management measures in the pre-IPO and lockup periods with those in the post-lockup period. Hence, our first hypothesis states as follows:

***H1: Firms exhibit higher levels of earnings management in the pre-IPO and lockup periods than in the post-lockup period.***

Prior studies have documented the role of underwriters and venture capitalists in reducing information asymmetry and earnings management (Titman and Trueman, 1986; Megginson and Weiss, 1991; Morsfield and Tan, 2006; Chang et al., 2010). We further investigate the incremental impact of prestigious auditors on mitigating earnings management behavior beyond the monitoring role of underwriters and venture capitalists. That is, whether auditor quality helps reduce earnings management in the IPO context, after controlling for prestigious underwriters and venture capitalists.<sup>2</sup>

An entrepreneur who decides to go public must hire an auditor to examine his/her firm's financial statements. Financial statements in the IPO firm's prospectus have to be audited. Firms use auditors with high reputations to signal their high quality (Carpenter and Strawser, 1971; Titman and Trueman, 1986). From the auditors' perspective, they also have incentive to investigate and report deviations since their reputation capital is reduced by ex post misstatements (DeAngelo, 1981b; Beatty, 1989; Michaely and Shaw, 1995). High-quality CPA firms have more invested in their reputational capital, therefore have more to lose if they fail to reveal material misrepresentations (DeAngelo, 1981b). Therefore, we argue that high-quality auditors are more likely to curb earnings management in the IPO lockup period than low-quality auditors. Any earnings management behavior is more likely to be detected by high quality auditors. Therefore, our second hypothesis is stated as follows:

***H2: IPO firms that hire higher-quality auditors are associated with less accrual-based earnings management in the pre-IPO and lockup periods than firms that hire lower-quality auditors.***



The quarters that fall in the IPO lockup period may be either the fiscal year end or the interim quarters. Financial reports for the fiscal year end quarter are audited, whereas interim financial reports are not required to be audited, but reviewed. Interim reviews are distinguished from annual audits in scope. An audit usually consists of physical inspection, confirmation from external parties or examination of documents, whereas a review consists of simply inquiries, analytical procedures and discussion. As of March 2000, the SEC requires all registrants to have their quarterly financial statements reviewed before those reports are filed with the SEC (SEC, 1999). Before the SEC adopted the rule, firms could delay the review of their interim financial reports until the end of the fiscal year.

Interim reviews generally offer a lower degree of assurance, while annual audits are more intensive and carry more legal and regulatory responsibilities than do interim reviews (Kinney et al., 2004). Alves and Dos Santos (2008) find that the audited annual reports spur more significant price reactions than the unaudited quarterly reports. On the other hand, management has more discretion in the preparation of *interim* reports, and more opportunity to manipulate earnings when the earnings reports are unaudited than for annual reports (Mendenhall and Nichols, 1988). Hence our third hypothesis is stated as follows:

**H3:** *IPO firms whose financial statements in the lockup period have been audited are associated with less earnings management than firms whose lockup period financial statements have been reviewed.*

## RESEARCH DESIGN

We include discretionary current accruals (DCA) and discretionary total accruals (DTA) as our primary measures of earnings management around IPO lockup expiration (Dechow et al., 1995; Teoh et al., 1998a; Kothari et al., 2005). We start with the following model from Morsfield and Tan (2006) and Chang et al. (2010):

$$EM_{i,t} = a_0 + \beta_1 UW_i + \beta_2 VC_i + \beta_3 Big4_i + \beta_4 SEO_i + \beta_5 Hi-Tech_i + \beta_6 Age_i + \beta_7 \Delta CapEx_{i,t} + \beta_8 \Delta S_{i,t} + \beta_9 Proceeds_i + \beta_{10} Underprice + \beta_{11} ROA_{i,t} + \beta_{12} Loss_{i,t} + \beta_{13} CFO_{i,t} + \beta_{14} LnAT_{i,t} + \beta_{15} LEV_{i,t} + \beta_{16} OpCycle_{i,t} + \beta_{17} CapInt_{i,t} + IND + Year + \varepsilon_{i,t} \quad (1)$$

where,

- $EM_{i,t}$  = Levels of earnings management for firm  $i$  at quarter  $t$ , measured by DCA;
- $UW_i$  = Underwriter ranking with the value 0-9 from the Ritter website at <http://bear.warrington.ufl.edu/ritter/ipodata.htm>;
- $VC_i$  = Dummy variable equals one if the IPO firm is venture capitalist-backed, and zero otherwise;
- $Big4_i$  = Dummy variable equals one if the auditor is one of the Big Four auditors, and zero otherwise;
- $SEO_i$  = Dummy variable equals one if the firm subsequently conducted a seasoned equity offering, and zero otherwise;
- $Hi-Tech_i$  = Indicator variable that equals 1 if the IPO firm is in the high-tech industry (data obtained from SDC), and 0 otherwise;
- $Age_i$  = The IPO firm age measured as the natural logarithm of one plus the firm's age [ $\ln(1+age)$ ], where firm age is calculated as the difference between the IPO issue-year and the founding year;
- $\Delta CapEx_{i,t}$  = Change in capital expenditure from quarter  $t-1$  to quarter  $t$ , scaled by total assets in quarter  $t-1$ ;
- $\Delta S_{i,t}$  = Firm growth measured as change in sales from quarter  $t-1$  to quarter  $t$  for firm  $i$ , scaled by the sales in quarter  $t-1$ ;
- $Proceeds_i$  = Offer price multiplied by total number of primary shares issued for firm  $i$ ;

- Underprice<sub>i</sub> = Measured as the ratio between the offer price and the first-day closing price minus the offer price [(closing price – offer price)/ offer price];
- ROA<sub>i,t</sub> = Return on assets calculated as the ratio of net income to total assets;
- Loss<sub>i,t</sub> = Dummy variable for firms that report a loss in quarter t;
- CFO<sub>i,t</sub> = Cash flow from operations in quarter t;
- LnAT<sub>i,t</sub> = Firm size measured by the natural logarithm of total assets at quarter t;
- LEV<sub>i,t</sub> = Financial leverage calculated as the ratio of total liabilities to total assets in quarter t;
- OpCycle<sub>i,t</sub> = Operating cycle, calculated as  $\frac{(AR_t + AR_{t-1})/2}{\left(\frac{\text{Sales}}{360}\right)} + \frac{(INV_T + INV_{T-1})/2}{\left(\frac{\text{COGS}}{360}\right)}$ ;
- CapInt<sub>i,t</sub> = Capital intensity calculated as the ratio of gross PPE to total assets at quarter t;
- IND = Industry dummy; and
- Year = Year dummy.

We first include a set of variables to control for the monitoring role of underwriter reputation, venture capital backing, and auditor quality. Prior studies have demonstrated that prestigious underwriters and venture capitalists play a monitoring role by reducing information asymmetry and/or earnings management (Titman and Trueman, 1986; Carter and Manaster, 1990; Brav and Gompers, 2003; Morsfield and Tan, 2006; Fan, 2007). Therefore, we include underwriter (UW) ranking and venture capitalist-backing (VC) as control variables in the model. Underwriter reputation is ranked on a scale of 0-9, where 9 is the most prestigious underwriter and 0 is the least prestigious (Loughran and Ritter, 2004). We expect the coefficients on both variables to be negative. We also include an indicator variable Big4 to control for audit quality. Becker et al. (1998) and Krishnan (2003) find evidence that higher-quality auditors play a significant monitoring role in detecting and mitigating accrual-based earnings management. We expect the coefficient on Big4 to be negative.

