Analysts' perception of real earnings management

I. Introduction

Researchers identify three earnings management mechanisms used by managers to meet or beet earnings thresholds to date. There are accrual earnings management, real earnings management and analyst expectations management. Prior research mostly focuses on accrual earnings management. In fact, real activities earnings management is more pervasive in practice, especially in post-Sarbanes-Oxley eras. A survey conducted by Graham et al (2005) reports that around 80% of executives interviewed prefer to use real earnings management considering that auditors can not readily challenge real economic actions to meet earnings targets. Empirical research (e.g. Cohen et al. 2007) also provides evidence that firms switched from accrual-based to real earnings management (REM) in the Post-SOX period.

Current research on real earnings management mainly concentrates on whether managers make discretion over real activities to meat and/or beat certain earnings benchmarks or the interplay between real earnings management and accrual earnings management. However, very few papers investigate whether investors can see through real earnings management, although real earnings management is arguably more costly to investors because of its adverse future cash flow consequences. When managers adjust operating decisions to artificially inflate short-term performance, they potentially sacrifice future profitability. Considering Investors' decisions heavily rely on sell-side analysts' information, we are interested to investigate whether analysts identify and communicate information about potential future earnings declines associated with real

earnings management to investors. Thus, this study first examines whether analyst issue more pessimistic future earnings performance forecasts to firms engaging in real earnings management. Next, this study examines the association between analysts' long-term growth forecast error and real earnings management measures to see if analysts alert investors to future earnings problems experienced by firm with real earnings management. At last, this study examines whether analysts play a monitoring role in managers' real earnings manipulation.

Following previous research (e. g. Royychowdhury 2006, Gunny 2005), we create two sets of real earnings management measures including individual measures as abnormal cash flow from operations, abnormal R&D expense, abnormal level of selling, general and administrative expenses, and abnormal level of gains on asset sales and a comprehensive measure which combines the four individual measures. To investigate our first research question, we compare analysts' future performance forecasts between suspected REM firms and control firms. Our results show that analysts do not take the REM information into account when they issue future performance forecasts. To examine our second research question, we regress analysts' forecast error on our interested variables, individual real earnings management variables or the combined measure, and the control variables. Our results present that Firms with higher abnormal cash flow from operations, abnormal selling, general and administrative expenses or abnormal gains on assets sales have lower forecasts error (measured as the difference of realized long-term growth in earnings and analysts' forecast of long-term growth in earnings). To examine whether analysts play a monitoring role in managers' real earnings manipulation, we look into the relationship between analyst coverage and real earnings management measures.

We find that analyst coverage is negatively related to real earnings management measures, indicating that firms with more analysts' coverage are less likely to engage in real earnings management.

II. Background and theory development

Earnings management has been a hot topic in accounting literature and still remains a fertile ground for academic research. Previous researchers exhibited greater attention on accrual earnings management (AEM) and already studied AEM from different possible angels. However only in recent years, there has been an increased appreciation for understanding how firms manage earnings through real earnings management (REM) in addition to AEM. Actually, according to a survey conducted by Graham et al (2005), managers express a greater willingness to mange earnings through REM rather than AEM to meet earnings targets. Moreover, an empirical research Zhang (2006) suggests that decisions to manage earnings through "real" actions precede decisions to manage earnings through accruals by analyzing the tradeoffs between REM and AEM.

Recent research basically focuses on the following four types of real earnings management activities: (1) regular sales manipulation; (2) discretionary expenses manipulation; (3) fixed-assets sales manipulation; (4) overproduction manipulation. **Regular sales manipulation** refers to managers' attempts to temporarily accelerate sales from the subsequent accounting periods into the current period through increased price discounts or more lenient credit terms. Under the assumption that the margins are positive, temporarily increased sales volume will boost current earnings and then contribute to meet earnings targets. **Discretionary expense manipulation** refers to managers'

