Evidence on managers' engagement in accrual-based versus real activities earnings management following Initial Public Offerings

Erasmus School of Economics, Erasmus University Rotterdam

Master Thesis

Abstract

This thesis aims to analyze how IPO firms use accrual-based earnings management (AM) or real activities earnings management (RAM) during-lock-up and post-lock-up period. Furthermore, it investigates whether IPO firms' tradeoff between AM and RAM is related to the firms' ability to use RAM and the cost of doing so. I provide empirical evidence that IPO firms employ earnings management (EM) more during the lock-up period than after the lock-up period expiration. Furthermore, I find that IPO firms' preference for RAM is related to the cost of using AM, which is associated with the outside scrutiny and potential penalties. However, I find a significantly negative association between RAM and net operating assets (NOA) the proxy for the flexibility of using AM, which is inconsistent with prior studies.

Keywords: accrual-based earnings management; real activities earnings management; lock-up period; tradeoff

Master of Science in Accounting, Auditing and control

Name: Min Chen

Student number: 453559

Supervisor: Dr. Alex Klein

Co-reader: Dr. Michael Erkens

Date: 2017-09-07

1. Introduction

1.1 Research question and Motivations

In this master thesis, I investigate both accrual-based earnings management (AM) and real activities earnings management (RAM) following initial public offerings (IPOs). The two main purposes of this thesis are 1) to analyze that IPO firms use AM or RAM during-lock-up period and post-lock-up period and 2) to investigate whether IPO firms' tradeoff between AM and RAM relates to firms' ability to use RAM and the cost of doing so. The main research question as follows:

RQ: Do IPO firms get involved in real activities versus accrual-based earnings management differently between during-lock-up period and post-lock-up period?

There are opportunities and different motivations to manage earnings surrounding IPOs. According to prior research (Ahearne et al., 2013; Bhojraj et al., 2009; Bessler and Thies, 2006), managements hold an extensive interest in taking advantage of the discretion in accounting items around the IPOs. On one side, original shareholders have the possibility to manage earnings to raise the issue price before IPOs so that they can add their firms' value. On the other side, shareholders intend to boost the share price after IPOs to gain more profits by selling their shares after the lock-up expiration (Ising, 2014). However, this incentive might decline in post-lock-up period, since it is less likely that a lot of shareholders will sell stocks at the same time. Given the limitation on the collection of pre-IPO data, this thesis focuses on comparing during lock-up period with post-lock-up period and investigating the second incentive of earnings management (EM). These special characters of IPO firms inspire me to look into IPO firms' EM.

The second motivation of my thesis is that AM and RAM have not gotten enough investigation in an IPO setting yet. IPO firms can employ different accounting strategies to mislead investors. If firms decide to use AM, managements will alter the accounting methods or estimates of given transactions in financial statements (Zang, 2012). For RAM, it is not only a mean used for higher earnings, but also it can affect the accounting items. Graham et al. (2005) present empirical evidences that firms indeed use RAM. Furthermore, Field and

Hanka (2001) present an idea that demonstrating the entire effect of earnings management needs to investigate its different strategies simultaneously. More important and interesting, there is a debate on whether IPO firms manipulate earnings to attain their specific targets. Teoh et al. (1998b) suggest that those managements of IPO firms raise earnings by adjusting discretionary accounting accruals. However, Ball and Shivakumar (2008) argue that managers prefer to use conservative accounting around IPOs. So the insufficient analysis and conflicting views motivate me to provide more empirical evidence on this issue.

Those accounting scandals happened at the beginning of 2000, Enron and WorldCom, decrease the trust in management, board, and auditing. Managers show a trend to shift away from AM to RAM after the enactment of SOX (Sarbanes Oxley Act). However, prior research doesn't provide enough empirical evidence on this issue under the IPOs setting. Meanwhile, Zang (2012) and Graham et al. (2005) contend that managers prefer RAM since that its techniques have less chance to be detected by outsiders (E.g. auditors and regulators). Firms attract more prominent scrutiny from outside when they go public; managers should have stronger motivation to use RAM rather than AM. Also, AM and RAM could be used alternately by managements (Cohen and Zarowin, 2010). Overall, it is better to analyze different types of operating figures so that market participants can get a deeper understanding IPO firms' diverging discretion.

1.2 Research Design and Findings

According to prior earnings management literature, I develop two hypotheses. First, IPO firms manage earnings more during the lock-up period than post it. Second, IPO firms' preference to choose RAM is associated with the ability and cost of doing so. To test my hypotheses, I measure the abnormal level of AM by adopting the Modified Jones Model of Dechow et al. (1995). Meanwhile, RAM I investigate includes overproducing inventory, cutting R&D expenses and SG&A expenditures. Thus I generate *RAM* according to Equation (5) to capture the RAM in total. Then I develop a two-stage Heckman model to investigate how these IPO firms trade off between RAM and AM according to the ability and the cost of doing so. I find that IPO firms indeed show a declining trend of using both RAM and AM

after the lock-up expiration. Furthermore, I find that IPO firms shift away from AM to RAM since that BIG4, SOX and LITIGATION increase the level of the scrutiny from outside and penitential punishment. While the NOA represent IPO firms' ability to use AM is negatively related to RAM, which is different from prior studies (Zang, 2012; Cohen and Zarowin, 2010) that the researchers use annual data. The potential reason is that I use quarterly data instead of annual data. Using this way, my models are less likely to underestimate the magnitude of EM. However, I can focus on investigating the effect of the lock-up period on IPO firms' incentives to use RAM or AM. Therefore, I document that NOA limits IPO firms' ability to use RAM as well.

1.3 Main contributions

This thesis provides a large-sample evidence on how IPO firms manage earnings by RAM and AM during the lock-up period and after it. Furthermore, it investigates how these IPO firms trade off between RAM and AM according to the ability and the cost of doing the particular strategy of EM. I contribute to earnings management literature in three different aspects. First, I analyze AM and RAM following a specific corporate finance event, IPOs, to show evidence on the different preference to manage earnings to achieve specific targets. I test RAM and AM at the same time following IPOs. Also, I involve the abnormal values of R&D expenses and SG&A expenditures in the calculation of *RAM*. Generally, prior studies use these two accounting items as part of discretionary expenses; in my thesis, I first measure these expenses separately then sum them up to capture the total RAM, which is different from most of prior studies. Second, I focus on the lock-up period by using quarterly financial reports to add more empirical evidence on whether IPO firms engage in earnings manipulation. I use quarterly data instead of annual data, which can prevent the underestimation of the magnitude of AM, as earnings inflation and succedent accrual reversal can happen in the same year. I prove that IPO firms engage more in RAM and AM during-lock-up compared to post-lock-up period. Lastly, I provide reasonable explanations on why IPO firms engage in more RAM than AM which is mostly related to the timing and the costs of using AM. Overall, this thesis should give market participants a better understanding

of IPO firms' EM behaviors.

The rest of my thesis is structured as follows. Section 2 displays a theoretical background, and Section 3 provides theory and hypothesis development. Then Section 4 describes the research design; Section 5 explains data source and the process of sample selection. Section 6 includes the descriptive statistics and my main results. The last section, Section 7, summarizes the conclusions.

2. Theoretical background

2.1 Literature review

There is a lot of prior literature that investigate accrual-based earnings management (AM) and real activities earnings management (RAM) around IPOs. Issuing IPO is a very special corporate event. The process of IPOs with more opportunistic motives and information asymmetry is quite vulnerable to earnings management (EM). In this section, I review previous studies on EM (RAM and AM), managers' tradeoff between RAM and AM, and the role of IPO lock-up.

2.1.1 Earnings management (EM)

U.S. GAAP permits discretion in recognition and estimate within the limits of legality. This regulation gives managements a plenty of chances to alter the results of financial reporting. EM is a practice made by firms using accounting methods, or real activities to manipulate earnings for achieving specific earnings targets (Scott, 2014, p.445). There could be some differences between EM and accounting deception, but they can lead to some same consequences (Dechow and Skinner, 2000). Furthermore, according to prior research (Fields et al., 2001; Schipper, 1989; Ronen and Sadan, 1975), EM has different intentions which result in different results. First, it would be favourable when firms use accounting flexibility for the sake of sharing their insider information with external market participants. Second, EM might take place in grey areas if the rig is carpetbag. Finally, it would be misleading for the investors if the firm intentionally misrepresents the firm's real financial situation. Generally, the term earnings management mentioned in prior studies is connoted with a

negative meaning.

EM is a problematic and pervasive issue for academic researchers, regulators, investors and practitioners. It can be divided into two categories: AM and RAM. Both of them contain managers' discretion to inflate or deflate earnings. However, AM is easier to be found than RAM; RAM affects operation, and AM has no effect on operating activities. This thesis relates to the following three streams of prior studies on EM.

2.1.2 Accrual-based earnings management (AM)

First of all, I build this thesis on literature focusing on AM. AM indicates that managements take advantage of the discretion allowed in GAAP so as to cover firms' true economic performance (Dechow and Skinner, 2000). Accruals arise when the timing of cash flow (from operations) disaccords with the accounting recognition of transaction occurs (Healy, 1985). Accruals allow investors to estimate firm's performance over time. But there are intentional and unintentional errors in estimating cash flows due to the complex progress of making the decision. These errors negatively affect the quality of earnings. In this thesis, following prior studies, I measure AM by adopting the modified Jones model.

Teoh et al. (1998b) conclude that positive discretionary accruals can forecast long-run stock prices to some extent. They document that the performance of firm using aggressive AM is different from the performance of firm using conservative AM. This empirical evidence proves the importance accruals for investors. This study is implicational and vital to subsequent EM studies. There is a plenty of literature (Lo, 2008; Dechow and Schrand, 2006; DuCharme et al., 2001; Healy and Wahlen, 1999) which analyze AM around IPOs as matter-of-course. They support the idea that the general stimulus of insiders who intentionally affect investors by managing earnings is to gain a higher issue price.

However, as mentioned before, there are other studies opposing to the argument explained in the previous paragraph. For example, Ball and Shivakumar (2008) examine AM prior to IPOs in the UK setting and test whether the pronounced scrutiny around IPOs constrains AM. They put forward an opposite assumption and question those outcomes of Teoh et al. (1998b). Their results show that IPO firms adopt conservative accounting method to report earnings

before issuing initial public offerings instead of the prevailing idea that IPO firms boost earnings. Furthermore, they include pre-IPO period, which presents a more comprehensive understanding of EM in IPO setting.

These divergent findings of prior studies might occur due to the combination of different factors, such as using financial data pre- and post-IPO at the same time (Ising, 2014). Ertimur et al. (2017) suggest the process of IPOs actually contains two different events: the IPOs and the lock-up. Thus in this thesis, I use the IPO date to identify before and after IPOs, and I concentrate on the post-IPO period. I intend to use this method to avoid including the mixed data of pre-IPO and post-IPO period.

