РАЗДЕЛ 2
УПРАВЛЕНИЕ ДОХОДАМИ И КОРПОРАТИВНОЕ УПРАВЛЕНИЕ

SECTION 2
EARNINGS MANAGEMENT AND CORPORATE GOVERNANCE

REAL AND ACCRUAL EARNINGS MANAGEMENT AROUND IPOs: US EVIDENCE

Ben-Hsien Bao*, Richard Chung**, Yanjun Niu, Steven Wei****

Abstract

This study examines the presence of real activities manipulation (REM) of IPO firms utilizing the cross-sectional regressions on each industry-year (Roychowdhury, 2006). The real activities examined in this paper include sales manipulation, reduction of discretionary expenses and overproduction. We show that IPO firms have significantly negative abnormal cash flows from operations and significantly positive abnormal production costs in the IPO year. The findings suggest that IPO firms not only manipulate accruals to inflate reported earnings, but also engage in real activities manipulation. We also show that IPO firms' decisions to manipulate earnings in the IPO year is positively related to the amounts of IPO proceeds and negatively related to the underwriters' reputation rankings and the presence of venture capital.

Keywords: Initial Public Offerings, Accrual-Based Earnings Management, Real Activities, Real Earnings Management

**The Hong Kong Polytechnic University, Hong Kong SAR, China*
***Corresponding author. Department of Accounting, Finance and Economics, Griffith Business School, Griffith University, Gold Coast Campus, Queensland 4222, Australia*
Tel: +61 07 5552 8584
Fax: +61 07 5552 8068
Email: r.chung@griffith.edu.au
****PriceWaterhouseCoopers, Beijing Office*

1 Introduction

The purpose of this study is to examine two types of earnings management activities, real and accrual earnings manipulation, around initial public offerings (IPOs) by US companies. Prior studies on accrual earnings management (AEM) around US IPOs provided mixed results (Teoh, Welsh and Wong, 1998b; DuCharme, Malatesta and Sefcik, 2001; Darrough and Rangan, 2005; Ball and Shivakumar, 2008; and Billing and Lewis, 2010). Also, authors in those papers considered AEM only. In addition to AEM, another type of earnings management activities, real earnings management (REM), has obtained more and more attention from researchers recently. A survey made by Graham, Harvey and Rajgopal (2005) reported that managers preferred REM over AEM. Also, since the publication of Roychowdhury (2006), the methodology used in that paper to study three kinds of REM activities has gained popularity

gradually in various settings such as around zero earnings threshold, around seasoned equity offerings (SEOs), meeting or beating analysts' earnings forecasts, etc. However, as far as we know, no paper has examined both AEM and REM around IPOs. This paper seeks to bridge the gap in the literature by examining both REM and AEM around IPOS by US firms. The three objectives of our paper are stated below.

First, we examine whether or not US IPO firms conduct both accrual and real activities manipulation around the IPO year. Based on previous studies, we find at least two reasons for managers to manipulate earnings through real operating activities (Cohen et al., 2008; and Zang, 2010). One is that after financial scandals such as Enron, World.Com, etc. and the passage of the Sarbanes and Oxley Act (SOX) in 2002, AEM is likely to draw more scrutiny by auditors, regulators, etc., thus firms would have less flexibility in accrual-based earnings management. So firms have more incentives to engage in REM. The other reason is that relying on AEM alone might be inadequate and risky. If reported earnings after AEM are still below the targeted earnings threshold, then it would be too late for managers to engage in REM because it takes time to be realized and cannot be manipulated at the end of year (Zang, 2010). So the first objective of this paper is to assess whether IPO firms manipulate real activities to inflate their reported earnings in addition to accruals earnings management. We follow the strategy in Roychowdhury (2006) by examining three types of real activities: sales manipulation, reduction of discretionary expenses and overproduction.

Second, we examine the determinants for firms to engage in AEM and REM around the IPO year. Since managers of different firms face different types of incentives to manipulate earnings, we identify the factors that affect firms' decisions to manipulate earnings for IPO firms by connecting the offering characteristics of IPO firms and levels of earnings management in general, regardless whether AEM or REM is engaged.

Lastly, we analyze factors leading to the choice between REM and AEM by managers around the IPO year. Previous literature has documented that AEM is much easier than REM to draw attention from regulators, auditors, financial analysts, etc., which leads to litigation and costly settlements. As a result, managers might make tradeoff between real activities and accrual manipulation to manage reported earnings, especially after the SOX (Cohen et al., 2008). We also consider the costs to and abilities of firms to engage in AEM following Cohen and Zarowin (2010) and investigate the factors leading to the choice of REM by IPO firms.

We contribute to the literature by being the first to study both AEM and REM around US IPOs. Also, by examining AEM again, we provide additional evidence on the AEM around IPOs.

The remainder of the paper proceeds as follows. In Section 2, prior studies on AEM around IPOs, as well as REM in different settings are summarized. In Section 3, first the estimation models used to measure AEM and REM are discussed; then the main testing models and hypotheses are formulated. In Section 4, the sample and data, and the empirical results are reported and discussed. In the last section, conclusions of the study are summarized and discussed.

2 Literature review and contributions

2.1 Earnings management of IPOs

Earnings management around IPOs is a popular research topic among researchers. Among the studies on IPOs and earnings management, two kinds of opinions have been held by scholars: (a) opportunistic earnings management and (b) earnings management to signal to the public the managers' private information. Each type of earnings management is discussed below.

2.1.1 Opportunistic earnings management around IPOs

Evidence shows that IPOs underperform after the offering (Ritter, 1991) and reasons have been documented to explain the underperformance. Because of the lack of public reporting history, scrutiny by auditors and underwriters, analyst followings, as well as observable stock market prices, information asymmetry exists in most IPOs. The environment also provides managers opportunities to manipulate reported earnings. Much literature focuses on the relation between earnings management around IPOs, and quite a few papers show that firms inflate earnings through accruals in the years around IPO. Also, the post-IPO underperformance is attributed to opportunistic earnings management behavior of IPOs. Teoh, Welsh and Wong (1998) stated that investors were misled by the inflated earnings so they offered higher stock price for IPOs. In the post-IPO periods, more information of these firms was revealed to the public and investors recognized the opportunistic inflation of earnings gradually. Thus, a negative stock return correction followed the IPO offering because of the misevaluation, as well as a reversal of unexpected accruals.

Consistent with the previous paper, Teoh, Wong and Rao (1998b) found evidence that for firms with high positive reported earnings and abnormal accruals around IPOs, they also have poor subsequent long-run earnings and negative abnormal accruals. They stated that investors failed to adjust the earnings opportunistically inflated through accruals by managers and explained that the subsequent underperformance resulted from investors' overoptimism about the IPOs. Teoh, Wong and Rao (1998b) examined the relation between reported

earnings and associated accrual and cash flow components around IPOs. Their findings suggested that discretionary working capital and total accruals are negatively related to the change in future net income.

DuCharme, Malatesta and Sefcik (2001) examined the relation between earnings management, IPO valuation and IPO firms' subsequent performance. They found a positive relation between pre-IPO abnormal accruals and IPOs' initial firm value. In addition, their results suggested that abnormal accruals in both the pre-IPO year and the offering year are significantly negatively related to subsequent firm stock return.

Li, Lu and Zhou (2006) reported a significant correlation between earnings management and the delisting risk of IPOs. They divided their sample firms into four quartiles based on the level of abnormal discretionary accruals. The findings suggested that IPO firms with most aggressive reported earnings are facing more risk of delisting and provided evidence that opportunistic earnings manipulation exists among IPO firms.

