

Earning management

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1 Earning management

The first equation to reflect the relation between Earning and Cash Flows is:

$$Earning = Cash\ flows + Accruals$$

so if the *Accruals* is higher, there is more likely that firms manage their earning. In these two measure of components of *Earning*, the *Cash flows* is more important and a higher ratio of this component in the total *Earning*, the higher the quality of the income.

Why there exists the Accruals? Is it legal? Gong et al. (2008)note that as long as managers use their discretion within the limits of generally accepted accounting principles (GAAP), earning management is not illegal. Actually, it is not need illegal because of the accrual accounting system by GAAP. This system allows for accounting ajustment so that it can reflect the underlying business condition more accurately (as the deals happen rather than the cash payment happens).

For example

- Timing of events: You can sell the good today (2017 June 13), but wait until next month to pay the money. In this case, the revenue is recorded because the deal happened but the cash inflows will be in next month.

- Amount: You could decide how long the machine is depreciated so the amount of depreciation expense will be different.

Managers could exploit this system to “cook the book”:

- Current accrual adjustments:
 - advancing recognition of revenues with credit sales (before cash is received),
 - delaying recognition of expenses through assumption of a low provision for bad debts,
 - deferring recognition of expenses when cash is advanced to suppliers.
- Long-term accrual adjustments:
 - decelerating depreciation,
 - decreasing deferred taxes (the difference between tax expense recognized for financial reporting and actual taxes paid),
 - or realizing unusual gains.

How to measure the Accruals?

From accounting reports Using only some elements in balance sheet and income statement, Sloan (1996) propose a simple measure of *Accruals* as follows:

$$Accruals = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep$$

where

ΔCA	is change in current assets,
$\Delta Cash$	is change in cash and equivalent,
ΔCL	is change in current liabilities,
ΔSTD	is change in debt included in current liabilities,
ΔTP	is change in income taxes payable,
Dep	is depreciation.

According to this definition, *Accruals* has three components: current assets, current liabilities, and depreciations.

From regression and residuals The idea is run cross-sectional regression (of two-digit SIC code peers) of *Accruals* to estimate the fitted value as *normal* or *nondiscretionary accruals* then take residual as *discretionary accruals* (Jones, 1991). For example, here I present the method of Teoh et al. (1998).

First, they calculate *Total Accruals*:

$$AC = Net\ Income - Cash\ flows\ from\ operations$$

If CF is not available, they replace it with Current Accruals which is the change in noncash current assets minus the change in operating current liabilities:

$$CA = \Delta [current\ assets - cash] - \Delta [current\ liabilities - current\ maturity\ of\ longterm\ debt]$$

To reduce the influences of nonstandard classifications of certain items, they calculate the current accruals in details:

$$CA = \Delta [account\ receivables + inventory + other\ current\ assets] - \Delta [account\ payable + tax\ payable + other\ current\ liabilities]$$

Second, they run the regression for firm i in year t :

$$\frac{CA_{j,t}}{TA_{j,t-1}} = \alpha_0 \left(\frac{1}{TA_{j,t-1}} \right) + \alpha_1 \left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}} \right) + \epsilon_{j,t}, \quad j \in 2\ digits\ SIC\ code\ peers$$

where $\Delta Sales$ is change in sales, TA is total assets.

The *normal* or *nondiscretionary current accruals* is:

$$NDCA_{i,t} = \hat{\alpha}_0 \left(\frac{1}{TA_{i,t-1}} \right) + \hat{\alpha}_1 \left(\frac{\Delta Sales_{i,t} - \Delta TR_{i,t}}{TA_{i,t-1}} \right)$$

where ΔTR is change in trade receivables.

The *abnormal* or the *discretionary current accruals* is:

$$DCA_{i,t} = \frac{CA_{i,t}}{TA_{i,t-1}} - NDCA_{i,t}$$

Third, repeat the process for total accruals, run the following regression:

$$\frac{AC_{j,t}}{TA_{j,t-1}} = \beta_0 \left(\frac{1}{TA_{j,t-1}} \right) + \beta_1 \left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}} \right) + \beta_2 \left(\frac{PPE_{j,t}}{TA_{j,t-1}} \right) + \epsilon_{j,t} \quad j \in 2\ digits\ SIC\ code\ peers$$

The *nondiscretionary total accruals*:

$$NDTAC_{i,t} = \hat{\beta}_0 \left(\frac{1}{TA_{i,t-1}} \right) + \hat{\beta}_1 \left(\frac{\Delta Sales_{i,t} - \Delta TR_{i,t}}{TA_{i,t-1}} \right) + \hat{\beta}_2 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right)$$

where PPE is gross property, plant, and equipment.

The discretionary total accruals: $DTAC_{i,t} = \frac{AC_{i,t}}{TA_{i,t-1}} - NDTAC_{i,t}$

Fourth, define the long-term accruals as follows:

$$NDLA_{i,t} = NDTAC_{i,t} - NDCA_{i,t}$$

$$DLA_{i,t} = DTAC_{i,t} - DCA_{i,t}$$

Among all measures, the DCA is considered the key variable to represent the earning management (Teoh et al., 1998).