Teoh et al. (1998b) document that subsequently issuing seasoned equity offerings (SEOs) provides incentives for earnings management. Hence, we include an indicator variable SEO and predict the coefficient on SEO to be positive. Hi-Tech, Age,  $\Delta S$  and  $\Delta \text{CapEx}$  measure growth opportunities. Younger and high-growth firms build a substantial part of firm value from highly uncertain growth opportunities, making it easier for management of these firms to manage earnings. Hi-Tech is a dummy variable that equals to one if the IPO firm is in the high-tech industry. Age is calculated as the natural logarithm of one plus the age of the firm before going public, where age is the difference between the founding year and the IPO year.  $\Delta \text{Sales}$  measures change in sales from quarter t-1 to quarter t for firm i, scaled by the sales in quarter t-1.  $\Delta \text{CapEx}$  is the change in capital expenditure from quarter t-1 to quarter t scaled by total assets at quarter t-1 (Rangan, 1998; Teoh et al., 1998a; Cohen and Zarowin, 2010). High growth firms are more likely to experience high discretionary accruals due to increased sales revenue and have more uncertainty regarding the firm valuation. Therefore, we expect the coefficients on changes in sales ( $\Delta S$ ) and capital expenditure ( $\Delta \text{CapEx}$ ) growth to be positively, and Hi-Tech and firm age (Age) to be negatively associated with earnings management.

Following prior research, we also control for IPO underpricing (Underprice) and IPO proceeds (Proceeds) (Chang et al., 2010). IPO proceeds are calculated as the offer price multiplied by total number of primary shares issued. Underprice is measured as the ratio between offer price and first-day closing price minus offer price. Prior studies have found evidence that the first-day IPO underpricing is positively associated with post-IPO stock returns and insider selling (Aggarwal et al. 2002) and negatively associated with earnings information quality (Boulton et al., 2011). Similarly, prior research has found that IPOs with larger proceeds have more incentive to inflate earnings (Teoh et al., 1998d; DuCharm et al., 2004). Therefore, we expect the coefficients on Underprice and Proceeds to be positive.

Kothari et al. (2005) show that operating performance is associated with the magnitude of discretionary accruals, thus we include three variables to control for operating performance and profitability: return on asset (ROA), cash flow from operation (CFO), and Loss (Chang et al., 2010; Gunny, 2010). Firms with high operating performance have less incentive to conduct earnings

management. Roychowdhury (2006) finds evidence that firms reporting loss are more likely to manage earnings. We expect the coefficient on Loss to be positive and the coefficients on ROA and CFO to be negative.

Leverage (LEV) captures financial structure. We use the ratio of total liabilities to total equity to measure LEV. Aharony et al. (1993) provide evidence that earnings management is more pronounced among firms with large financial leverage. Morsfield and Tan (2006) argue that highly leveraged firms have high incentives to manipulate earnings upwards in order to avoid covenant violation, but these firms may also face greater monitoring debt holders. Thus, we do not have a specific prediction for the coefficient on LEV.

We include the natural logarithm of total assets (LnAT) to measure firm size. Prior studies suggest firm size is positively associated with accrual quality (Brau et al., 2004). Larger firms are expected to have greater information available to markets and are more closely followed by analysts, which reduces the opportunity for earnings management. Therefore, we expect the coefficient on LnAT to be negative.

Anecdotal and empirical evidence indicates a reversal in the pattern of quarterly earnings changes. A firm performing poorly in the interim quarterly may attempt to increase earnings of the fourth quarter, whereas a firm performing well in interim quarters may attempt to decrease earnings of the fourth quarter to build a reserve for the future (Das et al., 2009). Accordingly, we include in our model operating cycle (OpCycle) and capital intensity (CapInt) to control for quarterly fixed effect. Finally, we include controls for industry (IND) and year (Year) fixed effect.

Our first hypothesis (H1) predicts income-increasing earnings management by IPO firms during the pre-IPO and lockup periods relative to the post-lockup period. To test this hypothesis, we add two dummy variables, Pre-IPO and Lockup, into the basic model developed in the previous section. We divide our sample into three periods: pre-IPO, lockup and post-lockup periods.

**FIGURE 1  
TIME LINE**

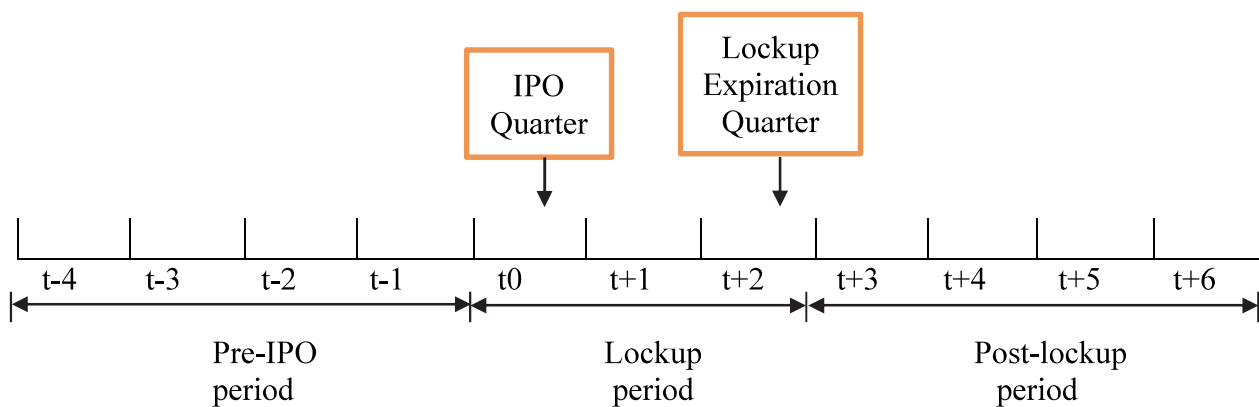


Figure 1 illustrates our time line. We define the fiscal quarter in which the IPO occurs as IPO Quarter ( $t=0$ ) and the fiscal quarter in which lockup expires as Lockup Expiration Quarter ( $t=1+2...+12$ ). Our lockup period begins with the IPO Quarter and ends with the Lockup Expiration Quarter.<sup>3</sup> The pre-IPO period is composed of four quarters prior to the IPO Quarter and the post-lockup period comprises four quarters after the Lockup Expiration Quarter. The post-lockup period is our estimation period or control period. To better capture the normal level of firm accounting choice, Hence, we test H1 using the following regression model:

$$EM_{i,t} = a_0 + \beta_1 \text{Pre-IPO}_{i,t} + \beta_2 \text{Lockup}_{i,t} + \beta_3 \text{UW}_i + \beta_4 \text{VC}_i + \beta_5 \text{Big4}_i + \beta_6 \text{SEO}_i + \beta_7 \text{Hi-tech}_i + \beta_8 \text{Age}_i + \beta_9 \Delta \text{CapEx}_{i,t} + \beta_{10} \Delta \text{S}_{i,t} + \beta_{11} \text{Proceeds}_i + \beta_{12} \text{Underprice} + \beta_{13} \text{ROA}_{i,t} + \beta_{14} \text{Loss}_{i,t} + \beta_{15} \text{CFO}_{i,t} + \beta_{16} \text{LnAT}_{i,t} + \beta_{17} \text{LEV}_{i,t} + \beta_{18} \text{OpCycle}_{i,t} + \beta_{19} \text{CapInt}_{i,t} + \text{IND} + \text{Year} + \varepsilon_{i,t} \quad (2)$$

where,

Pre-IPO<sub>i,t</sub> = Dummy variable that equals one if the firm-quarter observation is in the pre-IPO period, and zero otherwise.