2.1.3 Real activities earnings management (RAM)

RAM is another method to manage earnings by altering real accounting items like advertising, research and development expenses (R&D), maintenance, etc. More specifically, RAM is an accounting strategy that managers systematically affect the timing and/or the structure of an operation for the sake of altering the outcomes of financial reports (Gunny, 2010). Compared to AM, RAM costs more to implement, but it is less prone to raise outsiders' suspicion. Also, the importance of these accounting items associated with RAM during IPOs can be higher than for AM, since that they are valued by different market participants and managed by real actions (Ising, 2014). RAM can provide more direct evidences than AM to investigate managers' discretion, while the accuracy of calculation of RAM is a difficult and crucial concern.

Graham et al. (2005) document the extensive utilization of RAM via surveying over 400 executives. They provide strong supporting evidence that the managers do undertake RAM to keep firm performance in a better place. According to their results, 320 executives admit achieving a specific earnings target by decreasing discretionary expenditures (advertising, maintenance and R&D expenses). Furthermore, over 200 executives show a preference to delay or abandon some new positive net income projects to attain the target of earnings.

Also, the study of Roychowdhury (2006) includes a large sample to examine RAM and shows sufficient evidences on the management of operational activities. The author assesses

RAM by using the zero earnings as a benchmark. Results indicate that firms try to minimize losses through altering sales, overproducing goods to lessen the cost of goods sold (COGS), cutting down discretionary expenses as well.

Some of the prior studies have started to assess the consequence of RAM, such as the study of Gunny (2010). The author adds selling, general and administrative expense (SG&A) and gain on assets sales (GAS) in RAM's estimations and presents anticipated sign of discretionary behavior in manipulating R&D and SG&A. Gunny (2010) finds sample firms show a better future performance if they meet earnings benchmarks. However, as mentioned in the study of Bhojraj et al. (2009), firms that use RAM and/or AM to achieve analyst forecasts show worse operating performance when compared with firms that failure to attain analyst forecasts without RAM or AM in the next three years.

Overall, compared with AM, RAM has not been investigated sufficiently, especially under IPOs setting. Generally, researchers assess managerial judgment over R&D disbursements (Bushee 1998; Dechow and Sloan 1991), as well as other types of RAM such as utilization of advertising activities (Ising 2014), share buybacks (Hribar et al. 2006), derivative hedging products (Barton 2001), decreases in sales price (Jackson and Wilcox 2000), etc. These measures are not only accounting items, but also can be seen as valuable accounts with signalling effects. They would be valuable in themselves instead of the means to the end. In this thesis, I include the abnormal values of production costs, R&D expenses and SG&A disbursements in evaluating RAM.

2.1.4 Tradeoff between RAM and AM

From the perspective of management, it is important to note the different benefit and cost of RAM and AM. Thus, firms can make suitable decisions based on their different economic situations. There is an increasing trend to investigate the tradeoff between RAM and AM. This section provides a review of the literature on multi-dimensional approaches of EM.

Ising (2014) points out that AM can be adopted at year-end, but RAM have to implement through the fiscal year otherwise should be used in last quarter. Moreover, it would cost more to use RAM than AM. RAM can harm firm value if those activities conflict with business

optimization (Ewert & Wagenhofer, 2005; Graham et al., 2005). In contrast to discretionary accruals, RAM does not need to reverse in following period (Dechow et al. 2012). Managers can affect accounting items over a few of periods and maintain the normal level of return instantly without reversing or cutting down the amount of expenditures. However, overinvesting in certain transactions cannot hold for a long period since that this behaviour would damage the operation of regular businesses.

Firms would choose RAM compared to AM since that RAM is harder to be found by external auditors and regulators (Graham et al. 2005). Although RAM can cause more cost to firms, its strategies can lower the probability of being perceived as well. The findings of Cohen et al. (2008) can support this notion. The researchers state that managers prefer to use RAM more than AM after enactment of Sarbanes–Oxley Act (SOX) to achieve earnings targets when compared to similar firms before SOX. This shift from AM to RAM after SOX implies that the need to avoid detection of AM is greater than ever before, inducing managers to engage in RAM rather than AM.

Furthermore, some firms are also likely to employ multiple strategies of EM in the meantime. Cohen and Zarowin (2010) examine the tradeoff between AM and RAM around SEOs (seasoned equity offerings) period and test whether RAM has a greater effect on firms' future performance than AM. They reveal that the trade-off relates to the associated costs of these two different types of EM and the ability to use AM. Badertscher (2011) investigates whether overvaluation is an incentive to manage earnings. Although the author does not build the model of the trade-off between RAM and AM, he claims that one of the managers' important considerations in weighing different EM approaches is the persistence of overvaluation. He finds managers prefer to use AM in the early stage, RAM in the middle stage, and non-GAAP EM in the last lap of overvaluation.

Additionally, Zang (2012) models how firms weigh their decisions to use RAM or AM according to the relative cost and timing of using them. The author documents a set of accounting items that proxy for the price of AM and RAM. The results show that managers shift between these two strategies based upon their relative costs, and that they use the

realized degree of AM as a reference to adjust the level of RAM. Fedyk et al. (2012) investigate RAM through testing the levels of earnings, sales, and R&D expenses following the IPOs. They further investigate whether managers use them simultaneously. The authors consider the effect of different industries as well. The results indicate that managers not only use reported earnings to affect investors' decisions, but also make use of other accounting items. Given the more intense scrutiny and more serious information asymmetry around IPOs, I expect to figure out whether IPO firms also decide to engage in RAM versus AM according to the same rationale of Zang 2012 and Fedyk et al. 2012.

2.1.5 The role of lock-up period

The IPO lock-up period refers to a contractual agreement between the IPO issuer and its underwriter indicating a predetermined period after a company has gone public. Based on prior research (Field and Hanka 2001; Bradley et al. 2001; Ofek and Richardson 2000), the IPO lock-up period is usually 180 days (two-quarters). During this special period, none of the shareholders can sell any of their shares. As soon as the IPO lock-up period terminates, most trading restrictions would be removed.

According to Brav and Gompers (2003), the IPO lock-up provision has two competing roles. First, lock-up period is a useful method to control for moral hazard problems. If insiders, who know more about the firms, sell stocks right after the IPO, this behaviour can be interpreted as that the stocks are overvalued, and can subsequently impair the firm value. Second, lock-up works as a signalling device to reduce adverse selection. When insiders hold a large amount of ownership, their profits would be aligned with outsiders' (Ibbotson and Ritter, 1995).

However, by restricting insider sales for an extended period, the lock-up makes sure insiders' wealth being connected to IPO firms' future performance for a period determined in advance (Tsai et al., 2015). Therefore, initial shareholders have propensities to show a better prospect intentionally and to sustain a higher stock price within the IPO lock-up period through EM to maximum their own wealth. By doing this, insiders can gain more profits by selling their shares after the lock-up expiration at higher price. Supporting this rationale, both

Teoh et al. (1998a,b) and Huang and Lin (2007) prove that there is significant AM around IPOs.

More recently, Ertimur et al. (2017) state that there are two main incentives for IPO firms to manage earnings. One is that management may help initial shareholders to obtain higher stock price due to their close relations; the other one is that IPO firms want to keep strong performance to avoid initial shareholders to sell their stocks in large amounts. They use quarterly data to investigate the timing and incentives of EM of IPO firms. Consistent with Ball and Shivakumar (2008), they do not get any evidence, which would prove, that firms manage earnings before the IPOs. However, they find a higher level of discretionary accruals during the lock-up period, suggesting that the lock-up can raise managers and initial shareholders' incentives to take advantage of the pronounced information asymmetry by EM and to gain benefits from new investors.

3. Theory and hypothesis development

Issuing IPOs is a very special event for firms. Firms choose to go public is partly due to the enhanced liquidity, which can improve the financial structure and lower the cost of raising capital (Aharony et al. 1993; Ritter 1998). However, the process of IPOs provides opportunities and inducements for managers to use different strategies of EM.

Prior studies (Titman and Trueman 1986; Brau et al. 2005) document that outstanding information asymmetry exists during IPOs. The main reason is the lack of public information for potential investors. Hence, managers who have private information about firms' current and future trend may manipulate earnings to maximum personal profits at the cost of potential investors. Furthermore, the information asymmetry, after the lock-up period expires, is more pronounced than information asymmetry at the IPO date. The reasoning behind is that the market does not know how many shares the insiders actually intend to sell, whereas at the IPO, the number of secondary shares for sale must be revealed in the prospectus (Brau et al., 2004). Thus managers may grasp this opportunity to conceal the real firm performance to set a higher share price.

Furthermore, once managers plan to sell their shares as soon as the lock-up expiration, they also have strong incentives to inflate earnings by RAM or AM to increase share price. When firms go public, initial shareholders can put near 15 - 20 percent of shares on the market. However, the rest of shares are restricted from selling until the lock-up expiration. The lock-up period not only prevents shareholders selling shares right after IPOs, which could seriously harm firms' value, but also motivates shareholders to manipulate earnings so as to gain more benefits by selling their ownership after the lock-up expiration. Consistent with this argument, Rajan and Servaes (1997) and Ofek and Richardson (2000) prove that the aggressive insider sales cause the negative abnormal returns after the lock-up period expires.

However, the effects of earnings management cannot last for a long period. For AM, accruals have to be reversed in the future, i.e. managers cannot borrow money from the future forever; for RAM, this method is more costly than AM since it causes a decrease in firm value and might put the regular business in bad financial health. Furthermore, managers' opportunistic incentives can still exist in the first two years after the IPO but will decline because of shareholders' lowered and dispersed incentives (Ising, 2014). In the long run, shareholders' are less prone to sell shares in the meanwhile in comparison with the end of lock-up period. Therefore, the management is not incentivized to manipulate with the earnings. Overall, I expect that the level of EM is higher within the lock-up period than post the lock-up period. I separate my first hypothesis as follows:

H1-a: IPO firms show higher levels of RAM within the lock-up period than post the lock-up period.

H1-b: IPO firms show higher levels of AM within the lock-up period than post the lock-up period.

According to recent studies on the tradeoff between RAM and AM strategies (Fedyk et al. 2012; Zang 2012; Badertscher, 2011; Cohen et al. 2008; Graham et al. 2005), managements can either utilize RAM and AM as substitutes or use AM and RAM at the same time to achieve the expected earnings targets. Generally, managers' decisions are based on the associated cost (i.e. scrutiny and accounting flexibility), timing, and financial health. In this

thesis, I expect that IPO firms' trade-off between RAM and AM lies on the prices of using AM and the ability to do so.