discretion over cutting R&D expenses, advertising expenses and SG&A expenses to escalate current period earnings. Under current accounting rules, outlays on these discretionary expenditures must be charged to expense as incurred, therefore managers can reduce discretionary expenses to meet earnings targets. **Fixed-assets sales manipulation** refers to managers' timing of income recognition from disposal of assets. Under the assumption that market value of an asset is greater than residual value of an asset on the balance sheet, the timing of asset sales can be an efficient instrument to manipulate earnings. On the one hand, the timing of asset sales is a managers' choice. On the other hand, gains from assets disposal are required to be reported in the current period. **Overproduction manipulation** refers to managers' attempt to lower cost of goods sold by overproducing to spread fixed overhead costs over a larger number of units and then make earnings upward. This manipulation is effective as long as the reduction in fixed costs per unit is not offset by any increase in marginal cost per unit. However, this manipulation method only applies to manufacturing firms.

There are primary two streams of literature on REM to date. One stream of research studies how managers manipulate real activities to meet and/or beat earnings benchmarks. Baber et al. (1991) provide evidence that R&D spending is significantly less when spending jeopardizes the ability to achieve earnings objectives. Bartov (1993) find that managers avoid negative earnings changes by timing of selling fixed assets. Bushee (1998) presents evidence that firms reduce R&D expenditures to meet earnings benchmarks. Roychowdhury (2006) finds evidence consistent with managers manipulating to avoid reporting losses by using price discounts to temporarily increase

sales, overproducing to report lower cost of goods sold, and cutting discretionary expenditures to improve reported margins.

Another steam of research is interested in the interplay between REM and AEM, especially changes in pre- and post-Sarbanes Oxley (SOX) periods. Zhang (2006) finds results indicating that REM is positively correlated with the costs of AEM, and that REM and AEM are negatively correlated. Therefore, she concludes that managers treat the two strategies as substitutes. Ewert and Wagenhofer (2005) show theoretically that the marginal benefit of earnings management increases with tighter accounting standards which limits AEM, thus managers increase REM. Bartov and Cohen (2006) find a decline in the use of expectations and accrual management but no change in REM in the Post-SOX period to reach earnings targets. Cohen et al. (2007) report that firms just achieving earnings benchmarks used fewer AEM and more REM after SOX when compared to similar firms before SOX and then conclude that firms switched from AEM to REM after the passage of SOX. Cohen and Zarowin (2008) investigate REM and AEM around seasoned equity offerings and also document that firms have substituted from AEM to REM after SOX.

Compared to AEM, REM has a distinguishing feature that it negatively affects future operating performance because actions taken in the current period to increase earnings can have a negative effect on cash flows in future periods. Reduction R&D expenses can results in firm forgoing investment opportunities which will benefit firms in the future. Empirical research (e.g. Lev and Sougiannis 1996) also shows that there is a significantly positive intertemporal association between firms' R&D expenses and subsequent stock returns. Marketing literature shows that there is a carryover effect of

advertising expenses, that is, decreasing advertising expenses will have an adverse effect on future sales. Furthermore, firms with high advertising carryover will be more likely to decrease advertising activities to meet earnings targets (Cohen et al 2007). Chapman (2008) provides evidence that sales discounting behavior appears to be persistent and also force competitors to reduce price, then eventually will reduce long-term earnings as a result of the drop in sales of following the promotion. In summary, REM directly affects firms' long-term growth rates and future profitability. Even though REM entails adverse future cash flow consequences, managers still choose to sacrifice firm's future value in order to meet and/or beat earnings targets. Graham et al. (2005, p. 32) find

> *……strong evidence that managers take real economic actions to maintain accounting appearances. In particular, 80% of survey participants report that they would decreases 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….*

Although researchers extensively assess whether investors recognize or see through AEM, they have devoted scant attention to investors' and analysts' perception of REM. As far as I know, Gunny (2005) is one of very few papers which examine consequences of REM and investors' perception of REM. Gunny (2005) document that REM is associated with significantly lower future earnings and cash flows and investors recognize the future earnings and cash flow implications of RM by studying stock price behavior of firms engaging in REM. Considering that stock price behavior may be due to unknown risk factors and/or survivorship biases, I attempt to focus on directly testing whether stock analysts, a professional financial intermediary, anticipate the predictable consequences experienced by REM firm. Stock analysts play an important role in collecting and processing information about firms and disseminating it to individual and

institutional investors. And both individual and institutional investors heavily rely on and value information that analysts provide: investors pay millions of dollars every year to purchase forecast and recommendation data from vendors such as Fist Call, IBES and Zacks. Therefore, it is interesting to see whether analyst information helps investor perceive implication of REM.