Fifth, in Gong et al. (2008) and in robustness of Cohen and Zarowin (2010), they introduce a performance-matched abnormal accruals equals abnormal accruals minus the median of abnormal accruals of the industry performance-based portfolio.

How to get this performance-matched industry? For each quarter and each industry (2-digit SIC), create 5 portfolios with at least 4 firms/each portfolio based on ROA from the same quarter in the previous year. Remind that Gong et al. (2008) use a very special ROA definition: return on net assets (i.e., assets - cash).

This performance-matched abnormal accruals solves two problems: (i) adjust abnormal accruals to eliminate any random effects arising from other events that may affect the accruals or managerial incentives to manage earnings and (ii) control for performance.

When firms choose to manage earning?

- IPO (Teoh et al., 1998): upward earning
- SEO (Cohen and Zarowin, 2010; Kothari et al., 2016): upward earning
- Repurchase (Gong et al., 2008): downward earning

2 Do investors recognize the importance of earning management?

Two components of earning: accruals and cash flows Sloan (1996) decomposes the earnings into cash flows component and the accrual component. He proposes 4 hypotheses:

1. H1: The persistence of earning (earning momentum) performance is decreasing in the magnitude of the accrual component and is increasing in the magnitude of the cash flows component.
2. H2:
 - (a) Stock price fails to recognize the relative importance of two components in attributable to earning persistence

- (b) A trading portfolio that long in low accruals firms and short high accruals firms could generate positive abnormal returns
- (c) The abnormal returns in H3 are clustered around future earning announcement dates.

Investors tend to fixate to earnings so they cannot recognize that cash flows component is more attribute to the earning persistence. If the market is efficient, it should incorporate the relative importance of two components into stock price. However, the findings show that it is not the case. The stock price could incorporate the earning in total perfectly, but it reflects the two components similarly. Thus, if investors take an investment portfolio that *long* in low accruals and *short* in high accruals, they can earn positive abnormal returns. The abnormal returns could earn in most of the years in sample period, thus this evidence challenges the market efficiency hypothesis.

The most important finding from Sloan (1996) is that a higher accruals could predict the negative long-term performance (H2b). From this results, it raises question among scholars that whether some puzzles in literature could be explained by the earning management.

- First, firms tend to manipulate earning more when they need to IPO and SEO from external investors. That's why these issuers tend to have poor long-term performance.
- Second, firms tend to downward manipulate earning before the share repurchase to buy back at lower price. Thus, these repurchase outperform in the long-run.

Teoh et al. (1998) apply this finding to IPO, while Gong et al. (2008) apply this idea to repurchase. Both papers end up in JF.

Repurchase and earning management Gong et al. (2008) solve the repurchase puzzle that repurchaser outperform in long-run. It is not the case because pre-repurchase earning management is negatively associated with positive operating performance and stock returns in post-repurchase periods. It means that managers use their discretion to deflate the earning downward prior to the repurchase announcement. Because investors fail to recognize the prior repurchase earning management so the faster earning growth rate in future than expected lead to a positive abnormal stock returns.

3 Real activities management or Real earning management

While classical literature focuses on accrual-based earning management, recent papers often add the real earning management to analysis and compare between two types.

So what is real earning management? While accrual earning management considers how managers choose the accounting choices to manipulate the earning, the real earning management entails departures from normal operations with the intent to mislead at least some stakeholders into believing that the reported financial performance has been achieved in the normal course of operations (Roychowdhury, 2006).

The difference between them:

- Auditors attempt to detect the departures from GAAP so accrual earning management is riskier, while the real earning management relates to managers' investment and operation decisions so it is more challenging for investors to detect. Thus, after SOX Act in 2002, there are more evidence of real earning management.
- Real activities management will sacrifice the long-term performance such as reduce firms' R&D expense to meet the short-term objective (i.e., myopia problem)

Real earning management vs. accrual management

Cohen and Zarowin (2010) Cohen and Zarowin (2010) find that the real earning management is more important and popularly used than the accrual-based in SEO. They examine three types:

- Sale manipulations: temporarily offer price discount and more easier credit terms
- Reduction of discretionary expenditures: reduce R&D, SG&A
- Overproduction: by reduce cost of good solds but put them in production cost, so production is abnormal high

They find that SEO firms conduct both accrual-based and real earning management, but the latter type is stronger and more popular. However, they argue that the real earning management conducting to obtain short-term objective of myopic managers tend to reduce long-term performance. Thus, a higher earning management around the SEO leads to a more negative ROA in long-term operating performance.