As is well known, both RAM and AM are costly tactics of EM. Managements might encounter different levels of restrictions for using these two strategies, which require different abilities to use them. There is a more severe scrutiny in IPOs setting. And RAM is harder to be detected than AM due to its special implementation progress. In this case, AM is more likely to be limited by the external scrutiny and the flexibility of using it. For example, it is easier to persuade low quality auditors to accept the aggressive accounting estimates than to convince high quality auditors. Moreover, if firms belong to high litigation industries, they are easier to be sued and get the penalties. Similarly, in the study of Cohen and Zarowin (2010), external monitoring provided by outsiders (e.g., auditors, regulators) and potential litigation expense represent the costs of using AM.

Other than the scrutiny from outsiders, the availability within accounting systems constrict the ability of using AM. As mentioned in the studies of Zang (2012) and Cohen and Zarowin (2010), firms would lack accounting flexibility if they have employed aggressive accounting method in prior periods, which makes them run into a higher risk of being detected by outsiders and breaking GAAP. They find that firms with excessive AM in prior years choose to use RAM more. A firm's accounting flexibility, measured by current net operating assets (NOA)，largely decides the ability and the degree to use AM. As stated by Barton and Simko (2002), the effects of managers' previous choices of accounting method show in the balance sheet.

As mentioned before, a plenty of managers shift away from AM to RAM post-SOX (Sarbanes-Oxley Act) (Cohen et al., 2008). The implementation of SOX can be seen as another indicator of the increasing degree of outsider scrutiny. Furthermore, given the pronounced scrutiny present around IPOs, managers have the stronger motivation to use RAM rather than AM, especially after the enactment of SOX. Hence, I formulate the following two hypotheses for H2:

H2-a: IPO firms prefer to use RAM than AM during lock-up period.

H2-b: The preference of IPO firms to utilize RAM relates to auditor characteristic, litigation probability, accruals management flexibility and post-SOX.

4. Research design

4.1 Using quarterly data rather than annual data

Most prior studies use annual data in investigating earnings management around IPOs. However, I choose to use quarterly data instead of annual data for several reasons. First of all, the significance and value relevance of quarterly earnings data has been documented by prior studies. For example, Zang (2012) use quarterly data to implement validity tests of the four proxies for RAM except for the main test where the author used annual data. Second, using annual data may underestimate the magnitude of AM since that earnings inflation and accrual reversals can happen in the same fiscal year. Last but not least, using annual data cannot distinguish if EM is caused by the IPOs or the lock-up expiration, since these two events happen closely to each other (Ertimur et al., 2017). Moreover, given the lock-up period normally last 180 days, using quarterly data to calculate the level of earnings management would be more precise.

To test for my first hypothesis H1, I calculate different types of EM in the lock-up period and post-lock-up by using quarterly accounting items by equations stated in the next sections. Then I show the change trends both of RAM and AM.

4.2 Accrual-based earnings management

My primary model for investigating AM is in accordance with the cross-sectional modified Jones model of Dechow et al. (1995). Discretionary accruals equal to firms' actual accruals deduct the normal levels of accruals.

$$\frac{TAcc_{i,t}}{At_{i,t-1}} = \alpha_t + \beta_{1,t}\frac{1}{At_{i,t-1}} + \beta_{2,t}\left(\frac{\Delta Sales_{i,t}}{At_{i,t-1}} - \frac{\Delta Rec_{i,t}}{At_{i,t-1}}\right) + \beta_{3,t}\frac{PPE_{i,t}}{At_{i,t-1}} + \varepsilon_{i,t} \quad \textbf{(1)}$$

Where $TAcc_{i,t}$,total accruals at quarter t of firm i, equals to income before extraordinary items (IBQ) minus cash flows from operation (CFO)[1]; $\Delta Sales_{i,t}$ equals to $Sales_{i,t}$ deduct

[1] Quarterly cash flows from operation (CFO) equals to operating income minus operating expense minus discontinued operations and extraordinary items.

$Sales_{i,t-1}$; $\Delta Rec_{i,t}$ is the change in net accounts receivable; $PPE_{i,t}$ indicates the gross property, plant, and equipment.; $At_{i,t-1}$ is firm i's total assets at last quarter. The estimated residuals $\varepsilon_{i,t}$, capturing discretionary accruals, are the proxy for AM.

4.3 Real activities earnings management

In this thesis, I adopt the abnormal levels of production costs, R&D and SG&A expenses as proxies for RAM.

4.3.1 Decrease cost of goods sold through overproduction

Prior studies (Roychowdhury 2006; Cohen et al. 2008; Cohen and Zarowin 2010) on RAM include production costs, the total measurement of changes in inventories and COGS, when examining specific events. Managers can manufacture a large amount of unnecessary production to inflate earnings. Overproducing results in lower COGS but more goods in stock. Considered sales do not change with overproducing goods; production costs are still increasing, then cash flows from operations decrease. I measure production costs as following Equation (2). It is equivalent to a firm' actual production costs subtracts its normal level.

$$\frac{Prod_{i,t}}{At_{i,t-1}} = \alpha_t + \beta_{1,t}\frac{1}{At_{i,t-1}} + \beta_{2,t}\frac{Sales_{i,t}}{At_{i,t-1}} + \beta_{3,t}\frac{\Delta Sales_{i,t}}{At_{i,t-1}} + \varepsilon_{i,t} \quad \textbf{(2)}$$

Where $\mathrm{Prod}_{i,t}$, production costs, equals to firm i's COGS plus changes at quarter t; $\Delta Sales_{i,t}$ refers to firm i's changes in sale every quarter; $At_{i,t-1}$ indicates firm i's total assets at last quarter. The estimated residual from Equation (2) denotes the abnormal value of production costs (RAM_PROD). The bigger residual represents the larger amount of overproduction and lower COGS.

4.3.2 Decrease in R&D to inflate earnings

R&D is a useful accounting item to affect the stock price, however, it is relatively less investigated in EM literature and especially not around IPOs. It is not easy for mangers to influence cash inflow from operations, but they can alter R&D expenses severely through utilizing their discretion. They could either cut R&D expenses to manipulate income upward or increase the amount of it to send a better future signal to investors. Following Ising (2014), I use the following regression to investigate R&D expenses.

$$\frac{RD_{i,t}}{At_{i,t-1}} = \alpha_t + \beta_{1,t}\frac{1}{At_{i,t-1}} + \beta_{2,t}\frac{RD_{i,t-1}}{At_{i,t-1}} + \beta_{3,t}\frac{AvChe_{i,t}}{At_{i,t-1}} + \beta_{4,t}SalesGR_{i,t} + \varepsilon_{i,t} \quad \textbf{(3)}$$

Where $\mathrm{RD_{i,t}}$ is R&D expenses of firm i at quarter t; $\mathrm{AvChe_{i,t}}$ denotes firm i's average cash holding every quarter; $\mathrm{SalesGR_{i,t}}$ is sales growth rate; $At_{i,t-1}$ is firm i's total assets at last quarter. The estimated residual from Equation (3) indicates the abnormal level of R&D expenses (RAM_RD).

4.3.3 Decrease in SG&A expenditures to inflate earnings

Same as R&D, SG&A expense is not very well researched as an independent item in EM literature around IPOs. Reducing such expenditures could boost current earnings temporarily. However, by doing so, the firm has to take the risk of lower cash flows in the following periods. In another aspect, SG&A expenditures incorporate executives' stock-based compensation, external sales representatives' payments, and legal and consulting disbursements. It is hard for IPO firms to alter these huge costs. I evaluate the abnormal level of SG&A expenditures by using the following equation.

$$\frac{SGA_{i,t}}{At_{i,t-1}} = \alpha_t + \beta_{1,t}\frac{1}{At_{i,t-1}} + \beta_{2,t}\frac{Sales_{i,t}}{At_{i,t-1}} + \varepsilon_{i,t} \quad \textbf{(4)}$$

Where $\mathrm{SGA_{i,t}}$ is selling, general, and administrative expenses of firm i at quarter t; $At_{i,t-1}$ is firm i's total assets at previous quarter. The estimated residual from Equation (4) indicates the abnormal level of SGA (RAM_SGA).

Additionally, to capture the total influence of RAM, I measure it as following:

*RAM = RAM_PROD + (-1) *(RAM_RD + RAM_SGA)* **(5)**

4.4 IPO firms' cross-sectional determinants of earnings management

My sample is not randomly selected, which could cause the potential omitted variable problem. It would misestimate the relation between dependent and independent variables. In order to solve this problem, I develop a two-stage model according to the method of Heckman (1979). By using this method, I intend to mitigate the self-selection bias in my sample. First, I develop a fundamental model to explain why IPO firms manage earnings and obtain the inverse Mills ratio (IMR). Secondly, I analyze those potential factors determining IPO firms' preference for RAM as compared to AM. In this step, IMR, a control variable, should be

effective for correcting the sample selection bias. I illustrate more details on this two-stage model below.

4.4.1 First stage: explain IPO firms' incentives to manage earnings

I investigate firms' decision to get involved in EM, no matter which strategy IPO firms prefer to use. Prior studies (Fields et al. 2001; Healy and Wahlen 1999) state that the most crucial incentive to manipulate earnings of managements is the capital market incentive. It motivates managements to beat or meet specific earnings targets. Therefore, I choose explanatory variables based on these capital market incentives. Simultaneously, I control the effect of different firm characters: profitability, size, growth and capital structure. The following quarterly Probit regression is the first step to explain EM in IPO firms:

$$Total\_EM = \beta_0 + \beta_1 HAB\_BEAT + \beta_2 SHARES + \beta_3 ANALYST + \beta_4 Lockup + \beta_5 ROA + \beta_6 MKT\_CAP + \beta_7 M\_B + \beta_8 LEVERAGE + \varepsilon \quad \textbf{(6)}$$

The dependent variable in this model, *Total_EM*, indicates whether or not a firm manages earnings by RAM or AM quarterly. It equals to 1 if either the aggregate proxy for RAM (*RAM*) or discretionary accrual (*AM*) is larger than the industry-quarter median[2].

HAB_BEAT and *SHARES* explanatory variables are included as representations for rewards and penalties raised from beating or failing to beat earnings forecasts, which can capture capital market incentives (Cohen and Zarowin 2010). *HAB_BEAT* refers to the frequency of beating or meeting analysts' forecast every quarter. As stated in the study of Kasznik and McNichols (2002), firms that attain analysts' earnings forecasts would gain more profits. Bartov et al. (2002) hold the same rationale. Both of these studies find that capital market prefers to pay a higher premium to firms continually able to beat or meet analysts' forecasts. These firms are seen as 'habitual beaters'. According to this evidence, I predict that 'habitual beaters' have stronger incentives to engage in EM and to keep doing so. Otherwise, the market would punish them if they fail to attain the earnings targets. So I include *HAB_BEAT* to capture the capital market incentive, and I predict the coefficient of it (β_1) to

[2] I choose medians as benchmarks since that extreme observations have less effect on them than on means (Cohen and Zarowin 2010).

be positive.