My hypothesis with respect to sell-side analysts' forecasts is straightforward. If analysts can see through REM's negative impact on future operating performance, then analysts' forecasts of future earnings should reflect these adverse future consequences experienced by REM firms. Thus I develop the first hypothesis:

H1: *Ceteris paribus*, analyst will issue more pessimistic future performance forecasts for REM firm-years.

Further, these adverse future consequences of REM will also have negative effect on firms' long-term earnings growth rate. If analysts incorporate the predictable decline in long-term growth earnings associated with REM, then their forecast errors (realized long-term growth in earnings minus analysts' forecast of long-term growth in earnings) should not be a function of the magnitude of REM. If they do not incorporate the information in REM, then their forecast errors will be more negative for REM firms. Therefore, I develop the second hypothesis:

H2: *Ceteris paribus*, there is no association between analysts' forecast errors with respect to long-term growth and the magnitude of REM.

There are two views in the literature about the analysts' role in earnings management. One view is that analysts play a monitoring role, and another view is that analysts create excessive pressure on managers to manage earnings. The most recent paper by Yu (2008) finds that the monitoring role of analysts dominates the pressure they

exert on managers to manage earnings. His results show there is negative association between analyst coverage and AEM. If analysts can decipher the implication of REM, it is interesting to examine whether analyst coverage affects firms' REM. Therefore, I develop the third hypothesis,

H3: *Ceteris paribus*, there is no association between analyst coverage and REM.

III. Methodology

The sample includes all firm-years in the period 1988-2006 with analysts' earnings forecasts from IBES, financial statement information from Compustat, and prices and returns data from CRSP. Sample period starts from 1988, when SFAS 95 took effective and required firms to disclose cash flow statements. Regulated firms, including financial institutions (SiCs between 6000 and 6999) and utilities (SICs between 4000 and 4999), are excluded because their operations and earnings management are markedly different from other firms.

REM measures

Following previous research (e. g. Royychowdhury 2006, Gunny 2005), I use the following models to estimate REM activities.

The normal level of cash flow from operations

Following Dechow et al. (1998), I express normal cash flow from operations (CFO) as a linear function of sales and change in sales.

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t}$$

Where, $CFO_{i,t}$ = Cash flow from operations=Data308-Data124;
$Assets_{i,t-1}$ = Total assets=Data6;
$Sales_{i,t}$ = Net sales=Data12;

$\Delta Sales_{i,t} = Sales_{i,t} - Sales_{i,t-1}$.

The normal level of R&D expense

Following Berger (1993), I estimate the normal level of R&D expenditures using the following model:

$$\frac{RD_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{RD_{i,t-1}}{Assets_{i,t-1}} + \alpha_2 \frac{Funds_{i,t}}{Assets_{i,t-1}} + \alpha_3 TobinsQ_{i,t} + \alpha_4 \frac{CapitalExp_{i,t}}{Assets_{i,t-1}} + \varepsilon_{it}$$

Where, $RD_{i,t}$=R&D expense=Data46;

$Funds_{i,t}$ = Internal funds=Data18+Data46+Data14;

$TobinsQ_{i,t}$ = Firms' market value divided by total assets

= (Data199*Data25+Data130+Data9+Data34)/Data6;

$CapitalExp_{i,t}$=Capital expenditures=Data128.

The normal level of SG&A expense

Following Anderson et al (2003), I estimate the normal level of selling, general, and administrative (excluding R&D expense) expenses using the following model:

$$\log(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}) = \alpha_0 + \alpha_1 \log(\frac{Sales_{i,t}}{Sales_{i,t-1}}) + \alpha_2 \log(\frac{Sales_{i,t}}{Sales_{i,t-1}}) \times DS_{i,t} + \alpha_3 \log(\frac{Sales_{i,t-1}}{Sales_{i,t-2}}) + \alpha_4 \log(\frac{Sales_{i,t-1}}{Sales_{i,t-2}}) \times DS_{i,t} + \varepsilon_{it}$$

Where, $SG\&A_{i,t}$ = SG&A expenses, excluding R&D expense=Data189-Data46;

$DS_{i,t}$=Dummy variable for decreasing sales that equals 1 if

$Sales_{i,t} < Sales_{i,t-1}$, 0 otherwise.