The study by Billings and Lewis (2010) focused on two objectives: one is the situations leading to opportunistic behavior and the second is consequences for firms and their managers. After identifying a sample of 1668 IPO firms and a sub-sample of 72 IPO lawsuit firms between January 1996 to December 2004, the authors employed three methods to measure abnormal discretionary accruals (the error from a cross-sectional Jones regression model estimated annually within an industry group based on Fama and French (1997); a performance-matched measure by using an IPO firm's discretionary accruals subtracting a matched firm's discretionary accruals, where the matched firm is in the same industry, same year with the closest ROA; and the unexpected accruals defined as the IPO firms' total accruals subtracting the mean total accruals of all same-industry, high-growth firms of similar sales size). Their findings did not suggest that the average IPO firms report more conservatively than similar public firms operating in the same industry. Additionally, they linked the opportunism at IPOs to consequences not only for the IPO firm (litigation, settlement payments, and delisting) but also for the managers themselves (in the form of SEC involvement and increased turnover). The findings suggested that although managers may report abnormal accruals that reflect their private information, there is no evidence to suggest that the average IPO firms report more conservatively than similar public firms operating in the same industry. By employing three methods to measure abnormal discretionary accruals, they found that many IPO firms report higher levels of accruals than their matched (based on size and growth) industry counterparts and managers who do behave opportunistically get penalized for this kind of behavior.

2.1.2 Views against opportunistic earnings management around IPOs

Recently a series of papers (Fan, 2007; Armstrong et al., 2008; Ball and Shivakumar, 2008) cast doubt on the opportunist earnings manipulation and provide empirical evidence to support their views.

Fan (2007) examined the interaction between earnings management and ownership retention. In contrast to the opportunistic behavior of earnings manipulation, Fan (2007) found that firms employ both earnings and ownership retention as signals to inform investors about their private information. While employing this strategy, high-value firms tradeoff between these two signals to prevent low-value firms from mimicking their performance. A recent work conducted by Armstrong and Foster (2008) re-examined earnings management around IPOs. This paper re-examined the magnitude of discretionary accruals around IPOs and investigated four incentives for managers to manipulate earnings. It found no evidence of a relation between discretionary accruals and IPO issue price, post-IPO equity values, insider trading profits, and executive compensation.

Ball and Shivakumar (2008) also provided opposite views from opportunistic earnings management around IPOs. Following the idea that timely loss recognition is substantially more prevalent for UK public firms than for private firms (Ball and Shivakumar, 2005), they provided an alternative explanation that public firms report earnings more conservatively prior to the IPOs, relatively to those firms' earnings reported as private firms. They stated that because of the more and closer monitoring by auditors, boards, analysts, media and greater regulatory scrutiny, IPO firms must meet higher-quality financial reporting standards. They re-examined the TWW evidence (Teoh, Welsh and Wong, 1998), and pointed out that the research design in TWW biased the findings: estimates of proxies for earnings management are too large to represent credibly earnings inflation. They also provided two factors to explain the non-discretionary changes in working capital: one is that the unusual growth in production and sales lead to optimal working capital level; the other is that any use of the IPO proceedings to inflate working capital (other than cash) is likely to be falsely identified as income-increasing earnings management.

The findings of the three papers contradict the opportunistic earnings management view and document that IPO firms do not engage in opportunistic earnings manipulation. Additionally, Armstrong et al. (2008) attributes the negative correlation between issue year discretionary accruals and future returns to an actual artifact of cash-flow mispricing. Since REM has impact on operational cash flows, results from these papers shed light on our incentive to examine the REM around IPOs as well to

get further evidence on earnings management around IPOs.

2.2 Real activities manipulation

Real earnings management (REM) is defined by Roychowdhury (2006) as follows:

…Real activities manipulation is defined as management actions that deviated from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds…

Also, a recent survey conducted by Graham, et al (2005) suggested that managers prefer real activities manipulation to accrual earnings management:

"…We find strong evidence that managers take real economic actions to maintain accounting appearances. In particular, 80% of survey participants report that they would decrease discretionary spending on R&D, advertising, and maintenance to meet an earnings target. More than half (55.3%) state that they would delay starting a new project to meet an earnings target, even if such a delay entailed a small sacrifice in value…"

Because a series of papers have studied firms' real earnings management (REM) in a more comprehensive manner in the past few years, several representative papers are reviewed below.

Roychowdhury (2006) develops empirical methods to measure REM and use these measures to examine REM around zero earnings threshold. He concentrates on patterns in operating cash flows, discretionary expenses, and production costs of suspect firms (e.g. firms with net income scaled by total assets that is greater than or equal to zero but less than 0.005) and studies three REM activities:

a. Sales manipulation, which means that managers provide price discounts or more lenient credit items to accelerate temporarily increased sales. This strategy will trigger higher current reported earnings but will result in lower level of cash flow in the current period;

b. Reduction of discretionary expenditures, such as R&D, advertising expenses, and general and administrative (SG&A) expenses. Consistent with sales manipulation, this strategy will lead to higher reported earnings in current period. However, reduction of discretionary expenses would result in higher contemporaneous cash flow; and

c. Overproduction: if firms produce more goods than normal quantities, the average fixed costs will be allocated to inventories and leads to the decreases in total cost per unit sold. The decrease in total cost per unit sold will result in lower cost of goods sold in the income statement and lower cash flows. As a result, the firms can report higher production margins as well as higher reported earnings.

The author develops two main hypotheses to test whether firms conduct real activities manipulation and six more hypotheses to test the cross-sectional variation in real activities manipulation. The results support the hypotheses that firms use the three REM activities to report small positive profits and small forecast errors. At the same time, the author finds a negative association between institutional ownership and real activities manipulation.

Two papers examined whether and how firms engage in REM around SEOs. Mizik and Jacobson (2007) make use of panel data time series models to forecast sized-adjusted earnings and R&D expenditures. They predict that firms reporting positive abnormal return on assets (ROA) and negative abnormal R&D are more likely to manipulate real activities. Their test results are consistent with the prediction and provide evidence that firms are likely to coordinate accounting and real activities to inflate earnings at the time of SOE. Their tests also show that financial market mis-valuates the firms that manipulate real activities, which is supported by negative stock returns of those firms subsequent to SEOs. However, they do not find significant mis-valuation of firms that only engage in earnings management through discretionary accruals.

Cohen and Zarowin (2010) focuses on three issues: whether managers manipulate earnings via both accruals and real activities; how firms make tradeoff between accrual and real earnings management, and the economic consequences of accrual and real earnings management around SEOs. The results show that firms use both AEM and REM around SEOs, and those firms tend to outperform their industry peers in the period preceding SEOs and underperform their peers following SEOs. The authors find that the probability of firms using REM increases with the presence of a Big 8 auditor, auditor tenure, in a high litigation industry, the level of net operating assets, and in the post SOX period. Additionally, in the SEO context the economic costs of REM are likely more than that of AEM.

Gunny (2005) conducts a comprehensive examination into the consequences of real earnings management. She identifies four types of REM activities: R&D expenditures, SG&A expenses, timing of income recognition from the disposal of long-lived assets and investments, and decreasing COGS. In addition, her results suggest that all four types of real activities negatively impact on firms' future operating performance. Analysis on the expectation of analysts indicates that analysts incorporate all four types of REM. Compared with analysts, investors recognize only the manipulation of R&D and the strategic timing of asset sales.

Cohen and Zarowin (2010) also studies the consequences of REM around SEOs. They examine the effect of each of the three types of REM methods in Roychowdhury (2006) on SEO firms' future performance. Their results suggest that the decline of firm performance in the post-SEO period is driven by both AEM and REM while the decline attributed to REM is more severe than that to AEM.