SHARES is equivalent to the natural logarithm of the number of shares outstanding. Zang (2012) states that earnings benchmarks refer to earnings per share generally. She suggests that the value of earnings per share (EPS) negatively relates to the amount of shares outstanding. A Larger number of shares outstanding would require managers to take more actions to manipulate earnings so as to achieve a given EPS target. While the high target can discourage EM as well since that the target might be too hard to achieve (Barton and Simko 2002). Given this mixture statement about the share effect on RAM or AM, I make no directional prediction about *SHARES*.

Following the study of Zang (2012), the variable *ANALYST* is equivalent to the natural logarithm of the number of analysts following the firm plus 1. Financial analyst coverage might either strengthen firms' incentives to manage earnings or weaken those incentives. More specifically, more financial analysts following the firm can result in higher scrutiny over its business activities. Thus this would limit EM. Nevertheless, analyst coverage also raises an incentive of EM since analysts provide earnings forecast regularly. Firms put in more recourse to attain analysts' forecasts, especially near the end of the reporting period (Cohen and Zarowin 2010). Thus the prediction sign of *ANALYST* remains unclear.

As discussed in section 3, prior studies (Titman and Trueman 1986; Brau et al. 2005) document that during IPOs a pronounced information asymmetry exists. The high information asymmetry gives managers more possibilities and incentives to manage earnings so as to keep stock price at a high level. Therefore, after the lock-up period, insiders gain more benefits by selling their stocks to others. So the lock-up period induces IPO firms to manage earnings. I set LOCK_UP as an indicator variable which equals to 1 if the quarter t is the first two-quarter after the IPO date, otherwise 0. I predict the coefficient should be positive.

Finally, for the control variables, I include ROA, MKT_CAP, M_B and LEVERAGE to capture the change in profitability, size, growth and capital structure, respectively. ROA is the return on assets, which is the most likely to be influenced by the earnings management activities (Zang, 2012). Firm size can affect the magnitude of EM (Becker et al., 1998). I use

MKT_CAP referring to market capitalization to proxy for the firm size. According to the results of prior studies (Skinner and Sloan 2002), managers have stronger incentive to inflate earnings if there are more growth opportunities for firms. Therefore, I calculate the lag value of the market-to-book ratio (M_B_{t-1}) to denote firms' growth opportunities. I also control the leverage ratio, as Morsfield and Tan (2006) find that a firm's the leverage ratio can impact accruals if its manager attempts to avoid debt contract restrictions. I add these control variables into the first-stage model so as to mitigate measurement errors in the empirical proxies for EM.

4.4.2 Second stage: explain IPO firms' preference to use RAM

Similarly to the first stage, I analyze the factors that are related with IPO firms' preference to manage earnings by using RAM rather than AM. IPO firm's choice to employ RAM or AM relates to the costs of using the technique and its ability to use AM. The costs of using AM contain the scrutiny provided by capital market and the potential fine. Furthermore, after the implementation of SOX, the level of outside scrutiny has been enhanced. Therefore, variables BIG4, post-SOX period and litigation industries are used to capture the cost. Furthermore, Zang (2012) find that firms with higher net operating assets (NOA) have more ability to substitute away from AM. Thus I develop the following quarterly cross-sectional Probit model:

$$RAM = \beta_0 + \beta_1 BIG4 + \beta_2 SOX + \beta_3 LITIGATION + \beta_4 NOA + \beta_5 IMR + \varepsilon \quad [3] \qquad \textbf{(7)}$$

The dependent variable *RAM* equals to 1 if a firm's total RAM is larger than its industry-quarter median value, otherwise 0.

BIG4, SOX, LITIGATION and *NOA* are all independent variables. I expect that all of the sign of these independent variables to be positive, suggesting that the IPO firms prefer RAM instead of AM.

First, *BIG4* equals 1, indicating that the firm's auditor is one of Big 4 auditing firms and 0 otherwise. Prior researches (Francis et al. 1999; Becker et al. 1998; DeFond and Jiambalvo,

[3] According to Cheng and Warfield (2005), executives' equity compensation also induces earnings management. However, Execump does not provide the quarterly data of executive compensation. So I cannot examine this incentive in this thesis.

1993) show that Big 4 auditing firms decrease the possibility of using AM, since auditors from Big 4 are generally more experienced. They are likely to put more energies and resources into auditing process and to take higher reputation risk compared to smaller audit firms. There would be more scrutiny if IPO firms are audited by Big 4 auditor (Gunny 2005). Also, Graham et al. (2005) document one reason of managements' preference for RAM is its techniques with a lower probability of being detected by outsiders. Thus, I expect that IPO firms' inclination to use RAM is associated with *BIG 4* positively.

SOX, an indicator variable, is equivalent to 1 if observations fall within the post-SOX period (after 2003), otherwise 0. Including SOX aims at controlling for macroeconomic effects. The study of Cohen et al. (2008) presents a shifting trend to RAM after the enactment of SOX. The accounting scandals destroy the trust of all market participants. Therefore, the SOX aims at rebuilding the confidence of the public by strengthening external scrutiny. The results of Cohen et al. (2008) imply that the incentive to avoid detection of AM is greater than before, inducing managers to prefer for RAM in the post-SOX period.

LITIGATION represents the primary penalty for earnings manipulation. As mentioned before, AM is more easily detected than RAM, which implies that companies which using AM face a higher risk of being punished. Thus, the preference for RAM positively relates to the perceived litigation penalties. *LITIGATION* equals to 1 if a firm is from one of those high litigation industries, and otherwise 0. Same as Barton and Simko (2002) and Zang (2012), I use SIC codes of pharmaceuticals, biotechnology, computers, and electronics industries to identify high litigation industries (2833–2836, 8731–8734, 7371–7379, 3570–3577, and 3600–3674). I predict the sign of *LITIGATION* should be positive when examining RAM.

NOA (net operating assets) represents the flexibility of using AM. Given the limited discretion allowed by GAAP and the unavoidable accrual reversal, firms' ability to inflate current accruals is constricted by the previous degree of AM (Zang 2012). Also, Barton and Simko (2002) support the notion that NOA reflects the previous AM. Higher current NOA implies that greater degree of AM has occurred before. The authors also find that the value of NOA has a negative effect on the frequency of meeting / beating analysts' forecasts. This

result indicates that the level of NOA constricts the flexibility of using AM to achieve accounting targets. In this case, I expect that an IPO firm's tendency of using RAM positively relate with previous NOA. NOA_{t-1}, equals 1 if its value (i.e., total debt plus shareholders' equity minuses the sum of cash and marketable securities; the result got before divide lagged sales) is above the median of corresponding industry-quarter, and otherwise 0.

Last but not least, I control the IMR (Inverse Mills Ratio) calculated according to the first stage of my model for mitigating the sample selection bias. Overall, I expect this two-stage model can be effective in explaining the determinants of IPO firms to engage in EM, and if they do, the reason of using RAM rather than AM.

5. Data sources and sample selection

This section describes the data sources, the process of sample selection and every specific selection criteria for the final sample.

U.S. IPOs provide a sufficient number of observations for my thesis. I obtain the domestic U.S. IPO sample from Wharton Research Data Services (WRDS). The sample period starts in 1988, which is the first year that IPO firms and underwriters agree to develop the lock-up period based on Rule 144 promulgated by the U.S. Securities and Exchange Commission (SEC). The last year of my sample period is 2016. In total, the range of my sample is 28 years.

Firstly, my quarterly financial accounting data are obtained from Fundamental quarterly dataset of the CRSP/Compustat Merged Database from 1988 to 2016. As explained by WRDS, IPO-date is the date of a company's initial public stock offering. Therefore, I use the IPO-date as an identifier of the IPO firms. Following the method of Zang (2012), this thesis also eliminates financial institution and regulated industries[4]. Furthermore, for those observations in the final sample, IPO firms must have available quarterly accounting data from COMPUSTAT both in the quarter of the offerings and in those quarters post the offerings. The reason is that the models developed in the research design include the lagged

[4] Financial institution industries: sic code 6000-6999; regulated industries: sic code 4400-5000.

values. To calculate the variables during the lock-up period (the first two quarters after the IPO-date), these sample IPO firms must have the variables one quarter before the lock-up period (i.e. the quarter includes the IPO-date). Furthermore, I set up the maximum number of IPO firms' quarters to 15, in order to avoid the effect of other big events or new regulations, which may potentially change the incentives of managers to manage earnings. Thus, the incentive of the lock-up period should be clearer.

Secondly, the data of analyst coverage and earnings forecasts are obtained from the IBES. The number of analyst coverage is obtained from Summary History. The number of analyst coverage varies monthly. If analysts do not update or confirm their estimates within this period, the IBES will remove it from the number of estimates. Therefore, I sum the number of analysts following IPO firms quarterly. Furthermore, the data of earnings forecast are obtained from detail history. Similarly to analyst coverage, I sum the number of firms, which beat or meet the earnings forecast every quarter.

Lastly, the detail information of Big4 auditing firms (PricewaterhouseCoopers, Ernst&Young, Deloitte, KPMG) is drawn from Audit Analytics. The auditor data are obtained for every IPO firms in my sample from Fundamental Annual dataset of the CRSP/Compustat Merged Database. Then I pick up the Big 4 auditing firms according to the information acquired from AuditAnalytics.

To be included in the final sample of this thesis, observations must satisfy these following criteria in Table 1

Table 1-Sample Selection Procedure

Criteria	Number of observations
1. Initial Sample	773,516
2. Use IPO-date to identify IPO firms	-417,395
3. Exclude the firms if the IPO-date is before 1988	-41,854
4. IPO firms must start to offer variables at IPO-quarter	-77,051
5. Cut IPO firms' quarters into 15 to avoid other effects rather than lock-up's	-140,439
6. Exclude financial institution and regulated industries	-25,340
7. The final sample after combining with other datasets	**71,437**

I apply the standard procedure of winsorizing in this process of sample selection. I winsorize all continuous variables (including all new variables I generate) at their top 99 percentiles and bottom 1 percentiles. By doing this step, I can limit the effect of extreme observations on the results. Therefore, as described in Table 1, after merging with the data of Big 4 auditing firms, earnings forecasts and analysts coverage, the final sample has 71,437 firm-quarter observations including 5,554 IPO firms from 1988 to 2016.

