Theoretical Study of Earnings Management: Evidence from China

Yixuan Zhang^{1,a,*}

¹Department of Economics and Management, Beijing Jiaotong University, Beijing, 100091, China a. clarazyx@foxmail.com *corresponding author

Abstract: Earnings management, as a commonplace in the practical world, has long been a heated topic in the fields of economics and management, and it has recently led to a proliferation of relevant studies. It is a form of manipulation that is highly associated with the discretion of management within the framework of legislation, which differentiates it from financial fraud. This study will give a thorough demonstration of earnings management, including its definition, incentives, and categorization, concerning authorized sources. Furthermore, this paper theoretically amplifies the most commonly used models to measure the level of accrual-based earnings management and real earnings management. Moreover, it applies the Modified Jones Model and Roychowdhury Model for analysis of Chinese listed companies. The empirical examination proves that the models are feasible and capable of providing large-sample evidence in China. This study also critically discusses the effect of earnings management, and suggestss that the judgement of its impact should depend on whether it is used responsibly. Therefore, it attempts to develop a theoretical understanding to facilitate further studies in this field.

Keywords: accrual-based earnings management, real earnings management, the Jones Model, Roychowdhury Model.

1. Introduction

The definition of earnings management has evolved over time. In this paper, three representatives will be discussed in chronological order. In 1989, Schipper popularized earnings management as an action of intervening in an external financial reporting process intentionally aimed at private gain. She went on to explain that management discretion, whether in the selection of accounting methods or the specific application of those methods, can incorporate earnings management into the external disclosure process in a variety of forms [1]. Scott also defined earnings management as "the choice by a manager," and he emphasized that this choice is within policies, such as GAAP, as an approach to maximize a firm's market value in addition to private gain, which differentiates earnings management from fraud [2]. Later in 1999, Healy and Wahlen provided a thorough definition that earnings management is an alternation of financial reports by managers' judgment in financial reporting and transaction structuring, with the purpose of either providing misleading company performance to stakeholders or affecting contractual outcomes based on accounting numbers [3].

Investigations on the motivations of earnings management have been mostly restricted to limited hypotheses from a single perspective, such as import relief while this paper makes a contribution to

 $[\]bigcirc$ 2024 The Authors. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).

this point by logically categorizing all possible incentives into external and internal angles. On top of that, it generates fresh insight into the positive impacts of earnings management, which is often neglected by researchers.

2. Literature review

According to the definitions discussed above, only when there is a lure of advantageous returns will managers be inclined to do earnings management. Dye specifically demonstrated the returns from two incentives, respectively internal and external demands, which make it inevitable for shareholders to eliminate managers' engagement in manipulation [4]. The internal demand for earnings management is a result of contractual compensation based on managers' reported earnings, and Martin and other scholars provide a good illustration that CEOs deliberately lowball the earnings guidance before Annual Incentive Plans (AIP) to make targets more achievable [5]. As for the external perspective, it is driven by various sources, especially the interest of existing shareholders, to attract prospective investors, including both creditors and shareholders. The research undertaken by Huang, Chen, and Liu is innovative evidence to verify the relationship between debtors and earnings management in the reverse direction that bank intervention discipline and reduce managers' manipulation [6].

Earnings management is classified into two categories, including accrual-based earnings management and real earnings management. The former refers to the discretionary and subjective choices of accounting rules within standards to manipulate the accruals, for example, depreciation methods, inventory valuation models. Thus, it only influences the accounting presentation of a firm's performance but has no impact on its underlying economics [7]. Roychowdhury defined real earnings management as "departures from normal operational practices," and it can be implemented through sales manipulation, discretionary expenditure reduction, and overproduction [8].

Previously, these two earnings management strategies were discussed separately until the tradeoff between them was discovered. Zang put forward the idea that management uses accrual-based earnings management and real earnings management as substitutes on the basis of their relative cost and sequential nature [9]. Roychowdhury stressed that accrual-based earnings management draws the attention of auditors and regulators, which leads to more rigorous scrutiny, which is considered to be one of the costs associated with it [8]. Meanwhile, there is also a negative correlation between cost and flexibility within the firm's accounting systems. As for real activity manipulation, it spawns a decline in enterprise value for its negative effect on future cash flows. The cost rises along with the firm's poor financial health, high institutional ownership, and high marginal tax rates, but it is less influential for the firm with market-leader status. Another factor of the trade-off is timing. Real activity manipulation only occurs during the fiscal year while there is no limitation for accrual-based earnings management, so the level of the later one is subject to the real activity manipulation already realized.