A tradeoff between AEM and REM also has been documented. Zang (2010) examines the tradeoff between REM and AEM. She finds that managers use these two methods as substitutes in earnings management. The author makes use of four variables to capture the real activities manipulation of firms, R&D expenditure, selling, general and administrative expenses, production costs, and gains on asset sales. She conducts a cost analysis for the relation between accrual and real earnings management and develops two equations to detect the tradeoff between AEM and REM. First, the author tests whether AEM and REM occur simultaneously. The results show that REM is uncorrelated with the error term in the AEM equation, which reject the hypothesis of the simultaneous occurrence of AEM and REM. Second, based on the result of the first equation, the author utilizes the recursive simultaneous equation system and provides evidence to support her hypotheses. She finds that real activities manipulation has a positive relation with the costs of accrual earnings management and accrual earnings management is negatively correlated with the level of real activities manipulation. All the evidence mentioned above support that managers make tradeoff between AEM and REM and they make REM decisions before AEM.

Cohen et al. (2008) study the real activities manipulation from another perspective. They investigate the prevalence of both AEM and REM activities in the period leading to the passage of SOX and in the period following the passage of SOX while examining three incentives for earnings management, including maintaining (or surpassing) last year's earnings or the consensus analysts' forecast and avoiding reporting losses. The results support that earnings management increased steadily over the sample period. And while the level of AEM declined, the level of REM increased significantly after the passage of SOX. These results also consistent with the view that AEM is more likely to draw scrutiny from auditors, regulators, etc., than REM and relying on AEM alone is inadequate if the realized earnings still could not meet the earnings targets through manipulate abnormal accruals.

Following Zang (2010), Cohen and Zarowin (2010) model SEO firms' choice to use REM or AEM as a function of their ability and costs to manipulate accruals. The authors use the net operating assets at the beginning of the year (NOA) to represent the ability to manipulate accruals for SEO firms. The costs to manipulate AEM are represented by BIG8 (a dummy variable for whether a firm has a Big 8 auditor), AUDIT_TENURE (the natural logarithm of the number years the auditor has audited the firm), LITIGATION (a dummy variable for whether a firm belongs to a high litigation industry) and SOX (a dummy variable for whether an SEO falls in the post-SOX period). Their results support the hypotheses that SEO firms' choice to use REM is positively related to NOA and the costs of AEM.

3 Methodology and hypotheses development

3.1 AEM and REM around IPOs

Previous literature in capital market research mainly utilizes the Standard Industrial Classification (SIC) system. Meanwhile, some other industry classification systems have also been used: the North American Industry Classification Systems (NAICS), the Fama-French algorithm (FF) and the Global Industry Classification Standard (GICS), which are found to provide more effective results than SIC thus the comparison among these systems has great implications for capital market research (Bhojraj et al., 2003; Chan et al., 2007; Scott and Hrazdil, 2010; Kahle and Walkling, 1996; Krishnan and Press, 2003). Scott and Hrazdil (2010) take a comparison of the properties and validity of four industry classification systems: SIC, NAICS, FF and GICS and provide that discretionary accruals estimates are materially affected by the industry classification method selected, with GICS best capturing the intra-industry homogeneity. Based on their findings, the authors seriously suggest the utilization of GICS. Therefore, we employ GICS to classify the industries and to estimate the discretionary accruals and real activities proxies.

3.1.1 Measure of AEM

Following the most recent papers about earnings management, the models for accruals, cash flows from operations, discretionary expenses and costs of goods sold are all estimated by the year and industry classified by the 6-digit GICS code in this study. The primary model used is the modified Jones model (Dechow, Sloan and Sweeney, 1995). We calculate abnormal discretionary accruals as the residuals by subtracting normal levels of accruals from the industry-year regressions from actual levels of accruals.

$$\frac{TA_{i,t}}{Assets_{i,t-1}} = \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

$$DA1_{i,t} = TA_{i,t} - NDA_{i,t} \quad (2)$$

TA = EBIT – CFO. EBIT is the earnings before interests and taxes, and CFO is the operating cash flows from the statement of cash flows. Assets is the total assets at the beginning of the year, ΔSales is the change in total sales, and ΔAR is the change in accounts receivable. PPE is the gross value of property, plant and equipment. The definitions of all variables used in those equations stated in this paper can be found in Appendix A.

3.1.2 Measures of REM

Following Roychowdhury (2006) we measure REM using the following models.

i. Sales manipulation. Roychowdhury (2006) generates the normal level of cash flows from operation by following the model developed by Dechow et al. (1998). To estimate the normal cash flow from operations, we run the cross-sectional regression model by employing sales and change in sales as independent variables.

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

$$\text{ACFO} = \text{Actual CFO} - \text{Estimated normal CFO} \quad (4)$$

ii. Reduction on discretionary expenses. Introduced by Roychowdhury (2006), R&D, SG&A, advertising should be expensed in the same period that they are incurred. However, managers could cut these expenses to inflate current earnings. This activity will decrease cash outflows and have a positive effect on abnormal cash flow from operations. As explained by previous literature, if managers manipulate sales upward in the current year, lower residuals from a regression model will deflate the levels of abnormal discretionary expenses. Thus, including lagged sales as independent variable will be more appropriate.

$$\frac{DisExpen_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (5)$$

$$\text{AExpen} = \text{Actual DisExpen} - \text{Estimated normal DisExpen} \quad (6)$$

iii. Overproduction. According to Roychowdhury (2006), production costs are defined as Prod = COGS + ΔInv. The change in inventory is regressed on current change in sales and lagged change in sales. Because of the data restriction around IPOs, we only include current change in sales as an independent variable. This regression is used to forecast the normal level of the dependent variable.

$$\frac{COGS_{i,t}}{Assets_{i,t-1}} = \beta_1 \frac{1}{Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (7)$$

$$\frac{\Delta Inv_{i,t}}{Assets_{i,t}} = \beta_1 \frac{1}{Assets_{i,t}} + \beta_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t}} + \varepsilon_{i,t} \quad (8)$$

$$\frac{\text{Pr}od_{i,t}}{Assets_{i,t}} = \beta_1 \frac{1}{Assets_{i,t}} + \beta_2 \frac{Sales_{i,t}}{Assets_{i,t}} \beta_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t}} + \varepsilon_{i,t} \quad (9)$$

$$\text{AProd} = \text{Actual Prod} - \text{Estimated normal Prod} \quad (10)$$

iv. Aggregate real activities manipulation measures. In order to test the total effects of real activities manipulation, aggregate real activities manipulation measures are developed. Cohen et al. (2008) compute a variable, RM_PROXY, as the sum of the three standardized variables, abnormal cash flow from operations, abnormal discretionary expenses and abnormal production costs. Different from Cohen et al. (2008), Zang (2010) and Cohen and Zarowin (2010) develop two comprehensive variables to capture the total effects of REM. They calculate RM_1 by multiplying abnormal discretionary expenses by negative one and adding it to the abnormal production costs, and calculate RM_2 by multiplying abnormal cash flow from operations and abnormal discretionary expenses by negative one and

aggregating them. Even though single REM proxies have different implications, and aggregated variables may dilute the empirical results, consistent with Zang (2010) and Cohen and Zarowin (2010), we calculate two aggregated variables to investigate the overall effects of REM as follows:

$$REM1 = AExpen * (-1) + AProd \quad (11)$$

$$REM2 = ACFO * (-1) + AExpen *(-1) \quad (12)$$

Previous literature provides empirical evidence on the presence of real activities manipulation under different circumstances. Based on the estimation models above, we calculate the proxies for accrual and real activities manipulation. Employing these proxies, we test the first hypothesis as follows:

H1. Firms manipulate reported earnings though accrual-based manipulation, sales manipulation, reduction of discretionary expenses and overproduction around the IPO year.

3.2 Cross-sectional determinants of AEM and REM around IPOs

Cohen and Zarowin (2010) employ a two-stage model following the Heckman (1979) method to investigate the factors that lead to SEO firms' decisions to manipulate earnings. We use similar models in this study.

3.2.1 Decision to manage earnings

In this section we investigate the factors that lead to the variation among firms' earnings management choice around IPOs, regardless of the earnings management tools IPO firms choose. Previous literature provided evidence on some determinants of earnings management for firms around IPOs; for example, higher stock price closely after IPOs (Teoh et al., 1998), managerial selling (Darrough and Rangan, 2005), proceeds from IPOs and venture capital backup (Billings and Lewis, 2010), etc. However, all of the evidence about the determinants of earnings management is associated with AEM, which has been explored by quite a few scholars, while the determinants of REM for IPO firms have not been documented.