The normal level of gains on asset sales

Following Bartov (1993) and Herrmann et al (2003), I estimate the normal level of gains on assets using the following model:

$$\frac{GLA_{i,t}}{Assets_{i,t-1}} = \alpha_0 \frac{1}{Assets_{i,t-1}} + \alpha_1 \frac{PPEsales_{i,t}}{Assets_{i,t-1}} + \alpha_2 \frac{ISales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t}$$

Where, $GLA_{i,t}$=Gain or loss from sale of PPE and investment=-Data213;

$PPEsales_{i,t}$=Sale of PPE=Data107;

$ISales_{i,t}$=Sale of investment=Data109;

To estimate all above models, I run cross-section regressions for each industry-year with at least certain number of observations (around ten, depending on sample size), where industry is defined following Fama and French (1997). The abnormal CFO (Ab_CFO), abnormal R&D (Ab_RD), abnormal SG&A (Ab_SGA) and abnormal gains from fixed-assets sales (Ab_GFA) are measured as the residual from each estimation model. I multiply Ab_CFO, Ab_RD and Ab_SGA by negative one, thus the higher values of these variables indicate firms are more likely to have engaged in REM.

Selection of suspected REM firms and control firms

Following previous research, I define suspected REM firms as firms are in the top quintile of REM measures and then identify the corresponding control firms by using the following procedures: (1) the control firm is matched on size decile and industry in year t; (2) it has the closest performance measure (return on assets, ROA) to that of suspected firm; (3) it is in the bottom two quintiles of REM measures; (4) it can only match with one suspected firm in the same year.

To test hypothesis one, I compare analysts' future performance forecasts between suspected REM firms and control firms. Here, I use consensus ROA issued by analyst in the closest month after earnings announcement to capture operating performance forecasts. I use the subsample over period from 2003-2007, since IBES starts to widely include future ROA forecasts in 2003. According to H1, if analysts do not expect decreases in future performance of suspected REM firms, then there is no significant difference in future ROA forecasts between suspected REM firms and control firms, otherwise suspected REM firms should have more pessimistic ROA forecasts than

control firms in year t+1 and t+2. Furthermore, I use the following model to check hypothesis one and am interested in α_5.

$$FROA_{t+1/t+2} = \alpha_0 + \alpha_1 LOGASSETS_t + \alpha_2 FROA_t + \alpha_3 BTM_t + \alpha_4 \mathrm{R}ETURN_t + \alpha_5 REMD_t + \varepsilon_t$$

Where: $FROA_{t+1/t+2}$= ROA forecasts for the subsequent one or two years;
$LOGASSETS_t$=the natural logarithm of total assets;
BTM_t=the book value of equity divided by the market value of equity;
$\mathrm{R}ETURN_t$=one year holding stock return;
$REMD_t$=1 for suspected REM firms, 0 otherwise.

I develop the following two models to test hypothesis two:

$$FE = \alpha_0 + \alpha_1 GROWTH + \alpha_2 Ab\_CFO + \alpha_3 Ab\_RD + \alpha_4 Ab\_SGA + \alpha_5 Ab\_GFA + \varepsilon$$

$$FE = \beta_0 + \beta_1 GROWTH + \beta_2 REMD + \varepsilon$$

The dependent variable, FE, is the analysts' forecast error, measured as realized long-term growth in earnings minus the analysts' forecast of long-term growth in earnings, which is the consensus long-term growth forecasts issued in the closest month after earnings announcement in year t. Sharpe (2005) provide results suggesting that market applies these forecasts to an average horizon somewhere in the range of 5 to 10 years. Consistent with prior research, I treat long-term growth forecast as five-year forecasts. Correspondingly, realized earnings growth is a 5-year annualized growth rate, which is calculated by fitting a least squares growth line to the logarithms of the six annual observations, beginning with the suspected REM year and ending in the fifth year after REM year (Dechow et al 2000). Prior empirical evidence demonstrates that analysts are more likely to issue optimistic long-term growth forecasts which increase with the level of forecast growth, thus I include the level of forecast growth as a control variable. I expect coefficients on REM measure and REM dummy not to be significant.