Lockup<sub>i,t</sub> = Dummy variable that equals one if observation is in the lockup quarters, and zero otherwise.

All other variables have been previously defined. We compare earnings management measures in the pre-IPO and lockup periods with those in the post-lockup period. In this analysis, the post-lockup period is used as a control base. We believe that the post-lockup period serves as an appropriate control because these sample firms are homogenous to the firms in the pre-IPO and lockup periods, the only difference being that in the post-lockup period the insider selling incentive does not exist or at least becomes less influential. A significant positive coefficient on Pre-IPO and Lockup will be consistent with H1, indicating the existence of earnings management at both the pre-IPO and lockup periods relative to the post-lockup period

Then we examine whether auditor quality mitigates the opportunistic earnings management behavior in the pre-IPO and IPO lockup periods. Following prior research, we use auditor size (Big4) as a proxy for auditor quality, which is the two-tier classification scheme of Big-Four versus non-Big-Four auditors. We use the following regression to test H2:

$$EM_{i,t} = a_0 + \beta_1 \text{Pre-IPO}_{i,t} + \beta_2 \text{Lockup}_{i,t} + \beta_3 \text{Pre-IPO}_{i,t} \times \text{Big4}_{i,t} + \beta_4 \text{Lockup}_{i,t} \times \text{Big4}_{i,t} + \beta_5 \text{UW}_i + \beta_6 \text{VC}_i + \beta_7 \text{Big4}_i + \beta_8 \text{SEO}_i + \beta_9 \text{Hi-Tech}_i + \beta_{10} \text{Age}_i + \beta_{11} \Delta \text{CapEx}_{i,t} + \beta_{12} \Delta \text{S}_{i,t} + \beta_{13} \text{Proceeds}_i + \beta_{14} \text{Underprice} + \beta_{15} \text{ROA}_{i,t} + \beta_{16} \text{Loss}_{i,t} + \beta_{17} \text{CFO}_{i,t} + \beta_{18} \text{LnAT}_{i,t} + \beta_{19} \text{LEV}_{i,t} + \beta_{20} \text{OpCycle}_{i,t} + \beta_{21} \text{CapInt}_{i,t} + \text{IND} + \text{Year} + \varepsilon_{i,t} \quad (3)$$

All variables have been previously defined. Our variables of interest are the two interaction terms. We predict that the coefficients on the two interaction terms will be negative.

Hypothesis H3 predicts IPO firms present lower levels of earnings management in the pre-IPO and lockup periods when the quarterly financial statements are audited than when their financials are just reviewed. We use the following regression model to test H3:

$$EM_{i,t} = a_0 + \beta_1 \text{Pre-IPO}_{i,t} + \beta_2 \text{Lockup}_{i,t} + \beta_3 \text{Pre-IPO}_{i,t} \times \text{Audit}_{i,t} + \beta_4 \text{Lockup}_{i,t} \times \text{Audit}_{i,t} + \beta_5 \text{UW}_i + \beta_6 \text{VC}_i + \beta_7 \text{Big4}_i + \beta_8 \text{SEO}_i + \beta_9 \text{Hi-Tech}_i + \beta_{10} \text{Age}_i + \beta_{11} \Delta \text{CapEx}_{i,t} + \beta_{12} \Delta \text{S}_{i,t} + \beta_{13} \text{Proceeds}_i + \beta_{14} \text{Underprice} + \beta_{15} \text{ROA}_{i,t} + \beta_{16} \text{Loss}_{i,t} + \beta_{17} \text{CFO}_{i,t} + \beta_{18} \text{LnAT}_{i,t} + \beta_{19} \text{LEV}_{i,t} + \beta_{20} \text{OpCycle}_{i,t} + \beta_{21} \text{CapInt}_{i,t} + \beta_{22} \text{Audit}_{i,t} + \text{IND} + \text{Year} + \varepsilon_{i,t} \quad (4)$$

where,

Audit<sub>i,t</sub> = Dummy variable that equals one if the sample firm i is audited at quarter t, and zero otherwise.

All other variables have been previously defined. Our variables of interest are the two interaction terms. We predict that the coefficients on the two interaction terms will be negative.

## SAMPLE SELECTION

We collect IPO data from the Securities Data Company (SDC) and financial data from Compustat Quarterly. The initial full sample consists of 4,312 US IPOs between 1996 and 2010 from the Global New Issues database of the SDC. Table 1 presents our sample selection process. Consistent with prior studies on IPOs and earnings management, we exclude offerings consisting of close-end funds, real estate

investment trusts (REITs), reverse leveraged buyouts, any spinoffs, limited partnership, shares of beneficial interest (SBI), foreign corporations, American depository receipts (ADRs), unit issues.<sup>4</sup> These restrictions result in a sample of 3,147 offers (1,165 offers are eliminated). We further require offer prices to be greater than \$1 and with IPO lockup information and underwriter data available. This procedure eliminates 896 offers, leaving a sample of 2,251 US common stock offerings from the SDC.

In addition, we require firms to have sufficient financial data from Compustat Quarterly to calculate accrual-based earnings management measures. We further require each sample firm to have at least nine quarterly observations (four-quarterly data in the pre-IPO period, one-quarterly data in lockup period, and four-quarterly data in the post-lockup period). Furthermore, for inclusion in the sample, an offering firm must have at least eight non-IPO peers in the same industry (based on two-digit SIC) and quarter to facilitate the estimation of expected accruals. We also require necessary data to calculate all control variables included in the models. Finally, we exclude firms in the financial (SIC 60-69) and utility (SIC 49) industries as they are highly regulated industries with different accounting rules. These restrictions further eliminate 1,507 IPOs, leaving a final sample of 744 unique firms with 7,500 firm-quarter observations.