We select the determinants of earnings management based on Teoh et al. (1998b) to investigate the effects of firm characteristics of IPOs on earnings management. From the SDC, we get the variables needed, including total proceeds from the offerings, ownership retention, lockup agreement of IPO firms, underwriters' names, and venture capital information. We also include several control variables: Sales to control firm size, ROA to control profitability, LEVERAGE to control capital structure and BTM to control the growth opportunities. We also include: (1) SOX, a dummy variable that is equal to one if the IPO falls within the post-SOX period; (2) GDP, the overall seasonal change in GDP; (3) S&P, the overall A&P 500 index return for the period. Summary statistics of these variables are reported in Table 3. Definition and calculation of these variables are included in Appendix A as well. We estimate the following model to investigate the cross-sectional determinants of AEM and REM.

$$\begin{aligned} EM = {} & \beta_0 + \beta_1 PROCEEDS + \beta_2 LOCKUP + \beta_3 OWN + \beta_4 UWRANK + \beta_5 VC \\ & + \beta_6 LogSales + \beta_7 ROA + \beta_8 Leverage + \beta_9 BTM + \beta_{10} SOX + \beta_{11} \Delta GDP \\ & + \beta_{12} S\&P + \varepsilon \end{aligned} \quad (13)$$

The dependent variable is used to measure whether a firm is classified as an earnings management firm-year observation or not. If the abnormal discretionary accruals (or abnormal production costs, REM1 and REM2) is above the industry-year median, or the abnormal cash flow from operations (or abnormal discretionary expenses) is below the industry-year median, then the firm-year is an earnings management observation and EM is equal to one; zero otherwise. We define the explanatory variables in the following pages and develop five hypotheses related to the model.

PROCEEDS are the proceeds from the issue (shares offered multiplied by the offer price). Here we use the natural logarithm of the proceeds from the offering. Previous studies (DuCharme et al., 2004; Billings and Lewis, 2010) find a positive relation between offering size and accrual earnings management. In addition, Teoh et al. (1998b) also hold the opinion that firms face more incentives to inflate earnings when offering size increases. Thus we expect a positive relation between PROCEEDS and IPOs' decision to manipulate earnings. We develop Hypothesis 2 as follows.

H2. In order to receive greater amounts of proceeds from IPOs, firms will engage in earnings management.

LOCKUP is an indicator variable which equals to 1 if the firm's IPO prospectus indicates that insiders are subject to a lockup agreement; zero otherwise. A lockup contract is signed by the underwriters and insiders of a firm which prohibits insiders from selling their stocks immediately after the offering. A lockup contract typically has a 180-days period. Since

insiders can only sell their shares after a specified date following the offering, managers will continue manipulating earnings to prevent earnings decreases. We predict a positive relation between LOCKUP (Ertimur et al. 2007; Billing and Lewis, 2010) and abnormal discretionary accruals (abnormal production costs, REM_1 and REM_2), and a negative relation between LOCKUP and abnormal cash flows from operations (abnormal discretionary expenses). Hypothesis 3 is showed below.

H3. Lockup agreements trigger earnings management around IPOs.

OWN is the retained ownership. We measure this variable as the number of shares held by owners prior to the new issue (adjusted by secondary offerings) divided by total shares outstanding after the new issue. Ownership retention could have two effects on earnings management documented by the literature. If the owner has a large stake that he intends to sell soon after the offering, then he would have an inventive to boost reported earnings until he sell his stocks in the market. If the owner holds the stake for a long term in the future, then he would have less inventive to manipulate earnings since earnings management would have consequences in the future. However, since Teoh et al. (1998) observe that earnings management is negatively related to ownership retention, we make predictions based on their opinion. We expect to see that the ownership retention is negatively related to firms' choice to manipulate earnings. Hypothesis 4 is stated below.

H4. IPO firms' tendency to engage in earnings management is negatively related to ownership retention.

UWRANK represents the reputation of underwriters of IPO firms. We retrieve the underwriters' name from SDC for each IPO firm. Then we get the table of underwriter reputation rankings from the information on Professor Jay Ritter' website from 1990 to 2007. We check the reputation rankings in the table and mark the values for all IPO firms. Previous literature holds the opinion that underwriter with high reputation may be less acquiesce to IPOs' earnings management (Teoh et al., 1998b; Billings and Lewis, 2010). It is expected that the underwriter's reputation is negatively related to IPOs' decision to engage in earnings management. We develop Hypothesis 5 as follows.

H5. IPO firms' tendency to engage in earnings management is negatively related to underwriters' reputation.

VC is an indicator variable which equals to one if one firm is backed by venture capitalists; zero otherwise. We obtain the information about venture capital from SDC. Tan and Suzanne (2006) examine the monitor role of venture capital in IPOs and their results shows that IPO firms show lower abnormal accruals with venture capital backup. Hochberg (2004) also provide evidence that there is a negative relation between venture capital backing and accrual earnings management in the IPO year. So we expect to see a negative relation between VC and abnormal discretionary accruals (abnormal production costs, REM1 and REM2), and a positive relation between VC and abnormal cash flows from operations (abnormal discretionary expenses). Hypothesis 6 is stated below.

H6. The presence of venture capital backup would have a negative impact on IPO firms' decisions to manipulate earnings.

3.2.2 Factors leading to the use of REM versus AEM around IPOs

We also run a second Probit model to capture the factors leading to REM rather than AEM by firms around IPOs. Consistent with previous discussion, the dependent variable is whether a firm is classified as a REM firm-year observation or not. If the abnormal production costs (REM1 and REM2) is above the industry-year median, or the abnormal cash flow from operations (or abnormal discretionary expenses) is below the industry-year median, than the firm-year is a REM firm-year observation and the dependent variable is set to one; zero otherwise.

Extant literature hols the opinions that AEM and REM involve different costs and get different levels of scrutiny from capital market stakeholders (e.g., Roychowdhury, 2006; Zang, 2010; Cohen and Zarowin, 2010). Such studies provide evidence that firms treat AEM and REM as substitutes rather than complements (Zarowin and Oswald, 2005; Zang, 2010; Cohen and Zarowin, 2010). Following Cohen and Zarowin (2010), we hypothesize that an IPO firm's choice to use AEM or REM is determined by its ability to use and costs of AEM around IPOs. Therefore we examine the use of REM versus AEM using the following equation.

$$REM = \beta_0 + \beta_1 AUDITOR + \beta_2 LITIGATION + \beta_3 NOA + \beta_4 SOX + \beta_6 \Delta GDP + \beta_5 S\&P + \varepsilon \quad (14)$$

The costs of accrual earnings management include auditor's scrutiny and litigation risk. To capture the future probability of detection, we include an indicator variable AUDITOR. AUDITOR is the proxy for auditing quality and is set to one if this firm is audited by a Big 4/6/8 auditor; zero otherwise (Gunny, 2005; Zang, 2007; Cohen and Zarowin, 2010). Auditing quality of Big 4/6/8 is higher and accrual earnings management is harder to be missed. Thus, we predict that this variable is positively related to IPO firms' tendency to manipulate real activities. LITIGATION is an indicator variable and we define

that LITIGATION equals to one if a firm is in a high litigation industry; zero otherwise. High litigation industries include pharmaceuticals/biotechnology (352010, 352020 and 352030), computers (452020), and electronics (452030)[6]. Firms in high litigation industry are under more monitoring from capital markets. Zang (2010) and Cohen and Zarowin (2010) consider Litigation as a cost for AEM. Consistent with previous literature, we expect a positive relation between LITIGATION and IPO firms' tendency to engage in REM.