6. Empirical Results

This section displays the descriptive statistics and Pearson correlation analysis. It also presents main results of my two-stage model. Additionally, I provide a table of Cronbach's alpha to show the reliability of all proxies.

6.1 Descriptive Statistics and Correlation Analysis

Table 2 shows the summary statistics for my overall sample of all variables included in the research models. It shows one proxy for AM *(AM*) and four proxies for RAM (*RAM, RAM_PROD, RAM_RD, RAM_SGA*). *AM* indicates the abnormal level of discretionary

accruals which is estimated according to the equation (1). *RAM_PROD* calculated based on the Equation (2) refers to the abnormal level of production costs; *RAM_RD* gotten by the Equation (3) denotes the abnormal level of research and development expenses; *RM_SGA* obtained from the Equation (4) proxies for the abnormal level of selling, general, and administrative expenditures. *RAM* captures the overall RAM, which is calculated by the Equation (5). *AM* and *RAM* are indicator variables so that the median values are 1 and 0 respectively. When I calculate *RAM_PROD, RAM_RD* and *RAM_SGA*, the sample size reduces to 61,111, 32,825, and 53,925. This is caused partly because of the missing values in the variables associated with the production costs, R&D expenses, and SG&A expenses. Furthermore, this decrease indicates that different sample firms use different types of RAM to achieve their goals.

The rest variables are the independent variables and control variables for the Heckman's two-stage model. The number of observation reduces to 23,157 for the data on beating/meeting earnings forecasts. The same applies for analyst coverage. The sample size is only 19,411 for *IMR*. Since I calculate *IMR* according to the first stage of Heckman model. The first stage must *include RAM/AM, HAB_BEAT, SHARES, Lockup, ANALYST, MKT_CAP*, M_B and *LEVERAGE* at the same time. Therefore, this requirement cuts down the sample size. *Lockup, Big4, SOX, LITIGATION* and *NOA* are all indicator variables, for which their medians equal to 0.

As shown in Table 2, the means of these variables are not equal to 0 since I winsorize them at the top 99% and the bottom 1% to minimize the noise caused by extreme observations. The mean values of *RAM* and *AM* show that 42 % of the sample firms use RAM and 51 % of the sample firms utilize AM respectively. *Lockup*'s mean value suggests that the lock-up period is 15 % of the total quarter period. The mean of *BIG4* indicates that 43 % of sample firms select Big 4 as their audit firms. The *SOX* (post-SOX period) shows that 26 % of sample firms go public from 2003 to 2016. The *LITIGATION* mean value denotes that 35 % sample firms are in high litigation industries. 0.49, the mean value of *NOA*, indicating that almost 50% of the sample firms' *NOAs* are larger than their corresponding industry-quarter

medians. On average, these sample firms have *ROA* of -0.07, *MKT_CAP* of 4.98 and *M_B* ratio of 2.28.

Table 2

Summary Statistics

Variable	N	Mean	Median	Std. Dev.	25%	75%
RAM	71,437	0.42	0.00	0.49	0.00	1.00
AM	71,437	0.51	1.00	0.50	0.00	1.00
HAB_BEAT	23,157	1.23	1.10	0.93	0.69	1.95
SHARES	67,978	2.81	2.77	1.07	2.03	3.48
Lockup	71,437	0.15	0.00	0.36	0.00	0.00
ANALYST	35,944	3.14	3.22	1.03	2.48	3.89
ROA	69,623	-0.07	0.00	6.53	-0.06	0.02
MKT_CAP	67,839	4.98	4.98	1.72	3.79	6.17
M_B	67,654	2.28	2.65	93.41	1.44	4.83
LEVERAGE	66,801	0.10	0.09	16.78	0.00	0.59
BIG4	67,638	0.43	0.00	0.49	0.00	1.00
SOX	71,437	0.26	0.00	0.44	0.00	1.00
LITIGATION	71,437	0.35	0.00	0.48	0.00	1.00
NOA	71,437	0.49	0.00	0.50	0.00	1.00
IMR	19,411	0.82	0.81	0.14	0.72	0.90
RAM_PROD	61,111	-0.13	-0.10	1.48	-0.19	-0.03
RAM_RD	34,684	-0.59	-0.49	0.68	-0.80	-0.18
RAM_SGA	53,925	-0.27	-0.16	9.89	-0.31	-0.06

Table 3 presents the Pearson correlation among the variables in the Heckman two-stage model. The correlation value of 0.11 suggests that there is a significantly positive correlation between *RAM* and *AM*. This result shows that part of my sample firms use RAM and AM at the same time. This finding is in accordance with prior research, which shows that

managements use different strategies to manage earnings simultaneously (Fedyk et al. 2012). For *HAB_BEAT*, the relation is significant and positive with *RAM* (correlation of 0.019) and significantly negative related to *AM* (correlation of -0.06), suggesting that firms seen as 'habitual beaters' prefer RAM to AM to attain their earnings' targets. As could be seen from previous studies, these firms are referred as more sophisticated, as they notice that AM is more likely to be monitored by outsiders (Zang 2012). -0.036 is the value of correlation between *SHARES* and *AM.* It is significant and negative. Same as the study of Barton and Simko (2002), this result proves that larger amount of shares outstanding discourage AM since the target is too difficult to achieve. *Lockup* has a significant correlation with both of *RAM* and *AM*; the sign of RAM is positive but the sign of AM is negative. This indirectly proves that there is more scrutiny during lock-up period, as the firms in the sample intentionally choose RAM instead of AM. As stated in section 4, the analyst following raises not only an incentive of EM but also the limitation of EM (Zang 2012; Cohen and Zarowin 2010). This notion is consistent with the correlation of *ANALYST* with *RAM* and *AM*. It is significantly positive (correlation of 0.062) with *RAM* but significantly negative with *AM* (correlation of -0.096).

For the variables used in the second stage of Heckman model, the correlation of both *BIG4* and *LITIGATION* with *RAM* are significant and positive (i.e. 0.051and 0.081), which is consistent with my prediction. Firms audited by one of the Big4 auditing firms and in high litigation industries face more scrutiny and severe penalties than others, which causes the preference of using RAM. The correlation between *SOX* and *RAM* is negative, but it is not significant; while the correlation between *SOX* and *AM* is significantly negative (correlation of -0.063). These results indicate that the utilization of AM is decreasing after the enactment of SOX. There is a significant and negative correlation (-0.049) between *NOA* and *HAB_BEAT*, in line with the result of Barton and Simko (2002). A higher level of NOA is generally with a lower probability of meeting or beating analysts' forecasts since NOA represent a sample firm' ability to use AM.

Table 3
Pearson Correlation Analysis

	RAM	AM	HAB_BEAT	SHARES	Lockup	ANALYST	ROA	MKT_CAP
RAM	1.00							
AM	0.110***	1.00						
HAB_BEAT	0.019***	-0.060***	1.00					
SHARES	-0.006	-0.036***	0.436***	1.00				
Lockup	0.056***	-0.016***	-0.085***	-0.052***	1.00			
ANALYST	0.062***	-0.096***	0.570***	0.506***	-0.234***	1.00		
ROA	0.004	-0.004	0.086***	0.006	0.003	0.020***	1.00	
MKT_CAP	0.036***	-0.003	0.503***	0.781***	0.035***	0.482***	0.019***	1.00
M_B	0.006	-0.004	-0.004	-0.005	0.009*	-0.011*	0.001	0.003
LEVERAGE	0.003	0.001	-0.004	-0.011**	0.004	-0.010	0.000	0.001
BIG4	0.051***	0.032***	-0.063***	-0.047***	0.006	-0.073***	0.004	0.010**
SOX	-0.028***	-0.063***	0.276***	0.442***	0.011**	0.369***	0.003	0.367***
LITIGATION	0.081***	0.123***	-0.020**	0.069***	0.001	0.034***	0.000	0.024***
NOA	-0.166***	0.026***	-0.049***	0.016***	-0.062***	-0.059***	-0.006	-0.014***
IMR	-0.164***	-0.046***	-0.119***	0.510***	-0.273***	-0.063***	0.023**	0.278***
RAM_PROD	0.005	0.005	-0.065***	0.031***	-0.002	0.018**	-0.044***	0.027***
RAM_RD	-0.426***	-0.017**	0.017	0.032***	-0.112***	0.054***	0.022***	-0.008
RAM_SGA	-0.008	-0.006	0.049***	0.006	0.002	0.123***	-0.003	0.005

Table 5 (Continued)

Pearson Correlation Analysis

	M_B	LEVERAGE	BIG4	SOX	LITIGATION	NOA	IMR	RM_PROD	RM_RD	RM_SGA
M_B	1.00									
LEVERAGE	0.295***	1.00								
BIG4	-0.008	-0.004	1.00							
SOX	-0.008*	-0.013**	-0.123***	1.00						
LITIGATION	0.012**	-0.008*	0.059***	0.037***	1.00					
NOA	-0.004	-0.001	0.006	-0.018***	0.115***	1.00				
IMR	-0.057***	-0.042***	-0.090***	0.422***	-0.025**	0.073***	1.00			
RAM_PROD	0.001	0.000	0.007	0.021***	0.012**	0.020***	0.119***	1.00		
RAM_RD	-0.009	0.006	-0.057***	-0.027***	-0.160***	0.031***	0.055***	0.210***	1.00	
RAM_SGA	0.000	0.000	-0.006	0.007*	0.009*	0.002	0.075***	0.603***	-0.068***	1.00

, **, ** Indicate significance at 5%, 1% and 0.1% levels, respectively.

6.2 Results of First Hypothesis

To test my first hypothesis "IPO firms show higher levels of RAM and AM during-lock-up period than post-lock-up period", I first calculate the abnormal values of discretionary accruals (AM). Then I estimate the abnormal values of R&D expenses, production costs and SG&A expenditures which allow me to generate the *RAM* according to equation (5). Furthermore, I measure the quarterly median values of AM and RAM. The results presented in Table 4-A and Table4-B show the trend line over the 15 quarters for both RAM and AM.

As seen in Table 4, the medians of RAM and AM (in bold) during the lock-up (quarter 2 and quarter 3) are higher than the medians in the post-lock-up period. This result proves that sample firms engage more in both RAM and AM around the lock-up period. More importantly, the result is in accordance with my predictions that both RAM and AM is declining after the lock-up period expiration. This proves that lock-up period motivates initial shareholders to manipulate earnings to achieve more benefits by selling their ownership after the lock-up expiration. The declining trend for AM is due to the reversal; the decrease in RAM can be caused by the cost associated with the manipulation and firms' concerns for the financial health of the company (Zang 2012). Also consistent with Ising (2014), the IPO firms' opportunistic incentives decrease as shareholders have fewer possibilities of selling a large amount of share simultaneously, comparing to the end of the lock-up period. As a whole, these results verify my first hypothesis.