3. Model for measurement

3.1. Accrual-based earnings management models

3.1.1. The Jones Model

The Jones Model is universally recognized as one of the pioneering models in measuring accrualbased earnings management [10]. Its underlying philosophy is that total accruals are partitioned into discretionary and non-discretionary accruals, and by subtracting non-discretionary accruals from total accruals, discretionary accruals are used as a proxy for accrual-based earnings management. The model is shown as follows, taking gross property, plant, and equipment and change in revenues into account:

$$\frac{\mathrm{TA}_{\mathrm{i},\mathrm{t}}}{\mathrm{A}_{\mathrm{i},\mathrm{t}-1}} = \alpha_{\mathrm{i}} \left[\frac{1}{\mathrm{A}_{\mathrm{i},\mathrm{t}-1}} \right] + \beta_{1\mathrm{i}} \left[\frac{\Delta \mathrm{REV}_{\mathrm{i},\mathrm{t}}}{\mathrm{A}_{\mathrm{i},\mathrm{t}-1}} \right] + \beta_{2\mathrm{i}} \left[\frac{\mathrm{PPE}_{\mathrm{i},\mathrm{t}}}{\mathrm{A}_{\mathrm{i},\mathrm{t}-1}} \right] + \varepsilon_{\mathrm{i},\mathrm{t}}$$
(1)

Where:

 TA_{it} = total accruals in year t for firm i

 A_{it-1} = total assets in year t -1 for firm i

 ΔREV_{it} = revenues in year t less revenues in year t - 1 for firm i

 $PPE_{it} = gross property, plant, and equipment in year t for firm i$

However, the Jones Model has been further criticized for its drawbacks. For example, other expenditures that may affect total accruals are not reflected in explanatory variables; some discretionary accruals detected may not be a result of earnings management but a consequence of particular business practices like acquisitions. Despite some shortcomings in the Jones Model, it has still laid a solid foundation for relevant empirical research.

3.1.2. The Modified Jones Model

Dechow and other scholars subsequently refined the Jones Model, adding the factor of change in trade receivables to mitigate some of its deficiencies, as it is easier to manage earnings at discretion on credit sales than on cash transactions [11].

$$NDA_{i,t} = \alpha_i \left[\frac{1}{A_{i,t-1}} \right] + \beta_{1i} \left[\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} \right] + \beta_{2i} \left[\frac{PPE_{i,t}}{A_{i,t-1}} \right] + \varepsilon_{i,t}$$
(2)

Where:

 NDA_{it} = non-discretionary accruals in year t for firm i

 ΔREC_{it} = net receivables in year t less net receivables in year t - 1 for firm i

3.2. Real earnings management model

The most commonly used and authoritative model for measuring real earnings management is the Roychowdhury Model. Taking three manipulation methods into consideration, which are sales manipulation, discretionary expenditure reduction, and overproduction, Roychowdhury has validated that these will ultimately end up in unusually low cash flow, low discretionary expenditures, or unusually high production costs, so that the Roychowdhury Model came out as a quantum leap in the field of earnings management research [8]. Followings are the cross-sectional estimation models for every industry and year:

$$CFO_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 \left[\frac{1}{A_{i,t-1}} \right] + \beta_1 \left[\frac{S_{i,t}}{A_{i,t-1}} \right] + \beta_2 \left[\frac{\Delta S_{i,t}}{A_{i,t-1}} \right] + \varepsilon_{i,t}$$
(3)

CFO refers to the operational cash flow reported in the statement of cash flow. Normal cash flow from operations is presented in a linear relationship with sales $(S_{i,t})$ and change in sales $(\Delta S_{i,t})$ in year t for firm i.

$$PROD_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 \left[\frac{1}{A_{i,t-1}} \right] + \beta_1 \left[\frac{S_{i,t}}{A_{i,t-1}} \right] + \beta_2 \left[\frac{\Delta S_{i,t}}{A_{i,t-1}} \right] + \beta_3 \left[\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right] + \varepsilon_{i,t}$$
(4)

Production cost refers to the sum of cost of goods sold (COGS) and change in inventory in the current period.

$$\text{DISEXP}_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 \left[\frac{1}{A_{i,t-1}} \right] + \beta \left[\frac{S_{i,t-1}}{A_{i,t-1}} \right] + \varepsilon_{i,t}$$
(5)

Discretionary expenditure refers to the sum of advertising expenses, R&D expenses, and SG&A expenses (selling, general and administrative).