NOA is the net operating assets, which represents the past accumulated AEM of a firm (Barton and Simko, 2002). The higher net operating assets, the more accumulated AEM firms conducted in the past. Thus, higher levels of NOA indicate lower flexibility of IPO firms to engage in further AEM. Following Zang (2010) and Cohen and Zarowin (2010), we predict that there exists a positive relation between the level of NOA and IPO firms' tendency to manipulate real activities.

SOX is an indicator variable that assumes the value of one if an IPO firm gets listed in the post-SOX period (after 2002); zero otherwise. The Sarbanes-Oxley Act was passed in the year of 2002. After the passage of the SOX Act, investors, auditors and regulators must give more scrutiny to AEM due to more litigation risk and associated costs involved with AEM. Thus the SOX Act increases the costs of AEM and leads to managers' decisions to substitute AEM with REM. Consistent with previous literature, we include SOX as cost factor of AEM. We predict that SOX is positively related to firms' tendency to conduct REM.

H7. IPO firms' tendency to use real activities manipulation is positively related to the costs of accrual earnings management and NOA.

4 Empirical results

4.1 Data and sample description

We utilize two different sources to form the datasets for the hypotheses testing. First of all, we obtain the list of IPO firms through 1990 to 2007 from the Security Data Corporation (SDC). The sample criterion also requires the IPOs to be listed on NYSE, AMEX or NASDAQ. We would like to detect earnings management activities of IPO firms from at least three years before they get listed. However, because the fundamental accounting information of IPO firms in the three (Year -3) and two (Year -2) year before the IPO year is too limited, we only investigate the earnings management one year immediately preceding the IPOs (Year -1). Next, we conduct a full research of COMPUSTAT to get relevant accounting data for these IPO firms.

We merge the SDC IPO sample with COMPUSTAT annual accounting data, and this operation yields an IPO Fundamental dataset of 1,014 firms reporting full financial statement data in the IPO year. Thus, in the earnings management incentive tests and tradeoff tests between AEM and REM we make use of the sample of 1,014 firm-years.

In order to estimate the models used to calculate normal levels of accruals, cash flow from operations, discretionary expenses and production costs, we begin with all firm-year observations from COMPUSTAT. As cash flow from operations is only available after 1986 and our IPO firms are between 1990 and 2007, we restrict the observations to the post-1989 period. Consistent with prior research, we eliminate all firms in financial industries (GIC codes between 401010 and 404030) and regulated industries (GIC codes between 551010 and 551050). we also exclude firm-year observations which do not sufficient data to calculate the COMPUSTAT-based variables described in Appendix A. We require at least 8 observations for each industry-year and the models we used for calculating the normal accruals, cash flow from operations, discretionary expenses and production costs are estimated by every industry (6-digit GIC codes) and year. All the criteria yield an estimating sample of 66,193 firm-years over the period from 1989 to 2009.

4.1.1 Sample descriptive statistics

Table 1 reports descriptive statistics of the IPO sample. As showed in Table 1, the sample of IPO fundamental has a mean for total assets of US$340.12 million with a standard deviation of 1735.60, which means during the period from 1990 to 2007 significant variation in firm size exists among IPO firms. The market value and book to market value of IPO firms also show various characteristics of IPO firms.

Panel B shows the time series distribution of the IPO sample. From the table, firms undertook IPOs throughout the whole period from 1990 to 2007. However, there is significant variation in the year-to-year number of IPO firms. Also, some time clustering exists: quite a lot of firms got IPOs around the 1990's and out of our IPO sample there are 1,004 IPOs during the 1990-1999 period, taking about 77.40% of the full IPO sample. This time clustering is consistent with previous literature. As the recovery of US economy began in March 1991 and drove a sustained period of economic expansion, the stock market enjoyed a boom in the 1990's. After this period, the stock market went through a downturn due to the economic recession beginning in the second half of 2001. Thus there were much fewer IPOs after 1999. This time variation and clustering are consistent with previous literature.

[6] We obtain the SIC codes of high litigation industries described in Cohen and Zarowin (2010) and find the corresponding name of each high litigation industry. Then we search the industry names in GICS to identify the GICS codes of high litigation industry. However, some mismatch exists between SIC industry names and GICS industry names.

Table 1. Descriptive statistics for IPO sample firms

Panel A: Size characteristics				
	Assets ($ mil.)	MV ($ mil.)	BTM	
Mean	340.12	559.21	0.30	
Median	37.77	147.45	0.31	
Std. Dev.	1735.60	1876.28	2.33	
Panel B: Time distribution				
	Freq.	%	Cum. (%)	
1990	26	2.6	2.6	
1991	52	5.1	7.7	
1992	98	9.7	17.4	
1993	122	12.0	29.4	
1994	93	9.2	38.6	
1995	73	7.2	45.8	
1996	128	12.6	58.4	
1997	101	10.0	68.3	
1998	48	4.7	73.1	
1999	44	4.3	77.4	
2000	51	5.0	82.4	
2001	15	1.5	83.9	
2002	16	1.6	85.5	
2003	11	1.1	86.6	
2004	37	3.6	90.2	
2005	33	3.3	93.5	
2006	40	3.9	97.4	
2007	26	2.6	100.0	
Total	1014	100.0		
Panel C: Industry Distribution				
Industry	6-digit GICS	Freq.	%	Cum. (%)
Energy, Gas and Oil	101010, 101020	45	4.44	4.44
Chemicals, Materials, Packaging, Mining and Paper	151010, 151020, 151030, 151040, 151050	52	5.13	9.57
Defense, Construction, Electronical and Machinery Equipment	201010, 201020, 201030, 201040, 201050, 201060, 201070	81	7.99	17.55
Commercial and Professional Services	202010	28	2.76	20.32
Air Freight, Airlines, Marine, Road, Rail, and Transportation	203020, 203030, 203040	9	0.89	21.20
Auto Instruments	251010, 251020	21	2.07	23.27
Durables, Leisure, Textiles, and Luxury Products	252010, 252020, 252030	75	7.40	30.67
Entertainment and Diversified Services	253010, 253020	57	5.62	36.29
Media	254010	30	2.96	39.25
Distributor, Internet, Multiline and Specialty Retail	255010, 255020, 255030, 255040	87	8.58	47.83
Food and Beverage Products, Household and Personal Products	301010, 302010, 302020, 302030, 303010, 303020	57	5.62	53.45
Health Care Equipment, Services and Technology	351010, 351020, 351030	116	11.44	64.89
Biotechnology and Pharmaceutical Equipment and Services	352010, 352020, 352030	48	4.73	69.63
IT Services and Software	451010, 451020, 451030	81	7.99	77.61
Computer and Electronic Equipment	452010, 452020, 452030, 452040, 452050	163	16.07	93.69
Semiconductors & Equipment	453010	41	4.04	97.73
Telecommunication Service	501010, 501020	23	2.27	100.00
Total		1014	100.00	

Panel C in Table 1 shows the industry distribution of the final sample by representing the frequency and percentage of IPOs for each industry. IPOs have been issued across a broad range of industries, while significant variation exists among different industries. There is also some industry clustering observed. During our sample period from 1990 to 2007, IPOs occured more frequently in high technology industries, such as health care technology, electronic equipment, computer equipment and IT services, etc. The phenomenon is consistent with the Internet boom in the early 2000's in US, during which period a group of Internet-based companies were founded and their equity values rose rapidly.