**TABLE 1**  
**SAMPLE SELECTION PROCESS**

Selection item	Sub-total	Total
Total number of IPOs in 1996-2010		4,312
Less: REITs and close-end funds	(751)	
Less: Reversed leverage buyouts and spinoffs	(259)	
Less: Limited partnership, unit offerings, ADRs, foreign corporation, shares of beneficial interest (SBI)	<u>(155)</u>	3,147
Less: Firms whose offer price < \$1	(31)	
Less: Firms with no lockup agreement or no underwriter data available	<u>(865)</u>	
Sample IPOs available		2,251
Less: Firms without sufficient financial data in COMPUSTAT Quarterly	(994)	
Less: Firms with less than nine quarterly observations	(64)	
Less: Firms missing data included in the regression analyses	(46)	
Less: Firms in the utilities (SIC 49) and financial (SIC 60-69) industries	<u>(403)</u>	
Final sample		<u>744</u>

Table 2 presents the sample characteristics and descriptive statistics. Panel A provides the distribution of IPO firms by year for the full sample. Consistent with prior IPO research, there is some clustering in time. Approximately 71 percent of sample IPO firms are concentrated in four years from 1996 to 1999. This is not surprising, as the stock market boomed during this period due to the dot-com IPO bubble. The lowest numbers of IPOs in our sample are in 2001, when the dot-com bubble crashed, and in 2008 as the result of the recent financial crisis. Panel B presents the distribution of IPO firms by industry using two-digit SIC codes. Our sample represents a wide selection of 55 different industries. At the same time, there is also a concentration of IPOs in computer, electronic, chemical products, and high-technology industries (SIC codes 28, 35, 36, 38, 73). They make up about 54.3 percent of the total sample.

Panel C of Table 2 reports the post-IPO firm characteristics and descriptive statistics for the full sample. The mean market value immediately after IPO is about \$400 million, but the median is only \$170 million, both about four to five times the post-issue book values (\$317 million in mean and \$125 million in median for the insider ownership sample). The mean (median) book-to-market ratio (BTM) is 28 (25) percent. The mean of total assets (AT) is \$209 million and the mean of sales is \$49 million (\$139 million and \$34 million, respectively, for the insider ownership sample). The significantly high mean and low medians in these values suggest skewness in both samples. To address this issue, we take the natural logarithm of total assets as a control variable for firm size in our cross-sectional analyses. Using log transformation should be able to mitigate the skewness problem.

**TABLE 2**  
**SAMPLE CHARACTERISTICS**

Panel A: Time distribution of IPO sample during 1996-2010

Year	Freq.	Percent	Cum. Percent
1996	234	31.45	31.45
1997	155	20.83	52.28
1998	76	10.22	62.50
1999	61	8.20	70.70
2000	21	2.82	73.52
2001	4	0.54	74.06
2002	8	1.08	75.13
2003	10	1.34	76.48
2004	31	4.17	80.65
2005	29	3.90	84.54
2006	48	6.45	90.99
2007	38	5.11	96.10
2008	4	0.54	96.64
2009	7	0.94	97.58
2010	18	2.42	100.00
Total	744	100	

**TABLE 2 (CONTINUED)**

Panel B: Industry distribution of IPO sample during 1996-2010

Industry	Two-digit SIC Codes	Freq.	Percent
Oil and Gas	13	27	3.63
Food products	20	9	1.21
Paper, paper products and printing	24-27	10	1.34
Chemical Products	28	49	6.59
Manufacturing	30-34	19	2.55
Computer Hardware & Software	35	47	6.32
Electronic Equipment	36	54	7.26
Transportation	37,39,40-42,44,45	41	5.51
Scientific Instruments	38	44	5.91
Communications	48	31	4.17
Durable Goods	50	20	2.69
Retail	53,54,56,57,59	36	4.84
Eating and Drinking Establishments	58	13	1.75
Business Services	73	210	28.23
Entertainment Services	70,78,79	16	2.15
Health	80	18	2.42
Engineering and management services	87	29	3.90
All others	1, 2, 10, 12, 14, 15, 16, 17, 21, 22, 23, 29, 46, 47, 51, 55, 72, 75, 76, 81, 82, 83, 86, 99	71	9.54
Total		744	100.00

**TABLE 2 (CONTINUED)**

Panel C: Post-offer firm characteristics for the full sample

Variables	Mean	Median	S.D.	Minimum	Maximum
MV (US\$ mil)	399.18	170.32	991.16	1.89	16,999.73
BV (US\$ mil)	76.64	35.83	183.36	-632.90	2,534.56
BTM	0.28	0.25	0.23	-0.99	2.11
S (US\$ mil)	49.02	11.81	139.95	0.00	1,990.58
NI (US\$ mil)	-0.65	0.21	11.69	-130.82	69.26
AT (US\$ mil)	208.61	54.18	804.39	0.84	18,677.40
ROA	-0.02	0.01	0.11	-1.14	0.64
CFO (US\$ mil)	10.69	0.19	100.81	-56.97	2,614.57
LEV	0.40	0.29	0.46	0.02	6.68
CapEx	26.76	1.43	429.05	0.00	11,644.84
Offer Price (US\$)	12.08	12.00	5.06	3.50	65.00
Proceeds (US\$ mil)	77.71	40.00	133.93	3.75	1,432.17
Age (years)	14.98	8.00	20.02	0.00	158.00
Underpricing	0.19	0.10	0.38	-0.96	6.06
Lockup (days)	214.91	180.00	113.06	90.00	1,095.00
Owner (%)	0.72	0.71	0.46	0.01	8.78
UW	6.98	8.00	2.25	1.00	9.00
VC	0.41	0.00	0.49	0.00	1.00
Big4	0.90	1.00	0.29	0.00	1.00
Hi-Tech	0.53	1.00	0.50	0.00	1.00

The mean value of Owner indicates that, on average, the number of shares owned by pre-IPO owners make up 72 percent of shares outstanding after IPO, consistent with prior research that the majority of ownership is retained by pre-IPO owners. The mean underwriter reputation ranking (UW) in our IPO sample is 6.98 (median 8.00) on a scale of 0-9; about 41 percent of the IPOs in our sample are venture-backed, most IPOs (90 percent) are audited by the Big-Four auditors, and 53 percent of IPOs belong to the high-tech industries.

Table 3 reports the time-series distribution for the two measures of earnings management, all scaled by prior period total assets, from quarter -4 to quarter +6 relative to the IPO quarter.<sup>5</sup> The mean DCA change over time from significantly negative at quarter -4 (-0.162, significant at 1% level) to significantly positive at quarter -1 up to quarter +3 (0.021, significant at 1%), then become negative again, though insignificant, at quarters + 4 and + 6. A similar time-series pattern is also observed with the mean DTA. Consistent with our hypothesis of income-increasing earnings management around the IPO lockup period, we find significant positive abnormal current accruals and total accruals.



**TABLE 3**  
**TIME-SERIES DISTRIBUTION OF ACCRUALS**

Proxies for EM	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
<b>DCA</b>											
Mean	-0.16	-0.20	-0.08	<b>0.03</b>	<b>0.05</b>	<b>0.03</b>	<b>0.02</b>	<b>0.02</b>	-0.79	0.01	-0.01
T-stat	(-8.0)***	(-8.2)***	(-4.2)***	(1.6)*	(2.6)***	(2.5)**	(3.1)***	(3.2)***	(-1.0)	(0.5)	(-1.1)
N	185 <sup>a</sup>	172	404	636	694	712	713	714	722	713	696
<b>DTA</b>											
Mean	-0.31	-0.36	-0.19	-0.03	-0.18	0.002	<b>0.03</b>	0.02	-0.91	0.01	0.02
T-stat	(-11.6)***	(-8.4)***	(-8.6)***	(-1.2)	(-1.1)	(0.2)	(3.2)***	(1.4)	(-1.0)	(1.4)	(-1.8)*
N	185	172	404	636	694	712	713	714	722	713	696

\*, \*\*, \*\*\* Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.