Their measurements of real earning management

There are three types of real earning managements, and they create three corresponding measures:

- Sale manipulation is residuals from this regression: CFO is cash flow from operation

$$\frac{CFO_{it}}{AT_{it-1}} = k_1 \frac{1}{AT_{it-1}} + k_2 \frac{SALE_{it}}{AT_{it-1}} + k_3 \frac{\Delta SALE_{it}}{AT_{it-1}} + \varepsilon_{it}$$

- Overproduction: production cost is sum of COGS and change in inventory during the year

$$\frac{COGS_{it}}{AT_{it-1}} = k_1 \frac{1}{AT_{it-1}} + k_2 \frac{SALE_{it}}{AT_{it-1}} + \varepsilon_{it}$$

$$\frac{\Delta INV_{it}}{AT_{it-1}} = k_1 \frac{1}{AT_{it-1}} + k_2 \frac{\Delta SALE_{it}}{AT_{it-1}} + k_3 \frac{\Delta SALE_{it-1}}{AT_{it-1}} + \varepsilon_{it}$$

$$\frac{PROD_{it}}{AT_{it-1}} = k_1 \frac{1}{AT_{it-1}} + k_2 \frac{SALE_{it}}{AT_{it-1}} + k_3 \frac{\Delta SALE_{it}}{AT_{it-1}} + k_4 \frac{\Delta SALE_{it-1}}{AT_{it-1}} + \varepsilon_{it}$$

- Discretionary expense: is sum of advertising cost, R&D cost, and SG&A cost

$$\frac{DISX_{it}}{AT_{it-1}} = k_1 \frac{1}{AT_{it-1}} + k_2 \frac{SALE_{it-1}}{AT_{it-1}} + \varepsilon_{it}$$

If firms manipulate the earning upward, we should see a abnormal low cash flow from operation, abnormal high production cost, and abnormal low discretionary expense.

They also create two total/aggregate metrics of real earning management:

- $RM1 = \text{Abnormal production cost} + (-1) \times \text{Abnormal discretionary cost}$
- $RM2 = (-1) \times \text{Abnormal CF} + \text{Abnormal production cost} + (-1) \times \text{Abnormal discretionary cost}$

A higher of these two measures, the more likely that firms is engaging in manipulation.

Kothari et al. (2016) In a recent paper, Kothari et al. (2016) compare between accrual management (AM) and real activities management (RAM) in a SEO too. Kothari et al. (2016) focus on discretionary expense (i.e., R&D expense) because this strategy could inflate earnings, profit margin, and cash flow from operation; while the sale manipulation (e.g., price discount) and overproduction could reduce profit margin and cash flow from operation (Roychowdhury, 2006).

Their measurement

For *real earning management*, they run *fixed-effect* first-order autoregressive model that includes lagged sales:

$$RD_{it} = \alpha_i + \Delta_t + \phi \times RD_{i,t-1} + \gamma \times Sales_{i,t-1} + \varepsilon_{it}$$

If just only use the residuals, the measurement of RAM will be similar to Cohen and Zarowin (2010). However, they subtract from the residuals of firm the mean value of residuals across all years for the corresponding firm to obtain abnormal R&D.

In particular, they get the residuals then: $\text{AbnormalRD} = \hat{\varepsilon}_{it} - \text{Mean}(\hat{\varepsilon}_{it}) \text{ over time} = \hat{\varepsilon}_{it} - \sum_{j=1}^T \frac{\hat{\varepsilon}_{ij}}{T}$.

Similarly, in *accrual management*, they also add the *fixed-effect* to a modified version of Jones (1991).

In addition, they calculate *abnormal earnings* by running: $ROA_{it} = \alpha_i + \Delta_t + \phi \times ROA_{i,t-1} + \varepsilon_{it}$ and take residuals as abnormal ROA.

Barber and Lyon (1997) matching method

- Matching firms based on size and BM ratio using post-issuance characteristics
- Select from firms in same 2-digit SIC not issuing SEO, ME between 70%-130% of sample firm, and has BM ratio closest to the sample firm
- Abnormal return = sample firm return - matched benchmark return

How to know that SEO firms engage in earning management? In SEO year, they form this matrix:

		Abnormal Accruals > 0	Abnormal Accruals < 0
Abnormal ROA > 0	Abnormal R&D > 0	Group 1: AM only	Group 2: non AM & RAM
	Abnormal R&D < 0	Group 3: both AM & RAM	Group 4: RAM only
Abnormal ROA < 0	Abnormal R&D > 0	Group 5: AM	Group 6:
	Abnormal R&D < 0	Group 7: both	Group 8: RAM

In cases abnormal ROA < 0 (Group 5 to 8), firms may be unsuccessful to manipulate the earnings.

But the most interesting cases will be Group 1 (use AM only), Group 4 (use RAM only), and Group 3 (both types).

Some of their findings are:

- Propensity that firms engage solely in AM is similar between SEO years and non-SEO years; while the propensity that they engage in RAM is higher in SEO years.
- Consistent with Cohen and Zarowin (2010), they find that firms with more RAM and AM before SEO tend to experience negative operating performance and stock returns in the following three years, but the RAM firms are more severe.
- It is more negative returns for young firms, where information opacity is more severe and is more difficult for investors to unravel it

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