Table 2. Estimation of normal level of accruals and real operations

	TA/Assets $_{t-1}$	CFO/Assets $_{t-1}$	DisExpen/Assets $_{t-1}$	Prod/Assets $_{t-1}$
Intercept	0.017***	0.030***	0.191***	-0.121***
	9.49	8.93	32.18	-20.74
1/Assets $_{t-1}$	-0.21	-1.102***	1.502***	-0.245
	-1.53	-5.85	4.82	-1.15
PPE/Assets $_{t-1}$	-0.039***			
	-11.26			
(∆Sales-∆REC)/Assets $_{t-1}$	0.067***			
	11.55			
Sales/Assets$_{t-1}$		0.053***		0.755***
		17.5		125.12
∆Sales/Assets$_{t-1}$		0.014*		-0.062
		1.84		-4.04
Sales$_{t-1}$/Assets$_{t-1}$			0.146***	
			33.00	
Mean adj. R^2	0.21	0.24	0.32	0.83

Six-digit GIC codes are used to make the industry groups. The estimation requires at least 8 observations for each industry-year and the models for calculating the normal accruals, cash flow from operations, discretionary expenses and production costs are estimated for every industry year. The table represents the mean coefficients and the corresponding t-statistics.

Table 3. Descriptive statistics of explanatory variables

	Mean	Median	Std. Dev.	25%	75%
PROCEEDS	3.640	3.622	1.120	2.959	4.314
LOCKUP	0.785	1.000	0.412	1.000	1.000
OWNERSHIP	0.710	0.762	0.225	0.607	0.872
UW	7.027	8.001	2.928	6.501	9.001
VC	0.369	0.000	0.483	0.000	1.000
Logsales	3.884	3.828	1.914	2.824	5.077
ROA	-0.095	0.080	0.986	-0.030	0.204
Leverage	0.487	0.431	0.292	0.256	0.669
BTM	0.345	0.295	0.297	0.178	0.476
SOX	0.162	0.000	0.369	0.000	0.000
GDP2005	13.619	16.700	4.826	10.800	17.400
S&P	0.159	0.157	0.142	0.076	0.286
AUDITOR	0.903	1.000	0.297	1.000	1.000
LITIGATION	0.442	0.000	0.497	0.000	1.000
NOA	1.110	0.362	13.135	0.220	0.595

4.1.2 Abnormal accruals and real activities estimation

Based on Roychowdhury (2006), we run the cross-sectional regressions for each industry-year. Regression coefficients are presented in Table 2. The first column for accruals earnings management is estimated from the modified Jones model. The last three columns are regression coefficients obtained to estimate the normal levels of cash flow from operations, discretionary expenses and production costs. We use the full COMPUSTAT sample of

66,193 firm-years over the period from 1989 to 2009 to estimate these four models. Industry-years that have less than 8 observations are deleted from the calculation of the coefficients in Table 2[7]. Table 2 reports the average coefficients across all industry-years and their corresponding t-statistics. T-statistics are calculated using the standard error of the mean coefficients across the industry-years.

The coefficients of the four regressions are significantly different from zero with several exceptions. The coefficient of total accruals on $1/Assets_{t-1}$ and that of production costs on $1/Assets_{t-1}$ are insignificant. In addition, the coefficients of production costs on sales change (scaled by total assets at the beginning of year) is significantly negative while the coefficient in Roychowdhury (2006) is significantly positive. Roychowdhury (2006) includes not only sales change (scaled by total assets at the beginning of year) but also lagged sales change (scaled by total assets at the beginning of year) to estimate normal level of production costs. However, including lagged sales change (scaled by total assets at the beginning of year) will lead to a too small IPO sample size, thus we only include the current sales change (scaled by total assets at the beginning of year) to run the regressions. In addition, the difference in the model estimation table may also come from the different industry classification codes, GICS rather than SIC, employed in those regression models. Except for the one surprise of production costs on sales change (scaled by total assets at the beginning of year), the coefficients of all other independent variables are significant and the signs of them are consistent with those of Roychowdhury (2006).

4.1.3 Descriptive statistics of explanatory variables used in Equations (13) and (14)

In order to investigate the cross-sectional determinants of AEM and REM around IPOs, as well as the factors leading to the choice of REM over AEM, we merger the IPO fundamental data with the IPO file which we get from SDC. We get the final sample which includes 1,014 firm-years that have all variables needed. The descriptive statistics on the independent variables used in Equations (13) and (14) are reported in Table 3.

[7] We delete one percent outliers on each side of the distributions of the variables in the COMPUSTAT sample and use the SAS coding to correct the potential heteroscedasticity problem in the cross-sectional linear regressions. The multicollinearity problem of independent variables in various regression models has also been checked by computing VIFs and they all are less than 10.

4.2 Empirical evidence on AEM and REM around IPOs

Table 4 reports proxies of AEM and REM. We make use of regression coefficients estimated by industry-years to calculate normal levels of four earnings management measures. Residuals calculated by subtracting normal levels from total levels of each variable are used to proxy earnings management.

Table 4 presents median discretionary accruals, abnormal cash flows from operations, abnormal discretionary expenses and abnormal production costs. We employ the one-sample t-test to test the significance of those proxies for AEM and REM. Medians are used because they are less likely influenced by extreme observations. The sample sizes vary depending on the length of time since the IPO year.

As expected, the median of abnormal discretionary accruals (scaled by total assets at the beginning of year) is significantly positive at 0.036 (t = 6.42). This is consistent with the evidence that IPO firms report positive abnormal discretionary accruals to inflate earnings in the IPO year (Teoh, Welch, and Wong, 1998; Teoh, Wong and Rao, 1998a; and Darrough and Rangan, 2005).

Also, we find significant negative abnormal cash flows from operations (median = -0.002 and t = - 4.93) and significant positive production costs (median = 0.025 and t = 2.64) at the IPO year. The level of abnormal discretionary expenses (scaled by total assets at the end of year) is inconsistent with the prediction while it has a significantly positive value of 0.045 (t = 9.54). Overall the results reported in Table 4 still provide evidence that IPO firms inflate reported earnings through sales manipulation and overproduction, as well as accruals earnings management.

We also find some evidence of positive abnormal cash flows from operations immediately preceding the IPO year (Year -1). The magnitudes we find are smaller than those in the IPO year, and not statistically significant, but the directions are opposite to those in the IPO year. In addition, we find that abnormal production costs in the year immediately preceding the IPO are insignificant (Year -1). The pattern of abnormal cash flows from operations and abnormal production costs suggest that managers may adjust sales and production in anticipation of the IPOs thus they prepared for higher reported earnings before the IPOs.

Table 5 presents the Pearson product moment correlation coefficients (below the diagonal) and the Spearman rank correlation coefficients (above the diagonal) among the various variables used to compute and/or proxy AEM and REM in IPO year. Consistent with prior literature, there is a significantly negative Spearman rank correlation coefficient (-0.215) between total accruals and cash flows from operations since they are the two primary components

of reported earnings. Analyzing the correlation coefficients between the accrual manipulation proxy and the real activities proxies, we find that between abnormal discretionary accruals and abnormal CFO, there is a significantly negative correlation (Pearson, -0.121 and Spearman -0.266) in the IPO year. This shows that IPO firms engage in both AEM and sales manipulation to trigger higher reported earnings. Also consistent with the above interpretation, the correlation coefficient between abnormal accruals and abnormal discretionary expenses is significantly negative (Pearson, -0.150) so IPO firms engage in both AEM and reduction on discretionary expenses to inflate earnings. The correlation coefficient between abnormal discretionary accruals and abnormal production costs is insignificant for the Pearson correlation coefficient while the Spearman correlation coefficient is significant (-0.073). The correlation coefficient between abnormal discretionary accruals and REM1 is significantly positive for the Pearson correlation coefficient (0.354) while the Spearman rank correlation coefficient is insignificant, and the correlation between abnormal discretionary accruals and REM2 is significantly positive (0.344, Pearson and 0.249, Spearman). These significantly positive correlation coefficients between AEM and REM proxies mean that IPO firms engage in real activities manipulations as well as accrual manipulation in the IPO year. This is consistent with the hypothesis that firms engage in both kinds of earnings management (Cohen et al., 2008; Cohen and Zarowin, 2010).