The first-stage of Heckman model can prove the statistical significance of lock-up period. As seen in table 5-Panel A, *Lockup* has a significantly positive effect on *RAM*. The coefficient is 0.254 (significant at the 0.1% level), which indicates that during-lock-up period the management has a higher incentive to manage earnings using RAM. For AM, the coefficient is -0.091 (significant at the 0.1% level), suggesting that the lock-up period has a significantly negative effect on AM. The lock-up period constricts IPO firms to use AM because of the more pronounced scrutiny during this period. Therefore, sample firms shift away from AM and rather use the RAM instead. These results support my H2-a that is IPO firms prefer RAM than AM during lock-up period.

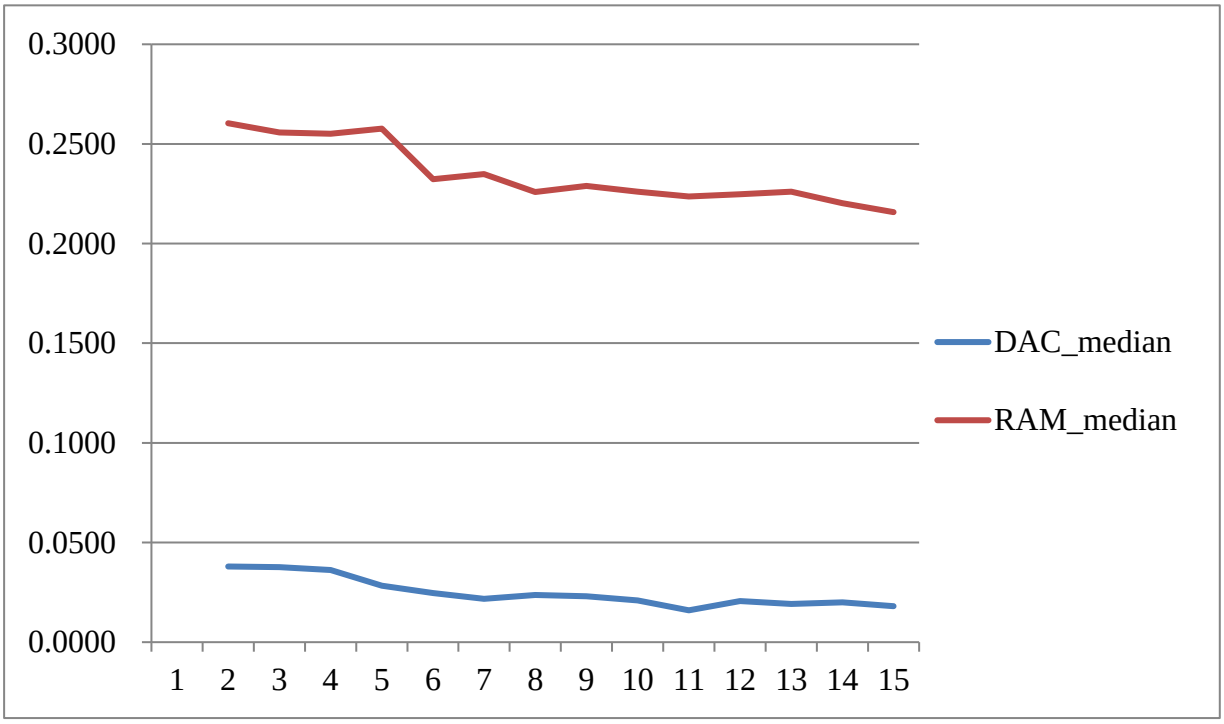
Table 4-A

The quarterly median values of AM and RAM

Quarter	AM_Median	RAM_Median
1	-	-
2	**0.0380**	**0.2604**
3	**0.0377**	**0.2558**
4	0.0362	0.2552
5	0.0283	0.2576
6	0.0247	0.2322
7	0.0218	0.2348
8	0.0236	0.2259
9	0.0231	0.2290
10	0.0209	0.2261
11	0.0160	0.2236
12	0.0207	0.2248
13	0.0192	0.2261
14	0.0200	0.2203
15	0.0181	0.2158

Table 4-B

The changing trends of AM and RAM



6.3 Results of Heckman Two-Stage model

Table 5 presents the results of Heckman's two-stage model. Table 5-PanelA shows the outcomes of the first-stage. The results of the model (1) for RAM and the model (2) for AM are based on Equation (6). As seen in the second column, the coefficient of *HAB_BEAT* is 0.068. Its significance level is 0.1%. This result proves that the firms, which intentionally meet/beat earnings forecast, are also more likely to use RAM to attain their earnings' targets. Similarly, in the model (2), the coefficient of *HAB_BEAT* is 0.024 (its significance level is 5%), which also verifies that part of the firms perceived as 'habitual beaters' use AM to manage earnings. The coefficients of *SHARES* in the model (1) and model (2) are all negative. Both of them have the 0.1% significant level. These results support the statement of Barton and Simko (2002), who claim that more shares outstanding set a high target, and therefore, discourage EM because the target might be too hard to achieve. For *Lockup,* its coefficients for RAM and AM are all significant at the 0.1% level. However, the sign of RAM is positive, and the sign of AM is negative. This result can be interpreted as sample firms shifting away

from AM to RAM during the lock-up period since there is more scrutiny during this period. Lastly, the coefficient of *ANALYST* in the model (1) is significantly positive (0.106) and in the model (2) is significantly negative (-0.114). These reported results are consistent with the finding of the prior researches (Zang 2012; Cohen and Zarowin 2010) analyst coverage is not only an incentive to get involved in EM but also is a limitation for the ability of firms to manipulate earnings. All in all, these results of the first-stage model are all in line with my predictions.

The outcomes of the second stage of Heckman model are presented in Table 5-Panel B. As mentioned before, I measure *IMR* based on the first stage to control for the potential omitted variable bias problem. *IMR*'s coefficient in the model (3) is significant at 0.1% level, validating the necessity of correcting for sample selection bias. As my prediction, all the coefficient of *BIG4, SOX, LITIGATION* and *NOA* should be positive. The coefficients of *BIG4* and *LITIGATION are* significant and positive (i.e. 0.137 and 0.383), suggesting that IPO firms prefer to use RAM, as they face more scrutiny by being audited by Big 4 and face also higher litigation risk. The coefficient of *SOX* is positive; its significance level is 5%. This outcome proves the important role of SOX' s implement in enhancing the level of monitoring. Then sample firms shift to RAM since that the technique of RAM is not easy to be detected by outsiders. This result is consistent with my prediction and the study of Cohen et al. (2008). The higher level of monitor after SOX leads IPO firms to shift to using RAM.

However, the coefficient of *NOA* is negative (-0.464) with significance level at 0.1%. This result is opposite with my expectation that an increase in *NOA* can enhance an IPO firm's preference for RAM. This expectation is based on the study of Zang (2012) and Cohen and Zarowin (2010), but they all collect annual data instead of quarterly data. As stated in section 4, using annual data not only underestimates the magnitude of earnings management, but also cannot indicate if the incentives of EM come from the IPOs or the lock-up. That is why I choose to use quarterly data in this thesis. Therefore, this result should be deemed as significant to some extent. Furthermore, Barton and Simko (2002) find that firms' ability to affect earnings declines with the extent to which net asset values that have been over reported in the balance sheet. So the significant negative relation between RAM and NOA can be interpreted as that overstating net asset in previous period constraints the ability to use RAM

as well.

As seen in table 5, the p-values of the Likelihood Ratio (LR) Chi-Square in all three models are 0.00, indicating that these three models as a whole are all statistically significant. Furthermore, Pseudo R^2 is McFadden's pseudo R-squared. It can show the predictive ability of my models. If it is more close to one, representing the model has a higher level of fitness. However, compared to Adjusted R^2 in linear regression an indicator of the fitness of model, the value of Pseudo R^2 is relatively smaller. Louviere et al. (2000) state that values of Pseudo R^2 between 0.20 and 0.40 are deemed as extremely good model fits. The Pseudo R^2 of model (1), model (2)) and model (3) are 1.96%, 1.67% and 5.57%, respectively. Although the value is not high, they still can suggest these models have good predictive abilities. And the Pseudo R^2 of model (3) is bigger than the other's, which means Heckman two-stage model mitigates the potential omitted variable problem partly.

Overall, these results prove that the preference of IPO firms to use RAM is positively related to auditor characteristic (BIG4), litigation probability (LITIGATION) and post-SOX period; however, this preference is negatively associated with accruals management flexibility (NOA).

Table 5

VARIABLES	**Pred. Sign**	**(1) RAM**	**Pred. Sign**	**(2) AM**	**Pred. Sign**	**(3) RAM**
Panel A: Heckman First-stage Results						
HAB_BEAT	+	0.068***	+	0.024*		
		(0.013)		(0.013)		
SHARES	+/-	-0.192***	+/-	-0.125***		
		(0.019)		(0.019)		
Lockup	+	0.254***	-	-0.0915***		
		(0.027)		(0.027)		
ANALYST	+/-	0.106***	+/-	-0.114***		

	(0.014)	(0.014)	
ROA	-0.110	-0.166*	
	(0.082)	(0.081)	
MKT_CAP	0.0139	-0.00142	
	(0.012)	(0.012)	
M_B	6.06e-05	-0.000132	
	(0.0001)	(0.0001)	
LEVERAGE	0.0004	0.0002	
	(0.0008)	(0.0008)	

Panel B: Heckman Second-stage Results

BIG4			+	0.137***
				(0.019)
SOX			+	0.0823*
				(0.152)
LITIGATION			+	0.383***
				(0.019)
NOA			+	-0.464***
				(0.019)
IMR				-1.269***
				(0.092)
Constant	-0.0495	0.836***		0.909***
	(0.094)	(0.094)		(0.160)
LR chi2	528.06	449.80		1,473.80
Prob > chi2	0.00	0.00		0.00
Pseudo R^2(%)	1.96	1.67		5.57
Quarter indicators	Yes	Yes		Yes

Observations	19,410	19,410	19,086

, **, ** Indicate significance at 5%, 1% and 0.1% levels, respectively. And values in parentheses are standard errors.

6.4 Additional Analysis

To show the reliability of variables in main models, I calculate the Cronbach's alpha of all these variables and present the result in Table 6. Cronbach's alpha is one way of estimating the strength of one proxy's consistency (reliability). Its value ranges from 0 to 1. Specifically, it equals to 0 when all of the scale items are not related to each other; it equals to 1 when the number of items in the scale is in proximity to infinity. The bigger Alpha, the more items measure the same underlying concept. Generally, 0.41 to 0.60 can be seen as the medium level of Alpha.