Table 3 reports time-series statistics on DCA and DTA in percentage of lagged total assets. DCA is extracted from current accruals by a within two-digit SIC industry cross-sectional modified Jones (1991) model. Expected accruals are estimated each quarter from a cross-sectional regression of current accruals on the change in sales using all non-issuing firms in the same two-digit SIC code as the IPO firm. Expected accruals are the predicted accruals from the regression after subtracting change in accounts receivables from change in sales. DCA is current accruals minus expected current accruals. All accrual variables are scaled by lagged total assets and are reported as a percentage of lagged total assets. DTA is estimated in the similar process. P-values for the Wilcoxon signed-rank tests are two-tailed, based on t distribution for means. See Appendix A for variable descriptions.

<sup>a</sup> The number of observations goes down dramatically in the pre-IPO quarters because there are only a limited number of firms report interim quarter financial information prior to IPO.

## EMPIRICAL RESULTS

H1 predicts earnings management in the pre-IPO and lockup periods in connection with the post-lockup period. Table 4 presents the results of two regression analyses for our hypothesis H1. The mean adjusted explanatory powers for the two models range from approximately 3.2 percent to 15.72 percent, which are comparable to prior literature. In the DCA column, the coefficients on control variables are generally consistent with prior studies. Results show that Big4,  $\Delta$ CapEx, Proceeds, Underprice, ROA, Loss, CFO, OpCycle, and CapInt are important factors in explaining discretionary current accruals. The coefficient on Big4 is negative and significant ( $t = -1.71$ ), suggesting that auditors with a higher reputation are more likely to mitigate earnings management. Consistent with our prediction of monitoring function, the coefficients on UW and VC are negative but insignificant.

When DCA is used as a dependent variable, the coefficient on Lockup is positive and significant (0.027,  $t=3.29$ ) after controlling for other variables, indicating that IPO firms engage in income-increasing earnings management during the lockup period. Consistent with hypothesis H1, the coefficient on pre-IPO is positive and marginally significant (0.021,  $t=1.77$ ). Therefore, H1 is supported. Our sample firms exhibit income-increasing earnings management in the lockup and pre-IPO periods in connection with the post-lockup period.

**TABLE 4**  
**REGRESSION RESULTS OF EARNINGS MANAGEMENT AROUND IPO LOCKUPS**

Variables	Pred. sign	Model 1 (DCA)		Model 2 (DTA)	
		Coeff.	t-Statistic	Coeff.	t-Statistic
Intercept		0.035	0.40	0.507	1.24
Pre-IPO	H2: +	<b>0.021*</b>	1.77	0.067	1.12
Lockup	H1: +	<b>0.027***</b>	3.29	-0.050	-1.20
UW	-	-0.001	0.59	0.015	1.42
VC	-	-0.006	0.73	0.015	0.37
BIG4	-	-0.023*	-1.71	-0.159**	-2.39
SEO	+	0.012	1.03	0.081	1.36
Hi-tech	-	-0.008	-0.85	-0.267***	-5.44
Age	-	-0.002	-0.42	0.048**	2.27
ΔCapEx	+	0.002**	2.33	0.008*	1.70
ΔS	+	0.000	0.16	-0.001	-0.24
Proceeds	+	6.832*	1.77	-5.348	-0.24
Underprice	+	0.019**	2.09	-0.245***	-5.28
ROA	-	-0.051***	-3.53	-0.666***	-9.27
Loss	+	0.013*	1.70	-0.042	-1.09
CFO	-	0.000**	-2.16	0.000	-0.48
LnAT	-	-0.006	-1.32	-0.022	-1.04
LEV	+/-	0.012	1.14	0.123**	2.42
OpCycle	+	0.000*	1.69	0.000	-1.62
CapInt	-	-0.044***	4.28	-1.650***	-31.9
Year-fixed effect		Yes		Yes	
# of obs.		7,500		7,500	
Adj. R <sup>2</sup> (%)		3.22		15.7	

\*, \*\*, \*\*\* Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.

In the DTA column, however, the coefficient on Pre-IPO remains positive but not statistically significant, while the coefficient on Lockup becomes negative but insignificant. Therefore, we do not find evidence of earnings management through total accrual adjustment.<sup>6</sup> This is not surprising as prior studies have documented that managers have more discretion over short-term than long-term accruals (Guenther, 1994; Teoh et al., 1998a). We also acknowledge that our quarterly data with a sample period of about ten quarters may not be able to capture long-term accrual adjustment by management.

Our second hypothesis predicts that high-quality auditors constrain accrual-based earnings management in the pre-IPO and lockup periods.<sup>7</sup> Consistent with prior research, we use an indicator variable Big4 to measure auditor quality. The Big4 column of Table 5 provides results to test H2. The estimated coefficients on Pre-IPO and Lockup remain positive and significant, indicating the presence of earnings management in the pre-IPO and lockup periods. All control variables are consistent with prediction in sign. The results also show that variables such as ΔCapEx, Proceeds, Underprice, ROA, CFO, OpCycle, and CapInt are significant factors in explaining the variation in DCA. Our variables of interest are the two interaction terms: Pre\_IPO\*Big4 and Lockup\*Big4. The coefficient on the interaction

term of Lockup\*Big4 is negative and highly significant (-0.159,  $t=-4.60$ ). The coefficient on Pre-IPO\*Big4, though negative, is not statistically significant. Hypothesis H2 is supported. These results suggest that sample firms audited by big-four auditors exhibit significantly less accrual earnings management around IPO lockup expiration after controlling for other factors.

Hypothesis H3 predicts that IPO firms experience lower levels of earnings management during the fiscal year-end quarters, when the financial statements are audited, than in the interim quarters, when the financial data are just reviewed. Regression results are presented in the Audit column of Table 5. Our variables of interest are the two interaction terms: Pre-IPO\*Audit and Lockup\*Audit. Consistent with hypothesis H3, the coefficient on the interaction term Lockup\*Audit is negative and significant (-0.043,  $t=-2.44$ ). The estimated coefficient on Pre-IPO\*Audit is negative; however, the negative coefficient is not statistically significant. Overall, we find that IPO firms experience lower levels of earnings management in the lockup periods when their financial statements are audited than in the interim quarters when their financials are just reviewed.

We then conduct the following sensitivity tests. First, to test whether our findings hold for different measures of accrual-based earnings management, we follow Kothari et al. (2005) and employ the performance-adjusted discretionary current accrual (ADCA) approach. Specifically, we match each IPO firm with one non-IPO firm in the same two-digit industry and quarter with the closest ROA. Then we estimate discretionary accruals as the difference between discretionary accrual from using the cross-sectional modified Jones model and the corresponding discretionary accruals for the performance-matched firm. The matching process results in a sample of 5,709 firm-quarter observations. We re-estimate equation (2) with the new measure of ADCA as our dependent variable. Results (untabulated) are similar to the main findings reported in Table 4 using DCA. The estimated coefficients for all control variables are consistent with our prediction. Adjusted  $R^2$  remains approximately 3.0 percent. The coefficient on Pre-IPO is positive yet insignificant. The estimated coefficient on Lockup is positive and significant (0.035,  $t=2.45$ ), indicating that sample IPO firms inflate earnings during the lockup period. Thus the primary results hold with the alternative measure of earnings management.