Table 4. Accrual-based and real earnings management proxies around IPOs

Year	-1	0	1	2	3
ADA	0.006*	0.036***	0.016***	0.001	-0.003
	1.67	6.42	5.50	0.88	-1.11
ACFO	0.006	-0.002***	-0.007***	-0.001**	0.000
	0.30	-4.93	-2.94	-2.15	0.040
AExpen	-0.021**	0.045***	-0.03*	-0.046	-0.05**
	2.33	9.54	1.83	-0.60	-2.26
AProd	0.025	0.014***	0.019***	0.011***	0.028***
	0.31	2.64	3.89	3.25	3.59

Table 4 represents time series of AEM and REM proxies from -1 year to 3 year relative to the IPO year (Year 0 in this table). Abnormal discretionary accruals (ADA) are estimated from the modified Jones model. Abnormal cash flows from operations (ACFO), abnormal discretionary expenses (AExpen) and abnormal production costs (AProd) are estimated from the cross-sectional industry-year regression by Roychowdhury (2006).

Table 5. Correlation matrix

	TA	CFO	DisExpen	Prod	ADA	ACFO	AExpen	AProd	REM1	REM2
TA	1	-0.215**	0.135**	0.378**	0.887**	-0.214**	-0.001	-0.043	0.004	0.181**
CFO	-0.045	1	-0.141**	-0.054	-0.265**	0.875**	-0.118**	-0.401**	-0.091**	-0.386**
DisExpen	-0.108**	-0.704**	1	0.206**	0.056	-0.124**	0.803**	-0.250**	-0.659**	-0.596**
Prod	0.267**	-0.185**	0.226**	1	0.227**	-0.119**	-0.001	0.362**	0.211**	0.073*
ADA	0.935**	-0.100**	-0.096**	0.217**	1	-0.266**	-0.048	-0.073*	0.009	0 .249**
ACFO	-0.080*	0.975**	-0.689**	-0.230**	-0.121**	1	-0.153**	-0.453**	-0.103**	-0.409**
AExpen	-0.155**	-0.710**	0.951**	0.146**	-0.150**	-0.710**	1	-0.374**	-0.830**	-0.734**
AProd	0.028	-0.405**	0.118**	0.514**	0.044	-0.458**	0.087**	1	0.724**	0.596**
REM1	0.151**	0.384**	-0.758**	0.169**	0.155**	0.354**	-0.819**	0.500**	1	0.813**
REM2	0 .307**	-0.069*	-0.587**	0.047	0.344**	-0.096**	-0.633**	0.382**	0.770**	1

***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.
This table reports the Pearson correlations (below the diagonal) and the Spearman correlations (above the diagonal) for the IPO sample in the 1990 to 2007 period. All the variables are scaled by total assets at the beginning of the year.

The correlation between abnormal cash flows from operations and abnormal discretionary expenses is significantly negative (-0.710, Pearson and – 0.153, Spearman). This can be explained that reduction of discretionary expenses leaves more cash flows for the firm. The negative correlation coefficient (-0.458, Pearson and -0.453, Spearman) between abnormal cash flows from operations and abnormal production costs shows that (a) IPO firms could engage in different REM methods at the same time to trigger higher reported earnings, and (b) overproduction has a negative effect on cash flows from operations. The correlation between abnormal discretionary expenses and abnormal production costs is insignificant for Pearson correlation coefficient and significantly negative for Spearman correlation coefficient (-0.374). This provide some evidence that in order to report higher earnings in the IPO year, managers engage in real activities that lead to reduction of discretionary expenses and overproduction.

Table 6. Cross-sectional determinants of earnings management around IPOs

	EM	Z-statistics	Marginal effect
Intercept	1.14	3.46	
PROCEEDS	0.181***	2.48	0.06
LOCKUP	0.011	0.11	0.00
OWNERSHIP	-0.148	-0.80	-0.05
UW	-0.119***	-3.61	-0.04
VC	-0.188*	-1.73	-0.05
LogSales	-0.070	-1.54	-0.12
ROA	-0.361**	-2.28	0.11
Leverage	0.329	1.45	0.01
BTM	0.272	1.52	-0.09
SOX	-0.006	-0.05	0.00
∆GDP	0.004	0.47	0.00
S&P	-0.368	-1.15	-0.13
Likelihood ratio	42.11		
R^2	0.14		
EM is defined as follows: if the abnormal discretionary accruals (or abnormal production costs, REM1 and REM2) is above the industry-year median, or the abnormal cash flow from operations (or abnormal discretionary expenses) is below the industry-year median, then the firm-year is an earnings management observation and EM is equal to one; zero otherwise.			

4.3 Determinants of AEM and REM in the IPO year[8]

To test the factors influencing firms' decision to manipulate reported earnings in the IPO year, we conduct a cross-sectional regression test by regressing firms' decisions to manipulate earnings on the determinant variables. We also include Sales, Leverage and Book-to-Market ratio, ROA, SOX, ∆GDP and S&P as control variables. Results based on Equation (13) are reported in Table 6. It shows the Probit regression coefficients and their corresponding Z-statistics, as well as the marginal effect of each determinant on the probability of conducting earnings management of IPO firms.

According to H2, EM should have a significantly positive relation with PROCEEDS. Consistent with the prediction, β_1 is significantly positive (β_1 = 0.181 and Z-statistics = 2.48). This implies that one unit increase in PROCEEDS increases the probability of engaging in earnings management by 6.26% of firm-year observations in the IPO sample. H3 predicts that the coefficient on LOCKUP should be significantly positive since lockup agreement would make managers continue manipulating earnings to prevent earnings decreases. Inconsistent with this prediction, β_2 is insignificant. Based on H4, the coefficient on ownership retention ratio should be significantly negative. Inconsistent with the prediction, β_3 is insignificant. H5 predicts a negative relation between EM and underwriter reputation rankings. Consistent with the prediction, β_4 is significantly negative (β_4 = -0.119 and Z-statistics = -3.61). This evidence implies that one unit change in underwriter reputation rankings would decrease the probability of conducting earnings management by 4% of firm-year observations in the IPO sample. H6 predicts that the coefficient on venture capital should be significantly negative and the empirical evidence shows a negative β_4 of -0.188 (Z-statistics = -1.73). This finding supports the opinion that venture capitalists play a monitor role in the IPO process and the presence of venture capital backup leads lower probability of earnings management by 5.29% of firm-year observations in the IPO sample.

4.4 Factors leading to REM around IPOs

In this section, we investigate the factors that lead to IPO firms' choices between AEM and REM. Following Cohen and Zarowin (2010), we model IPO firms' decisions to manipulate real activities as a function of their abilities and costs of using accrual-based earnings management. We run a cross-sectional Probit model and get results presented in Table 7. Table 7 shows the regression coefficients and their corresponding Z-statistics, as well as the marginal effect of each factor on the probability of conducting REM by IPO firms.

[8] We also check the potential multicollinearity problem for both Equations (13) and (14), and do not find any variable that is highly correlated with other explanatory variables.