Eventually, the three regression models above, as equations (3) to (5) show, respectively represent the cash flow from operations, production cost, and discretionary expenditure at the normal level. Therefore, the residuals calculated will separately stand for their abnormal level. Then the level of real activities manipulation is shown as below [12]:

$$REM_{i,t} = -AbCFO_{i,t} + AbPROD_{i,t} - AbDISEXP_{i,t}$$
(6)

where $\text{REM}_{i,t}$ is the real earnings management in year t for firm i; $\text{AbCFO}_{i,t}$ illustrates the abnormal cash flow from operations in year t for firm i (residual of Model 3); $\text{AbPROD}_{i,t}$ represents the abnormal production cost in year t for firm i (residual of Model 4); and $\text{AbDISEXP}_{i,t}$ shows the abnormal discretionary expenditures in year t for firm i (residual of Model 5)

Nonetheless, it is worth mentioning that there are still some components neglected when developing the model, and it is only applicable to samples that are large enough where the individual differences can be ignored.

3.3. Evidence from China

3.3.1. Sample selection

This section sets out to assess the feasibility of the Modified Jones Model and the Roychowdhury Model sampled from China. The data is extracted from a database named China Stock Market and Accounting Research (CSMAR). This data covers Chinese listed companies of A-shares in Shenzhen, Shanghai, and Beijing stock exchanges for the period 2013-2023, excluding those that belonged to Special Treatment (ST) and finance industry categorized by Chinese Securities Regulatory Commission 2012 version, which turns out to be 5,627 companies contained. In addition to the previous selection, relevant variables in the regression that have missing values are also screened out, and in order to minimize the impact of outliers, the proxies are winsorized at the top and bottom one percent.

3.3.2. Regression results

Based on the sample from China, the regression adopts a panel two-way fixed effects model, controlling individual fixed effects (namely industry) and time fixed effects (namely year) simultaneously so as to remove the impacts of unobserved heterogeneity on the regression results and enhance explanatory power. This methodology is credible for it has been verified by Hausman Test, and the Chi² is displayed in Table 1 along with the regression coefficients. The null hypothesis is "difference in coefficients not systematic," but they are all rejected for the reason that probability > Chi² = 0.0000. Consequently, according to Tables 1, the results are all statistically significant, supporting that the Modified Jones Model and Roychowdhury Model are both suitable for Chinese market analysis.

	$CFO_{i,t}/A_{i,t-1}$	PROD _{i,t}	DISEXP _{i,t}	$TA_{i,t}/A_{i,t-1}$
		$/A_{i,t-1}$	$/A_{i,t-1}$	
$1/A_{i,t-1}$	-0.0021***	-0.0058***	0.0245***	0.0029***
$S_{i,t}/A_{i,t-1}$	0.0363***	0.9111***		
$S_{i,t-1}/A_{i,t-1}$			0.0330***	
$\Delta S_{i,t} / A_{i,t-1}$	0.0221***	-0.0208***		
$\Delta S_{i,t-1}/A_{i,t-1}$		-0.0463***		
$(\Delta \text{REV}_{i,t})$				0.0921***
$-\Delta \text{REC}_{i,t})/A_{i,t-1}$				
$PPE_{i,t-1}/A_{i,t-1}$				-0.0728***
Hausman (Chi ²)	108.09	71.23	1118.37	158.74
Number of	3,665	3,665	3,665	3,340
industry-years				

Table 1: Model parameters

4. The dual effect of earnings management

4.1. Positive effect

As a manipulation within legislation, earnings management is fundamentally different from financial fraud, as shown in the comparison presented in Table 2. Consequently, its merits are not supposed to be neglected, and Scott claimed that its positive effects have always been a propulsion for its persistence [2]. First and foremost, it provides management with an impetus to forge ahead from a contracting perspective, but this only makes sense under the premise of efficient performance-based compensation. Otherwise, management may rest on its laurels either laying below the performance threshold or taking the bonus cap at ease. Furthermore, in some cases, earnings management functions more as an adjustment than simply cheating from a financial reporting perspective. Agents, the ones who are most familiar with the overall business, are inherently responsible for conveying information to principals. Notwithstanding, it is prohibitively impossible to transfer all the information, so management would prefer to disclose a sustainable outcome rather than the actual ones that will no longer persist. Therefore, earnings management has sustainable earning power by circulating valuable information from insiders to investors.