"Sign" indicates the direction. The negative sign indicates that the item was reversed, such as *RAM* and *AM*. The column of Item-test correlation shows the correlation of each item with the sum index; the column of Item-rest correlation presents the correlation of each item with the summed index with that item excluded. The column of average interitem correlations shows the covariances if the standardized item is omitted. Finally, the values of Alpha are given in the last column.

As seen in table 6, most Alphas are around 0.5, suggesting that these items have a medium level of reliability. The Item-test correlations and Item-rest correlations of *ROA* (0.241; 0.003) and *LITIGATION* (0.226; 0.003) are relatively lower than those of the other items. Their average interitem correlation both can increase to 0.068 if one of them is removed. For Cronbach's Alpha, the Alpha will increase to 0.503 if I drop the item *ROA* and will increase to 0.506 if I drop the item *LITIGATION*. Test scale of average interitem correlation is 0.058. 0.48 denotes the value of Alpha for the test scale computed by using all the items. Overall, these items included in main models can be seen as moderately reliable.

Table 6-Cronbach's alpha

Item	Obs	Sign	Item-test correlation	Item-rest correlation	Average interitem correlation	Alpha
RAM	71,437	-	0.322	0.104	0.061	0.478
AM	71,437	-	0.304	0.083	0.062	0.482
HAB_BEAT	23,157	+	0.487	0.326	0.053	0.441
SHARES	67,978	+	0.598	0.425	0.041	0.374
Lockup	71,437	-	0.294	0.073	0.063	0.486
ANALYST	35,944	+	0.551	0.383	0.050	0.423
ROA	69,623	+	0.241	0.003	0.068	0.503
MKT_CAP	67,839	+	0.521	0.332	0.046	0.402
M_B	67,654	-	0.293	0.073	0.063	0.486
LEVERAGE	66,801	-	0.293	0.070	0.063	0.486
BIG4	67,638	-	0.298	0.078	0.063	0.483
SOX	71,437	+	0.500	0.310	0.048	0.415
LITIGATION	71,437	-	0.226	0.003	0.068	0.506
NOA	71,437	+	0.229	0.004	0.068	0.505
IMR	19,411	+	0.493	0.339	0.054	0.446
Test scale					0.058	0.480

7. Conclusions and limitations

This thesis provides a large-sample evidence on how IPO firms manage earnings by using RAM and AM during the lock-up and post-lock-up period. Furthermore, it concentrates on how these IPO firms weigh between RAM and AM based on the ability and the cost of doing so. The sample period starts from 1988 to 2016. I measure the abnormal level of discretionary accruals to proxy for AM based upon the modified Jones model (Dechow et al. 1995). For RAM, the proxy includes overproducing inventory, cutting R&D expenses and SG&A expenditures. I generate *RAM* according to equation (5) to capture the RAM in total.

According to prior literature on earnings management, I develop two main hypotheses. First, IPO firms manage earnings more during the lock-up period than after it. In accordance with this hypothesis, I find that IPO firms indeed show a declining trend of using EM (RAM and AM) after the lock-up expiration. The result is statistically significant, as shown in the first stage of Heckman model. Second, IPO firms' preference to choose RAM is associated with the ability and cost of doing so. I conclude that IPO firms are more prone to engage in EM (by RAM or AM) when they are 'habitual beaters'. Furthermore, when IPO firms have more shares outstanding, it makes it harder for them to manage earnings regardless of the strategy they choose. The results also show that incentives of managers to choose RAM increase, but the frequency of use of AM decreases for the firms with higher level of analyst coverage during lock-up period. These findings indicate that IPO firms prefer RAM over AM if they face more scrutiny and more severe penalties.

The findings found in the second stage of my model can only partially support the results in the previous literature but can support my second hypothesis. Explanatory variables - BIG4, SOX, LITIGATION are in line with my second hypothesis. BIG4, SOX and LITIGATION represent the scrutiny from outside and potential punishment. The outsider can detect AM more easily, therefore, these costs motivate IPO firms to shift away from AM to RAM. However, the reported result for NOA is not the same as my prediction. I find NOA constraints RAM as well.

This thesis contributes to EM literature by investigating both RAM and AM in IPO firms using quarterly data. Moreover, I use the abnormal level of R&D expenses and SG&A

expenditures in calculating *RAM*. Generally, prior studies use these two accounting items as a part of discretionary expenses. However, in my thesis, I measure these expenses separately to capture the total RAM, which distinguishes this thesis from most of the prior studies. Furthermore, I use quarterly data instead of annual data, which can avoid the underestimation of the magnitude of AM and captures the lock-up period better, since the earnings inflation and subsequent accrual reversal can happen in the same fiscal year. Lastly, I provide evidence about how and why IPO firms trade off between RAM and AM.

The main limitation of this thesis is that I measure the lock-up period as a typically fixed period, which is 180 days according to the prior studies (Bradley et al. 2001; Field and Hanka 2001; Ofek and Richardson 2000). However, every IPO firms have different lock-up periods, and therefore, the standardization of the time frame can cause imprecise results. Therefore, I suggest that future study should measure the lock-up period more accurately by focusing on each of the companies individually.

8. References

Ahearne, M. J., C. J. Chapman, J. P. Boichuk, T. J. Steenburgh. 2013. Real Earnings Management in Sales, the Interaction with Finance and Appearance in Financial Reports. *Working paper, Kellogg School of Management.*

Aharony, J., C. Lin, and M.P. Loeb. 1993. Initial public offerings, accounting choices, and earnings management. *Contemporary Accounting Research* 10 (1): 61-81.

Bessler, W., and S. Thies. 2006. Initial Public Offerings, Subsequent Seasoned Equity Offerings, and Long-Run Performance: Evidence from IPOs in Germany. *The Journal of Entrepreneurial Finance* 11(3):1-37.

Ball, R. and L. Shivakumar. 2008. Earnings quality at initial public offerings. *Journal of Accounting and Economics* 45(2-3): 324-349.

Bhojraj, S., P. Hribar, M. Picconi, and J. McInnis. 2009. Making Sense of Cents: An Examination of Firms That Marginally Miss or Beat Analyst Forecasts. *The Journal of Finance* 64(5): 2361-2388.

Brav, A. and P. A. Gompers. 2003. The role of lockups in initial public offerings. *The Review of Financial Studies* 16(1): 1-29.

Bradley, D. J., B. D. Jordan, and Ha-Chin Yi. 2001.Venture capital and IPO lockup expiration: An empirical analysis. *Journal of Financial Research* 24(4): 465-492.

Brau, J. C., V. E. Lambson, and G. McQueen. 2005. Lockups revisited. *Journal of Financial and Quantitative Analysis* 40 (3): 519-530.

Barton, J. and P. J. Simko. 2002. The balance sheet as an earnings management constraint. *The Accounting Review* 77: 01-27.

Brau, J.C., D.A. Carter, S. E. Christophe, and K.G. Key. 2004. Market reaction to the expiration of IPO lockup provisions. *Managerial Finance* 30 (1): 75-91.

Bhojraj, S., P. Hribar, M. Picconi, and J. McInnis. 2009. Making sense of cents: An examination of firms that marginally miss or beat analyst forecasts. *The Journal of Finance* 64 (5): 2359–2386.

Bushee, B. 1998. The influence of institutional investors on myopic R&D investment behavior. The Accounting Review 73 (3): 305–333.

Badertscher, B. 2011. Overvaluation and the choice of alternative earnings management mechanisms. *The Accounting Review* 86 (9): 1491–1518.

Barton, J. 2001. Does the use of financial derivatives affect earnings management decisions? *The Accounting Review* 76 (1): 1–26.

Bartov, E., D. Givoly, and C. Hayn. 2002. The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics* 33 (2): 173–204.

Becker, C., M. DeFond, J. Jiambalvo, and K. Subramanyam. 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research* 15 (1): 1–24.

Cohen, D. A., A. Dey, and T. Z. Lys. 2008. Real and Accrual-Based Earnings Management in the Pre- and Post-Sarbanes-Oxley Periods. *The Accounting Review* 83(3): 757-787.

Cheng, Q., and T. D. Warfield. 2005. Equity incentives and earnings management. *The Accounting Review* 80 (2): 441–476.

Cohen, D. A. and P. Zarowin. 2010. Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics* 50: 2-19.

Dechow, P. M., and D. J. Skinner. 2000. Earnings Management: Reconciling the Views of Accounting Academics, Practitioners, and Regulators. *Accounting Horizons* 14(2): 235-250.

Dechow, P. M., and C. M. Catherine. 2004. Earnings quality. *The Research Foundation of CFA Institute.*

Dechow, P. M., A. P. Hutton., J. H. Kim, and R. G. Sloan. 2012. Detecting Earnings Management: A New Approach. *Journal of Accounting Researc*h 50(2): 275-334.

Dechow, P. M., and R. G. Sloan. 1991. Executive incentives and the horizon problem: An empirical investigation. *Journal of Accounting and Economics* 14 (1): 51–89.

DeFond, M., and J. Jiambalvo. 1993. Factors related to auditor-client disagreements over income-increasing accounting methods. *Contemporary Accounting Research* 9(2): 415–431.

DuCharme, L. L., P. H. Malatesta, and S. E. Sefcik. 2001. Earnings management: IPO valuation and subsequent performance. *Journal of Accounting, Auditing and Finance* 16: 369-396.

Ewert, R. and A. Wagenhofer. 2005. Economic Effects of Tightening Accounting Standards to Restrict Earnings Management. *The Accounting Review* 80(4): 1101-1124.

Ertimur, Y., E. Sletten, J. Sunder and J. Weber. 2017. When and Why do IPO Firms Manage Earnings? *Working Paper*

Fan, Q. T. 2007. Earning Management and ownership retention for Initial Public Offerings firms: Theory and Evidence. *The Accounting Review* 82(1): 27-64.

Fedyk, T., Z. Singer, and M. Soliman. 2012. The Sharpest Tool in the Tool Shed: Simultaneous Equations of Financial Statement Management Tools during IPOs. *Working paper*, Arizona State University, McGill University, and University of Southern California.

Field, L. C., and G. Hanka. 2001. The Expiration of IPO Share Lockups. *The Journal of Finance* 56(2): 1-106.

Fields, T. D., T. Z. Lys and L. Vincent. 2001. Empirical research on accounting choice. *Journal of Accounting and Economics* 31(1-3): 255-307.