To test hypothesis three, I develop the following model:

$$RESUM \mid REMD = \alpha_0 + \alpha_1 BIG4 + \alpha_2 T\_AUDIT + \alpha_3 LITIGATION + \alpha_4 NOA + \alpha_5 SOX + \alpha_6 ACOVERAGE + \varepsilon$$

NOA=shareholders' equity-cash-marketable securities + total debt (defined in Barton and Simko 2002)

$RESUM$ is a combined measure of REM, which is the sum of all standardized values of four REM measures. $BIG4$, T_AUDIT, NOA are controlling for firms' constraints to manipulate earnings by AEM. Under auditors' scrutiny, AEM decreases with the presence of a big4 auditor, and with the auditor's experience. Barton and Simko (2002) document that NOA (net operating assets) reflects previous AEM: higher current NOA indicating greater AEM. Therefore, higher NOA limits a firm's ability to manage earnings by AEM. Several researches support that firms switch from AEM to REM after SOX, so I include a SOX dummy variable, which equals to 1 Post-SOX, 0 otherwise. The primary penalty for earnings management is litigation, so I include a LITIGATION dummy which equals one if a firm is in a high litigation industry, and zero otherwise. High litigation industries are SIC codes 2833-2836, 8731-8734, 7371-7379, 3570-3577, and 3600-3674.

IV. Results

Based on our first hypothesis, analyst will issue more pessimistic future performance forecasts for REM firm-years. The results that test this hypothesis are presented in Table 1. The coefficient of REMD is insignificant for all the four REM measures we use. This implies that REM has no effect on future analysts' performance forecasts. LOGASSETS are positively and significantly related to EPS forecasts for the subsequent two years, which means firms with larger size tend to have more positive

future performance forecasts. FEPS1 is negatively related to REM_CFO, but positively related to the other three REM measures, and its effect is always highly significant. BTM and Return are usually insignificant, indicating that neither market to book ratio or one year holding stock return can explain analysts' future performance forecasts.

Table 2 displays results that examine analysts forecast errors. Fgrow is negatively and significantly related to analysts' forecast error, which means that the analysts' forecast of long-term growth in earnings can reduce analysts' forecast error. REMD is positively related to analysts' forecast error, which makes sense as it may be harder for analysts to predict future performance for REM firms. In the last column, all four REM measures are included. Firms with higher abnormal cash flow from operations, abnormal selling, general and administrative expenses or abnormal gains on assets sales have lower forecasts error (measured as the difference of realized long-term growth in earnings and analysts' forecast of long-term growth in earnings).

The results that examine the factors that affect the REM decision are reported in Table 3. Whether the firm's auditor belongs to big four has no association with the REM decision. The coefficient of T_AUDIT is positive and significant, which implies that firms that use the same auditor for a longer time are more likely to engage in REM. Litigation is also positively related to REM decision, meaning that firms in the high litigation industry are more likely to be REM firms. SOX are negatively related to REM, indicating that after controlling for other factors, firms use less REM after SOX. ACOVERAGE has a negative effect on REM; firms with more analysts' coverage are less likely to choose REM.

Assumptions and limitations

This study examines real earnings management rely on some income statement expenses. These expenses, however, could be affected by accrual choices. This study assumes a one-to-one correspondence between real earnings manipulation and the observed accounting performance.

The first limitation is that this study only focuses on four types of the most pervasive real earnings management tools which already have developed models to estimate their normal levels, but may omit some other possible real manipulation means. The second limitation is that these REM measures may have measurement errors and then affect power of tests, although Zhang (2006) proves their validity to some extent. The third limitation is that analysts may self choose to follow firms not engaging in REM, and thus the model to test the third hypothesis incurs an endogeneity issue.

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