Second, venture capitalists as insiders may have incentives and abilities to manage earnings that are different from management. When venture capitalists decide to exit their position from a company, their incentive may no longer be aligned with other insiders or company shareholders. Instead, they focus more on short-run profit; they switch their interest to maximize their investment returns and are less interested in the reputation of the firm. Therefore, we partition our sample into 304 VC-backed firms (with 3,046 observations) and 435 non-VC-backed firms (with 4,454 observations). We re-estimate equation (2) separately for the two subsample groups. Results (untabulated) show that coefficients on Lockup for both groups are positive and significant; the coefficient on Lockup for the VC-backed groups is greater in magnitude and significance. Consistent with prior studies, we find that venture capitalists are generally aligned with management in inflating earnings during the lockup period.

**TABLE 5**  
**REGRESSION RESULTS OF H2 AND H3**

Variables	Predicted Sign	Model 1		Model 2	
		Coeff.	t-Statistic	Coeff.	t-Statistic
Intercept		0.009	0.11	0.034	0.42
Pre-IPO	+	0.167***	4.93	0.013	1.37
Lockup	+	0.048**	2.15	0.037***	3.92
BIG4	-	-0.005	-0.29	-0.023*	1.76
Pre_IPO*BIG4	-	-0.022	-0.93		
Lockup*BIG4	H1: -	-0.159***	-4.60		
Audit	-			-0.016*	1.63
Pre_IPO*Audit	-			-0.004	0.13
Lockup*Audit	H2: -			-0.043**	-2.44
UW	-	-0.001	-0.60	-0.001	-0.67
VC	-	-0.006	-0.76	-0.006	-0.79
SEO	+	0.013	1.05	0.009	0.78
Hi-tech	-	-0.009	-0.91	-0.008	-0.84
Age	-	-0.002	-0.45	-0.002	-0.38
ΔCapEx	+	0.002**	2.37	0.002**	2.34
ΔS	+	0.0001	0.17	0.0001	0.17
Proceeds	+	6.869*	1.78	6.705*	1.74
Underprice	+	0.020**	2.15	0.019**	2.02
ROA	-	-0.050***	-3.52	-0.049***	-3.39
Loss	+	0.012	1.54	0.012**	-2.02
CFO	-	-0.0001**	-2.16	-0.0001*	-1.91
LnAT	-	-0.006	-1.34	-0.005	-1.17
LEV	?	0.011	1.07	0.011	1.05
OpCycle	+	0.000*	1.75	0.0000	1.73
CapInt	-	-1.045***	-4.27	-0.044***	-4.21
Industry-fixed effect		Yes		Yes	
Year-fixed effect		Yes		Yes	
# of observations		6,674		6,674	
Adjusted R <sup>2</sup> (%)		3.53		3.50	

\*, \*\*, \*\*\* Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.

This table reports the estimation results of equations (3) and (4) based on the pooled ordinary least squared method with industry fixed effect and year indicators. The dependent variable is discretionary current accruals (DCA). See Appendix A for variable descriptions.

Third, we consider potential self-selection bias of firms in choosing their auditors. IPO firms are not randomly assigned to audit firms; it is probable that they self-select their auditors, either Big Four or non-

Big Four, based on factors other than auditor quality (i.e., firm size, private information, and underwriter recommendation, etc.). For example, Titman and Trueman (1986) find that entrepreneurs with favorable information about their firm's value choose higher-quality auditors. To address this potential self-selection bias, we follow Chaney et al. (2004) and use the Heckman (1979) approach to estimate the self-selection model.<sup>8</sup> Results (untabulated) show that the coefficient on the interaction term Lockup\*Big4 is still negative and significant (-0.037,  $t=-5.33$ ). After controlling for self-selection bias, we obtain similar results compared with the primary analysis presented in Table 4. These results indicate that self-selection is not an issue in our study.

Finally, we consider the influence of negative book values. Descriptive statistics in Panel C of Table 2 indicate a negative minimum book value for the full sample. To address the potential influence of negative book values on earnings management behavior in this study, we exclude all observations with negative book values (495 observations were deleted) and re-estimate equation (2) based on the new sample of 7,005 observations with DCA as the dependent variable. Results (untabulated) are similar to the primary findings reported in Table 4. The estimated coefficients on Lockup (0.114,  $t=3.35$ ) and Pre-IPO (0.033,  $t=1.95$ ) are positive and significant, indicating income-increasing earnings management during the lockup and Pre-IPO periods. Thus, the primary results hold after excluding sample observations with negative book values.

## CONCLUSIONS

Motivated by significant insider sales documented by prior research, we investigate whether insiders engage in income-increasing earnings management around the lockup period. We also compare levels of earnings management in the pre-IPO and lockup periods with those in the post-lockup period. In addition, we explore the impact of auditor quality on earnings management and annual audit in the unique setting of IPO lockups.

We first find evidence with our sample that IPO firms inflate earnings in the pre-IPO and lockup periods, mainly through current accruals manipulation. Our central results are that IPO firms that hire prestigious auditors experience less earnings management in the lockup period after controlling for the monitoring role of venture capitalist and underwriter reputation. Cross-sectional analysis also reveals that IPO firms are less likely to engage in earnings management in the fiscal yearend quarters than in the interim quarters, as firms' financial statement for fourth quarters are audited.

In summary, our study contributes to the earnings management literature by documenting accrual earnings manipulation during the pre-IPO and lockup periods, and this income-increasing earnings management could be motivated by insider sales at lockup expiration. Our results are robust to controlling for a number of issues including alternative AEM measures, separate VC-backed firms from non-VC-backed firms, and self-selection bias when choosing auditors.

The results of this study should be of interest to IPO investors, issuers and intermediaries such as underwriters and auditors. Prior research shows that opportunistic earnings management behavior has long-term consequences, including the long-run underperformance of IPO firms, reputation damage for management, underwriters, and auditors. A firm's reputation for credible information disclosures would be negatively affected by the opportunistic accounting choices, which in turn may negatively affect the firm's equity valuation on the capital market.

## ACKNOWLEDGEMENT

Minna Yu acknowledges the financial support from Business Council of Leon Hess Business School at Monmouth University.

## ENDNOTES

1. They are still subject to more general insider trading regulations such as Rule 10b-5, Rule 144 and Rule 701, which place additional restrictions on insider trading.
2. We control for underwriter reputation and venture capitalist-backing as prior research has documented evidence of significant monitoring role of underwriters and venture capitalists.
3. Figure 1 indicates a two-quarter IPO lockup period, which is based on the typical 180 lockup days documented in prior research (Bradley et al. 2001; Field and Hanka 2001). In our actual sample, this period varies from two to twelve quarters for different firms.
4. We use both SDC flag and CRSP share code to identify and remove certain offerings. For example, to delete close-end funds, we use SDC flag and CRSP share code 14; to delete REITs, we use the SDC REIT type code and CRSP share code 18.
5. The majority of firms in our sample have a lockup period from quarter 0 to quarter +2. Among the 744 sample IPO firms, 640 firms (86%) have a lockup period of two quarters; the rest of the firms (104 firms, about 14% of sample) have a lockup period ranging from three to twelve quarters.
6. In the subsequent analyses on auditor quality, annual audit and insider selling incentives, we find similar and insignificant results when using DTA. Therefore, we mainly report results from using DCA to estimate earnings management for all subsequent tests.
7. We drop the DTA measure for the audit quality analysis and all subsequent tests as prior studies also indicate that managers have more discretion over short-term than long-term accruals (Guenther 1994). The prior regression
8. In the first stage, we use a probit model regressing the indicator variable Big4 on a set of variables that are related to the choice of auditors including asset size, asset turnover, debt-asset ratio, current ratio, quick ratio, return on assets, and the interaction of return on assets and loss to compute the inverse Mills ratios (IMR). In the second stage, we include the inverse Mills ratio in our primary model as an additional explanatory variable.