Francis, J., E. Maydew, and H. Sparks. 1999. The role of Big Six auditors in the credible reporting of accruals. *Auditing: A Journal of Practice & Theory* 18 (2): 17–35.

Gunny, K. A. 2010. The Relation between Earnings Management Using Real Activities Manipn1ation and Future Performance: Evidence from Meeting Earnings Benchmarks. *Contemporary Accounting Research* 27(3): 855-888.

Graham, J. R., C. R. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40(1): 3-73.

Healy, P. M., and J. M. Wahlen. 1999. A Review of the Earnings Management Literature and Its Implications for Standard Setting. *Accounting Horizons* 13(4): 365- 383.

Huang, C, and C Lin. 2007. Earnings management in IPO lockup and insider trading: Evidence from Taiwan. *Emerging Markets Finance and Trade* 43: 78–91.

Heckman, J. J. 1979. Sample Selection Bias as a Specification Error. *Econometrica* 47(1): 153-161

Hribar, P., N. Jenkins, and W. Johnson. 2006. Stock repurchases as an earnings management device. *Journal of Accounting and Economics* 41 (1): 3–27.

Herrmann, D., T. Inoue, and W. Thomas. 2003. The sale of assets to manage earnings in Japan. *Journal of Accounting Research* 41 (1): 89–108.

Ising, P. 2014. *Earning accruals and real activities management around Initial Public Offerings: evidence from specific industries.* Springer Gabler.

Ibbotson, R.G., and J.R. Ritter. 1995. Initial public offerings, Chapter 30. *Handbook in Operations Management Research and Management Science* 9: 993-1016.

Jackson, S., and W. Wilcox. 2000. Do managers grant sales price reductions to avoid losses and declines in earnings and sales? *Quarterly Journal of Business and Economics* 39 (4): 3–20.

Kasznik, R., and M. McNichols. 2002. Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. *Journal of Accounting Research* 40 (3): 727–759.

Lo, K. 2008. Earnings management and earnings quality. *Journal of Accounting and Economics* 45: 350-357.

Louviere, J. J., D. A. Hensher and J. D. Swait. 2000. *Stated Choice Methods: Analysis and Applications.* Cambridge University Press. pp.55

Morsfield, S. G. and C. E. L. Tan. 2006. Do Venture Capitalists Influence the Decision to Manage Earnings in Initial Public Offerings? *The Accounting Review* 81(5): 1119-1150.

Ofek, E., and M. Richardson. 2001. Dotcom Mania: A Survey of Market Efficiency in the Internet Sector. *Working paper*. Stern School of Business, New York University.

Ofek, E., and M. Richardson. 2000. The IPO lock-up period: implications for market efficiency and downward sloping demand curves. *Working paper*. Stern School of Business, New York University.

Kim, Y., and M. S. Park, 2005, Pricing of seasoned equity offers and earnings management. *Journal of Financial and Quantitative Analysis* 40: 435–463.

Morsfield, S. G., and C. E. L. Tan. 2006. Do venture capitalists influence the decision to manage earnings in initial public offerings? *Accounting Review* 81: 1119–1150.

Roychowdhury, S. 2006. Earnings management through real activities manipulation. *Journal of Accounting and Economics* 42(3): 335-370.

Ritter, J.R. 1998. Initial public offerings. *Contemporary Finance Digest* 2 (1): 5-30.

Rajan, R., and H. Servaes. 1997. Analyst following of initial public offerings. *The Journal of Finance* 52 (2): 507-529.

Ronen, J. and S. Sadan. 1975. Classificatory smoothing: Alternative income models. *Journal of Accounting Research* 13(1): 133-149.

Schipper, K. (1989): Commentary on earnings management. *Accounting Horizons* 3(4): 91-102.

Skinner, D., and R. Sloan. 2002. Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies* 7 (2–3): 289–312.

Scott, W. R. 2014. *Financial accounting theory*. 7th ed. Pearson.

Teoh, S. H., I. Welch, and T. J. Wong. 1998a. Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics* 50: 63-99.

Teoh, S. H., I. Welch, and T. J. Wong. 1998b. Earnings management and the Long-Run Market Performance of Initial Public Offerings. *The Journal of Finance* 53(6): 1935-1974.

Teoh, S. H., T. J. Wong, and G. R. Rao. 1998c. Are Accruals during Initial Public Offerings Opportunistic? *Review of Accounting Studies* 3(1-2): 175-208.

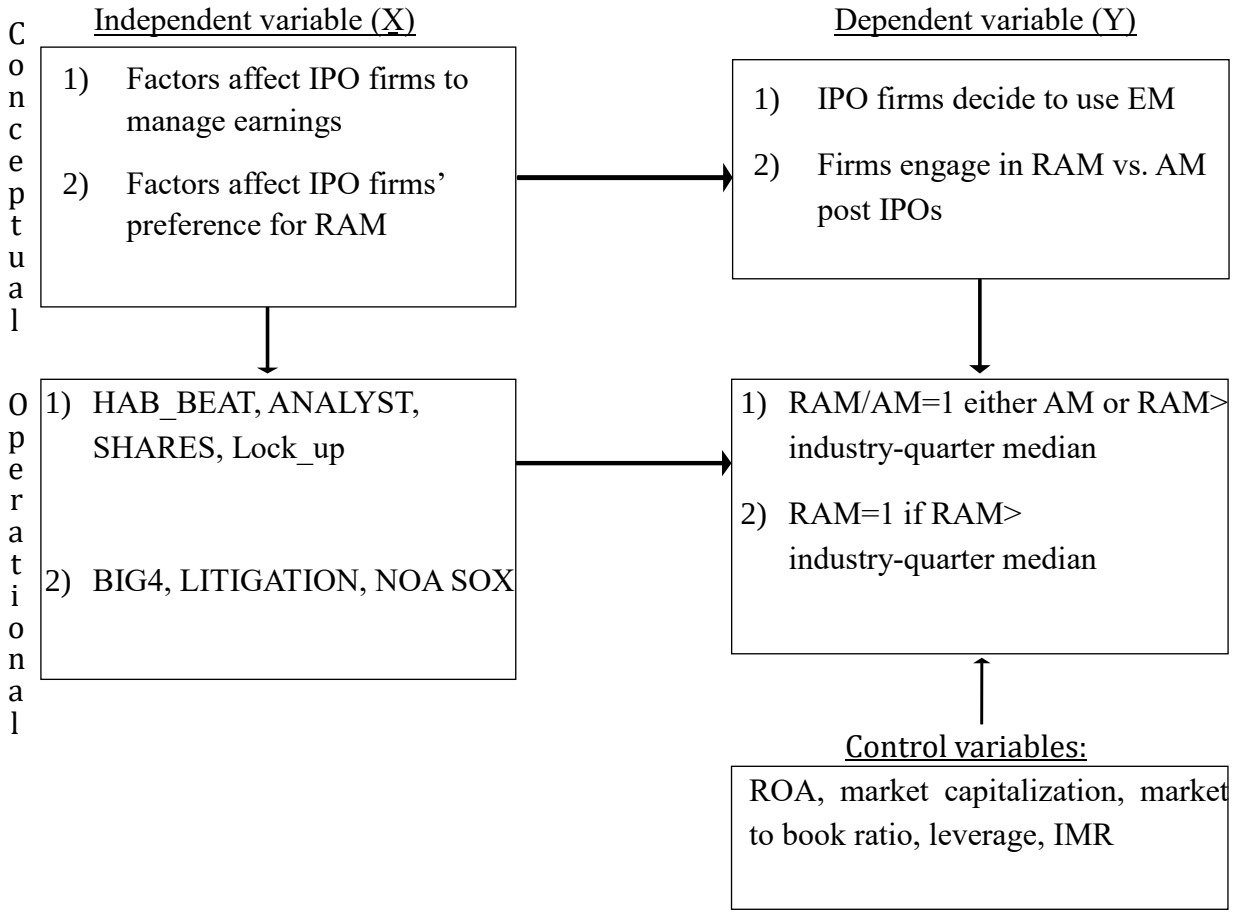
Tsai, L. L., J. H. Chih, and C. L. Hsiao. 2015. Earnings management during lockup in explaining IPO operating Underperformance. *Review of Pacific Basin Financial Markets and Policies* 18(1): 1-21.

Titman, S. and B. Trueman. 1986. Information quality and the valuation of new issues. Journal of Accounting and Economics 8 (2): 159-172.

Zang, A. Y. 2012. Evidence on the Trade-Off between real activities manipulation and accrual-based earnings management. *The Accounting Review* 87(2): 675-703.

9. Appendix

9.1 Predictive validity framework



9.2 Explanation of variables

DAC	Discretionary accrual based on Modified Jones Model
TAcc	Total accruals = IBQ-CFO
IBQ	Income before extraordinary items
CFO	Operating income – Operating expense – discontinued operations and extraordinary items
A	Total assets
ΔSales	$Sales_t - Sales_{t-1}$
ΔRec	Net accounts receivable $_t$ − Net accounts receivable $_{t-1}$
PPE	Gross property, plant, and equipment
Prod	Production costs= cost of goods sold + change in inventories
RD	Research and Development expenses
AvChe	Average cash holding=CHE/ATQ
SalesG	Sales growth rate=$(Sales_t - Sales_{t-1})/Sales_{t-1}$
SGA	Selling, general, and administrative expenses
HAB_BEAT	The natural logarithm of the frequency of meeting/beating analysts' earnings forecasts in every quarter
SHARES	The natural logarithm of the number of shares outstanding
ANALYST	The natural logarithm of 1plus the number of analysts covering the firm
ROA	Return on assets=net income/total asset
MKT_CAP	The log of market capitalization (CSHO*PRCC)
M_B	The market-to-book ratio
LEVERAGE	The amount of debt in the firm's capital structure
Big4	Indicator variable, equals to 1 if a firm has a Big 4 auditor, otherwise 0
LITIGATION	Indicator variable, equals to 1 if a firm in a high litigation industry, otherwise 0. SIC codes are 2833–2836, 8731–8734, 7371–7379, 3570–3577, 3600–3674
NOA	Net operating assets= share equity - (cash + marketable security) + total debt, then divided by lagged sales. NOA equals to1 if the value above the industry-quarter median, otherwise 0.
IMR	The nonlinear combination of the first-stage regressors
SOX	Indicator variable, equals to 1 if year after 2003, otherwise 0.
Lockup	Indicator variable, equals to 1 if the fiscal quarter is 2 and 3, otherwise 0.
RAM（total）	RAM = RAM_PROD+ (-1) *(RAM_RD+ RAM_SGA)
AM	Indicator variable, equals to 1if DAC above the industry-quarter median, otherwise 0.
RAM	Indicator variable, equals to 1if RAM (total) above the industry-quarter median, otherwise 0.