Table 7. Factors leading to choice of REM versus AEM

Panel A: Individual REM measures									
Parameter	ACFO	Z-statistics	Marginal effect	AExpen	Z-statistics	Marginal effect	AProd	Z-statistics	Marginal effects
Intercept	0.575	2.34		0.407	1.68		0.439	1.84	
AUDITOR	-0.445***	-2.46	-0.175	-0.245	-1.38	0.097	-0.262	-1.49	-0.106
Litigation	0.084	0.70	0.033	0.095	0.80	0.038	0.088	0.74	0.035
NOA	0.037*	1.70	0.015	-0.009	-0.40	-0.004	0.049*	1.67	0.020
SOX	-0.117	-0.72	-0.046	-0.154	-0.95	-0.061	-0.165	-1.03	-0.066
GDP2005	-0.013	-1.05	-0.005	-0.016	-1.36	-0.007	-0.017	-1.45	-0.007
S_P	-0.136	-0.36	-0.053	0.088	0.23	0.035	0.022	0.06	0.009
Likelihood ratio	11.41			5.48			13.89		
R^2	0.03			0.01			0.02		
Panel B: Aggregate REM measures									
	REM1	Z-statistics	Marginal effect	REM2	Z-statistics	Marginal effect			
Intercept	0.513	2.11		0.786	3.18				
AUDITOR	-0.372**	-2.08	-0.147	-0.508***	-2.80	-0.199			
Litigation	0.067	0.56	0.026	0.175	1.46	0.068			
NOA	-0.004	-0.73	-0.002	0.006	0.29	0.003			
SOX	-0.153	-0.94	-0.060	-0.270	-1.66	-0.105			
GDP2005	-0.014	-1.18	-0.006	-0.028**	-2.33	-0.011			
S_P	0.151	0.40	0.060	0.150	0.39	0.059			
Likelihood ratio	6.76			15.14					
R^2	0.02			0.03					

If IPO firms tradeoff between AEM and REM, their decisions to engage in REM should be positively related to the costs of AEM and negatively related to the flexibility of AEM in the current period. Based on H7, ACFO should have a significantly positive relation with AUDITOR, LITIGATION, NOA as well as SOX. However, inconsistent with the prediction, results in Table 7 do not support that IPO firms' decisions to engage in REM is positively related to the costs of AEM. Interestingly, the coefficient on AUDITOR is significantly negative (β_1 = -0.445 and Z-statistics = -2.46). Coefficients of ACFO on LITIGATION and SOX are insignificant. In addition, the coefficient of ACFO on NOA is significantly positive (β_3 = 0.037 and Z-statistics = 1.70). The evidence implies that IPO firms' tendency to choose sales manipulation is positively related to the level of net operating assets, which indicates the accumulated effects of prior accounting choices and one unit increase in NOA leads to increased probability of engaging in sales manipulation by 1.46% of firm-year observations in the IPO sample.

H7 predicts that IPO firms' tendency to engage in reduction of discretionary expenses is positively related to AUDITOR, LITIGATION, NOA as well as SOX. However, inconsistent with the predictions, coefficients of AExpen on all explanatory variables are insignificant.

According to H7, the coefficients on AProd on AUDITOR, LITIGATION, NOA as well as SOX should be significantly positive. Consistent with the predictions, coefficient on NOA is significantly positive (β_4 = 0.049 and Z-statistics = 1.67). The evidence implies that IPO firms' tendency to overproduce is positively related to prior accumulated effects of prior accounting choices and one unit increase in NOA increases the probability of engaging in overproduction by 1.95% of firm-year observations in the IPO sample.

When the dependent variables are aggregate metrics of REM, either REM1_Indicator or REM2_Indicator, H7 are supported by none of the coefficients on AUDITOR, LITIGATION, NOA and SOX. The coefficients on AUDITOR are significantly negative for both REM1 (-0.372 with Z-statistics = -2.08) and REM2 (-0.508 with Z-statistics = -2.80).

5 Concluding remarks

In this paper we investigate both REM and AEM by US firms around IPOs. It contribute to the accounting literature by providing evidence that firms engage in REM in addition to AEM around their IPOs. The REM activities we examined include sales manipulation, reduction of discretionary expenses and overproduction. Previous studies of IPOs find that firms report unusually high discretionary accruals in the IPO year (Teoh, Welch, and Wong, 1998; Teoh, Wong and Rao, 1998a; and Darrough and Rangan, 2005). Consistent with them, we find that based on our IPO sample, on average those firms report positive abnormal accruals (median = 0.036) in the IPO year. We also find negative abnormal cash flows from operations (median = -0.002) and positive abnormal production costs (median = 0.015). However, we do not find negative abnormal discretionary expenses (median = 0.045). Even though, the results show that IPO firms manipulate both real business activities and discretionary accruals to inflate reported earnings. The existence of REM in the IPO year provides another explanation of the post-IPO underperformance of firms.

On the determinants of AEM and REM in the IPO year, the regression of firms' decisions to engage in earnings management supports H2. It means that large amounts of IPO proceeds positively influence firms' tendency to manage earnings.

As for H3 on ownership retention and H4 about lockup agreement, they are not supported by the empirical evidence. H5 is supported by the significantly negative coefficient on underwriter reputation rankings. For H6 on venture capital, the evidence support the monitor role of venture capitalists by limiting earnings management activities around IPOs.

As for IPO firms' tendency to tradeoff between REM and AEM, little evidence has been found. We find that IPOs' tendency to conduct sales manipulation and overproduction are positively related to NOA, the accumulated effects of accrual accounting choices in prior periods. In addition, we find that the presence of a Big4/6/8 auditor decreases IPOs' tendency to engage in REM, which is contrary to the results of Cohen and Zarowin (2010). However, the regression coefficients of REM proxies on AUDITOR in Zang (2010) are negative although insignificant.

In the tradeoff test between AEM and REM, we do find some tradeoff between AEM and REM by finding a significant and positive relationship between sales manipulation / overproduction and NOA, which are consistent with evidence documented by Cohen et al. (2008) and Cohen and Zarowin (2010).

In summary, our findings report the importance of REM and AEM engaged by firms around IPOs. Future studies on the earnings management issue in various settings should consider REM in their research designs.

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Appendix A

Table A.1. Variable Definitions

Variable	Measurement
Variables used in the estimation model for normal levels of accruals and real operations	
Assets	COMPUSTAT data 6
EBIT	COMPUSTAT data 139
AR	COMPUSTAT data 2
∆REC	Change in account receivables
PPE	COMPUSTAT data 7
TA	= EBIT - CFO
CFO	COMUSTAT data 308
Earnings	COMPUSTAT data 18
Sales	COMPUSTAT data 12
∆Sales	Change in sales
COGS	COMPUSTAT data 44
Inv	COMPUSTAT data 3
∆Inv	Change in inventory
Prod	= COGS + ∆Inv
DisExpen	= R&D (COMPUSTAT data 46)+Advertising (COMPUSTAT data 45) + Selling, general and administrative expenses (COMPUSTAT data 189)
Variable used in cross-sectional determinants of earnings management	
EM	An indicator variable that is set equal to one if either one of the abnormal discretionary accruals (or abnormal production costs, REM_1 and REM_2) is above the industry-year median, or the abnormal cash flow from operations (or abnormal discretionary expenses) is below the industry-year median; zero otherwise.
PROCEEDS	LN (Offer price * Shares offered)
LOCKUP	An indicator variable which equals to 1 if the firm's IPO prospectus indicates that insiders are subject to a lockup agreement; zero otherwise.
OWNERSHIP	(Shares before the offering – Secondary shares offered) / Shares after the offering
UWRANK	IPO underwriter reputation rankings (1980 - 2009) http://bear.warrington.ufl.edu/ritter/ipodata.htm
VC	An indicator variable which equals to one if one firm is baked by venture capitalists; zero otherwise.
LogSales	= LN ($Sales_t$)
ROA	Net income/ Lagged total Assets
LEVERAGE	Total debt / Average total assets
BTM	Book value of equity/ Market value of equity
Variable used in factors leading to REM versus AEM	
REM	An indicator variable which is set to one if the abnormal production costs (or REM_1 and REM_2) is above the industry-year median, or the abnormal cash flow from operations (or abnormal discretionary expenses) is below the industry-year median; zero otherwise.
AUDITOR	An indicator variable which is equals to one if this firm is audited by a Big 4/6/8 auditor; zero otherwise
LITIGATION	An indicator variable which is equal to one if a firm is in a high litigation industry; zero otherwise.
SOX	An indicator variable that assumes the value of one if this IPO firm gets listed in the post-SOX period (after 2003); zero otherwise.
NOA	= (Shareholders' $equity_{t-1}$ – cash and marketable $securities_{t-1}$ + total $debt_{t-1}$) / $Sales_{t-1}$
∆GDP	Overall seasonal change in GDP
S&P	Overall S&P 500 index return for the period