## REFERENCES

- Aggarwal, R.K., Krigman, L., & Womack, K.L. (2002). Strategic IPO underpricing, information momentum, and lockup expiration selling. *Journal of Financial Economics*, 66(1), 105-137.
- Aharony, J., Lin, C., & Loeb, M.P. (1993). Initial public offerings, accounting choices, and earnings management. *Contemporary Accounting Research*, 10(1), 61-81.
- Alves, C.F., & Dos Santos, F.T. (2008). Do first and third quarter unaudited financial reports matter? The Portuguese case. *European Accounting Review*, 17(2), 361-392.
- Ball, R., & Shivakumar, L. (2008). Earnings quality at initial public offerings. *Journal of Accounting and Economics*, 45(2/3), 324-349.
- Beatty, R., & Ritter, J. (1986). Investment banking, reputation and the underpricing of initial public offerings. *Journal of Financial Economics*, 15, 213-232.
- Beatty, R. (1989). Auditor reputation and the pricing of initial public offering. *The Accounting Review*, 64(4), 693-709.
- Becker, C.L., Defond, M.L., Jiambalvo, J., & Subramanyam, K.R. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, 15(1), 1-24.
- Beneish, M.D. (2001). Earnings management: a perspective. *Managerial Finance*, 27(12), 3-18.
- Boulton, T.J., Smart, S.B., & Zutter, C.J. (2011). Earnings quality and international IPO underpricing. *The Accounting Review*, 86(2), 483-505.
- Bradley, D.J., Jordan, B.D., Yi, H., & Roten, I. C. (2001). Venture capital and IPO lockup expiration: an empirical analysis. *Journal of Financial Research*, 24(4), 465-493.
- Brau, J.C., Carter, D.A., Christophe, S.E., & Key, K.G. (2004). Market reaction to the expiration of IPO lockup provisions. *Managerial Finance*, 30(1), 75-91.
- Brau, J. C., Lambson, V.E., & McQueen, G. (2005). Lockups revisited. *Journal of Financial and Quantitative Analysis*, 40(3), 519-530.

- Brav, A., & Gompers, P.A. (2003). The role of lockups in initial public offerings. *The Review of Financial Studies*, 16(1), 1-29.
- Burgstahler, D., & Eames, M. (2006). Management of earnings and analysts' forecasts to achieve zero and small positive earnings surprises. *Journal of Business Finance and Accounting*, 33(5), 633-652.
- Carpenter, C.G., & Strawser, R. (1971). Displacement of auditor when clients go public. *Journal of Accountancy*, 131, 55-58.
- Carter, R., & Manaster, S. (1990). Initial public offerings and underwriter reputation. *Journal of Finance*, 45(4), 1045-1067.
- Chaney, P.K., Jeter, D.C., & Shivakumar, L. (2004). Self-selection of auditors and audit pricing in private firms. *The Accounting Review*, 79(1), 51-72.
- Chang, S., Chung, T., & Lin, W. (2010). Underwriter reputation, earnings management and the long-run performance of initial public offerings. *Accounting and Finance*, 50(1), 53-78.
- Cohen, D.A., Dey, A., & Lys, T.Z. (2008). Real and accrual-based earnings management in the Pre-and Post-Sarbanes-Oxley periods. *The Accounting Review*, 83(3), 757-787.
- Cohen, D.A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics*, 50(1), 2-19.
- Cotten, B.D. (2008). Earnings management prior to initial public offerings: evidence from secondary share data. *Quarterly Journal of Finance and Accounting*, 47(4), 87-107.
- Das, S., Shroff, P.K., & Zhang, H. (2009). Quarterly earnings patterns and earnings management. *Contemporary Accounting Research*, 26(3), 797-831.
- DeAngelo, L.E. (1981a). Auditor independence, 'low balling,' and disclosure regulation. *Journal of Accounting and Economics*, 3(2), 113-127.
- DeAngelo, L.E. (1981b). Audit size and audit quality. *Journal of Accounting and Economics*, 3(3), 183-199.
- Dechow, P.M., & Skinner, D. (2000). Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons*, 14(2), 235-250.
- Dechow, P.M., & Sloan, R. (1991). Executive incentives and the horizon problem: an empirical investigation. *Journal of Accounting and Economics*, 14(1), 51-89.
- Dechow, P.M., Sloan, R., & Sweeney, A.P. (1995). Detecting earnings management. *The Accounting Review*, 70(2), 193-226.
- Dechow, P.M., Sloan, R., & Sweeney, A.P. (1996). Causes and consequences of earnings manipulations: an analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research*, 13(1), 1-36.
- Dechow, P.M., Kothari, S.P., & Watts, R. L. (1998). The relation between earnings and cash flows. *Journal of Accounting and Economics*, 25(2), 133-168.
- DuCharme, L. Malatesta, P., & Sefcik, S. (2001). Earnings management: IPO valuation and subsequent performance. *Journal of Accounting, Auditing, and Finance*, 16(4), 369-396.
- Fan, Q. (2007). Earnings management and ownership retention for initial public offering firms: theory and evidence. *The Accounting Review*, 82(1), 27-64.
- Field, L. C., & Hanka, G. (2001). The expiration of IPO share lockups. *The Journal of Finance*, 56(2), 471-500.
- Friedlan, J.M. (1994). Accounting choices of issuers of initial public offerings. *Contemporary Accounting Research*, 11(1), 1-31.
- Guenther, D.A. (1994). Earnings management in response to corporate tax rate changes: evidence from the 1986 tax reform act. *The Accounting Review*, 69(1), 230-243.
- Gunny, K. (2010). The relation between earnings management using real activities manipulation and future performance: evidence from measuring earnings benchmarks. *Contemporary Accounting Research*, 27(3), 855-888.
- Healy, P., & Wahlen, J. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons*, 13(4), 365-383.