	Earnings Management	Fraud	
Aggressive	Sometimes	Extremely	
GAAP violation	No	Yes	
Management discretion	Yes		
Focus	Numerical disclosure		

Table 2: Differences between earnings management and fraud [7]

4.2. Negative effect

Although earnings management is within the limitations of accounting standards, it is still necessary to put emphasis on the detection of its adverse influence. As stated in the definition, management manipulates financial reporting for the sake of private gain, among which maximizing bonuses is the most common purpose, making performance-based compensation a double-edged sword. Moreover,

it induces inconsistency in capital markets owing to managers' arrogance in cheating the market through their disclosure decisions, leaving aside securities market efficiency. Intrigued by the benefits of capital gain, existing shareholders are motivated to raise stock prices by means of earnings management, trading on the sacrifice of potential investors. This mispricing cannot be spotted immediately by the investors, and it takes time to be corrected. Hence, the existence of earnings management is not supposed to be easily determined, positive or negative, because it significantly depends on whether managers could utilize it responsibly.

5. Conclusion

Giving a thorough demonstration of earnings management, it is identifiable that there is consistency in its definition, incentives, and both positive and negative effects, which is management's impure intention to obtain private gains. This paper also discusses some deficiencies of current measurement models as well as providing large-sample evidence from China for the application of Modified Jones Model and Roychowdhury Model. However, this empirical study only limits itself to the adaptation of models, with no explanatory variables to explain the occurrence of earnings management. As current transactions are becoming increasingly complex, it is valuable to test hypotheses about the relationship between earnings management and various factors so that more tacks are available to detect it.

Given that earnings management may affect the firm's future performance and firm value, there should be a systematic mechanism to identify those behaviors with material influence, including both internal and external control. In terms of internal precaution, it is critical to implement segregation of duties and rotation among senior management. The antidote for external detection is to appoint accounting firms with a high reputation to assure a true and fair presentation of financial information and keep the auditor's tenure within a reasonable range.

References

- [1] Schipper, K. (1989). Earnings management, Accounting horizons, 3(4), 91-102.
- Scott, W. R. (1997). Financial accounting theory. New Jersey: Prentice Hall.
- [2] Scott, W. R. (1997). Financial accounting theory. New Jersey: Prentice Hall.
 [3] Healy, P.M. and Wahlen, J.M. (1999). A review of the earnings management literature and its implications for standard setting, Accounting horizons, 13(4), pp. 365–383.
- [4] Dye, R.A. (1988). Earnings Management in an Overlapping Generations Model, Journal of accounting research, 26(2), pp. 195-235.
- [5] Martin, X., Seo, H., Yang, J., Kim, D. S., Martel, J. (2023). Earnings Performance Targets in Annual Incentive Plans and Management Earnings Guidance, The Accounting review, 98(4), pp. 289–319.
- [6] Huang, Y., Chen, L. and Liu, F.H. (2024). Bank intervention and firms' earnings management: evidence from debt covenant violations, Review of quantitative finance and accounting, 63(1), pp. 237–264.
- [7] El Diri, M. (2018). Introduction to Earnings Management. Springer, Cham.
- [8] Roychowdhury, S. (2006). Earnings management through real activities manipulation, Journal of accounting & economics, 42(3), pp. 335-370.
- [9] Zang, A. (2012) 'Evidence on the trade-off between real activities manipulation and accrual-based earnings management'. Account Review, 87(2), 675-703.
- [10] Jones, J.J. (1991). Earnings Management During Import Relief Investigations, Journal of accounting research, 29(2), pp. 193–228.
- [11] Dechow, P.M. and Sloan, R.G. (1995). Detecting Earnings Management, Accounting Review, 70(2), pp. 193–225.
- [12] Li, X. et al. (2023). Gender diversity of boards and executives on real earnings management in the bull or bear period: Empirical evidence from China, International journal of finance and economics, 28(3), pp. 2753–2771.