- Heckman, J.J. (1979). Sample selection bias as a specification error. *Econometrica*, 47, (February), 153-162.
- Hughes, P. (1986). Signaling by direct disclosure under asymmetric information. *Journal of Accounting and Economics*, 8, 119-142.
- Jeter, D.C., & Shivakumar, L. (1999). Cross-sectional estimation of abnormal accruals using quarterly and annual data: effectiveness in detecting event-specific earnings management. *Accounting and Business Research*, 29(4), 299-319.
- Jones, J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, 29(2), 192-228.
- Kinney, W.R., Palmrose, Z., & Scholz, S. (2004). Auditor independence, non-audit services, and restatements: was the U.S. government right? *Journal of Accounting Research*, 42(2), 561-588.
- Kothari, S.P., Leone, A.J., & Wasley, C.E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics*, 39(1), 163-197.
- Krishnan, G.V. (2003). Does big 6 auditor industry expertise constrain earnings management? *Accounting Horizons*, 17, 1-16.
- Krishnan, J., & Zhang, Y. (2005). Auditor litigation risk and corporate disclosure of quarterly review report. *Auditing: a Journal of Practice & Theory*, 24, (Supplement), 115-138.
- Lambert, E. (2001). Locking up profits: post-IPO sales by insiders can lower prices. *New York Post*, New York: December 2, Page 037.
- Leland, H., & Pyle, D. (1977). Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance*, 32(2), 371-387.
- Loughran, T. & Ritter, J.R. (2004). Why has IPO underpricing changed over time? *Financial Management*, 33, 5-37.
- Meggison, W.L., & Weiss, K.A. (1991). Venture capitalist certification in initial public offerings. *Journal of Finance*, 46, 879-903.
- Mendenhall, R., & Nichols, W. (1988). Bad news and differential market reactions to announcements of earlier-quarters versus fourth quarter earnings. *Journal of Accounting Research*, 26, (Supplement), 63-86.
- Michaely, R., & Shaw, W. (1995). Does the choice of auditor convey quality in an initial public offering? *Financial Management*, 24, 15-30.
- Morsfield, S.G., & Tan, C.E.L. (2006). Do venture capitalists influence the decision to manage earnings in initial public offerings? *The Accounting Review*, 81(5), 1119-1150.
- Park, M.S., & Park, T. (2004). Insider sales and earnings management. *Journal of Accounting and Public Policy*, 23(5), 381-411.
- Rangan, S. (1998). Earnings management and the performance of seasoned equity offerings. *Journal of Financial Economics*, 50(1), 101-122.
- Rajan, R., & Servaes, H. (1997). Analyst following of initial public offerings. *The Journal of Finance*, 52(2), 507-529.
- Sawicki, J., & Shrestha, K. (2008). Insider trading and earnings management. *Journal of Business Finance and Accounting*, 35(3/4), 331-346.
- Securities & Exchange Commission (SEC). (1999). Final Rule: Audit Committee disclosure. SEC Release No. 34-42266. Available at <http://www.sec.gov/rules/final/34-42266.htm>.
- Seyhun, H.N. (1986). Insiders' profits, costs and trading, and market efficiency. *Journal of Financial Economics*, 16(2), 189-212.
- Sletten, E., Y. Ertimur, J. Sundar, & Weber, J. (2018). When and why IPO firms manage earnings? *Review of Accounting Studies*, 23(3), 872-906.
- Teoh, S.H., Welch, I., & Wong, T.J. (1998a). Earnings management and the long-run market performance of initial public offerings. *The Journal of Finance*, 53(6), 1935-1974.
- Teoh, S.H., Welch, I., & Wong, T.J. (1998b). Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics*, 50(1), 63-99.



- Teoh, S.H., Wong, T.J., & Rao, G.R. (1998c). Are accruals during initial public offerings opportunistic? *Review of Accounting Studies*, 3(1-2), 175-208.
- Titman, S. & Trueman, B. (1986). Information quality and the value of new issues. *Journal of Accounting and Economics*, 8, (2), 159-172.
- Venkataraman, R. Weber, J.P., & Willenborg, M. (2008). Litigation risk, audit quality, and audit fees: evidence from initial public offerings. *The Accounting Review*, 83(5), 1315-1345.
- Watts, R.L., & Zimmerman, J.L. (1990). Positive accounting theory: a ten year perspective. *The Accounting Review*, 65(1), 131-156.

## APPENDIX

### VARIABLE DESCRIPTIONS

---

CA	Current accruals = change in accounts receivable (data#37) + change in inventory (data#38) + change in other current assets (data#39) - change in accounts payable (data#46) - change in tax payable (data#47) - change in other current liabilities (data#48); <sup>a</sup>
AT	Total assets (data#44);
S	Sales (data#2);
ΔS	Change in sales from quarter t-1 to t;
AR	Accounts receivable (data#37);
ΔAR	Change in accounts receivable from quarter t-1 to t;
NDCA	Nondiscretionary current accruals;
DCA	Discretionary current accruals, measured as the difference between CA and NDCA;
CFO	Cash flow from operation (data#108);
TA	Total accruals = net income (data#69) - CFO;
PPE	Gross property, plant and equipment (data#118);
ROA	Return on assets = net income/total assets;
NDTA	Nondiscretionary total accruals;
DTA	Discretionary total accruals, measured as the difference between TA and NDTA;
EM	Earnings management, measured using DCA, DTA;
UW	Underwriter reputation using the ranking of 0-9 from the Ritter website at <a href="http://bear.warrington.ufl.edu/ritter/ipodata.htm">http://bear.warrington.ufl.edu/ritter/ipodata.htm</a> ;
VC	Venture capital, a dummy variable equals one if IPO firm is venture-capitalist-backed, and zero otherwise;
Big4	Big Five/Four auditor, a dummy variable equals one if the IPO firm is audited by one of the Big Five/Four auditors, and zero otherwise;
SEO	Seasoned equity offering, a dummy variable equals one if the IPO firm subsequently conducted a seasoned equity offering, and zero otherwise;

Hi-tech	High-tech industry, a dummy variable that equals one if the IPO firm is in the high-tech industry, and zero otherwise;
Age	IPO age = $[\ln(1+\text{age})]$ , where age is calculated as the difference between the IPO issue year and the founding year;
Proceeds	IPO proceeds = offer price*total number of primary shares issued;
$\Delta\text{CapEx}$	Change in capital expenditure from quarter t-1 to t, scaled by total assets in quarter t-1;
Loss	A dummy variable that equals one if the firm reports a loss in the quarter, and zero otherwise;
LnAT	Firm size measured as the natural logarithm of total assets;
LEV	financial leverage = total liabilities (data# 54)/total assets;
OpCycle	Operating cycle = $\frac{(\text{AR}_t + \text{AR}_{t-1})/2}{\left(\frac{\text{Sales}}{360}\right)} + \frac{(\text{INV}_t + \text{INV}_{t-1})/2}{\left(\frac{\text{COGS}}{360}\right)}$ ;
CapInt	Capital intensity = gross PPE/total assets;
IND	Industry dummy;
YEAR	Year dummy;
Pre-IPO	A dummy variable that equals one if the firm-quarter observation is in the pre-IPO quarters, and zero otherwise;
Lockup	A dummy variable that equals one if the firm-quarter observation is in the lockup quarters, and zero otherwise;
Audit	A dummy variable that equals one if the firm-quarter financials are audited, and zero otherwise;

---

<sup>a</sup> The data item number provided in parenthesis is based on Compustat Quarterly Data Industrial item numbers at [http://www.crsp.chicagobooth.edu/documentation/product/ccm/cross/quarterly\\_data](http://www.crsp.chicagobooth.edu/documentation/product/ccm/cross/quarterly_data).