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The Association of Audit Firm Size and Industry Specialization on Earnings Management: Evidence in China

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Abstract

Information asymmetry and earnings management are always common problems and popular research topics, however, little prior studies investigate the effect of audit quality to earnings management for Chinese market. This paper is to investigate the association of audit firm size and industry specialization on earnings management in China, which adopt abnormal accruals as proxy of earnings management. It examines abnormal accruals for a large sample of China firms between 2008 to 2011, standardized so as to control for audit size (Big 4 or Non Big 4), industry specialization and firm characteristics. The results show that audit firm size is significantly negative related to earnings management, especially firms with income-increasing abnormal accruals. However, there is no significant correlation between earnings management and industry specialization, and negative association between them only exists in firms with income-decreasing earnings management. In particular, it suggests that China should enhance the improvement and maintenance of audit quality and continue to emphasize the implementation of the policy "become bigger and stronger audit firms". Furthermore, the cultivation of industry experts is also a necessary and urgent developing strategy.

Keywords: Earnings Management, Audit firm size, Industry Specialization

1. Introduction

Recently, with the development of securities market, earnings management has been a serious problem in China, which increases market's transaction costs and investors' costs of searching the true information. A common definition of earnings management by Schipper (1989) is that managers conduct purposeful activities to mislead some information users, in order to obtain some private gain. The reason is the agency theory, which leads that asymmetric information between managers and shareholders, thus managers could adopt earnings management to pursue self-interest maximization.

Also, it is known that the important function of auditing is to reduce information asymmetries among related parties. Several previous studies have linked earnings management to audit quality in US, EU and Taiwan securities markets, but little with Chinese evidence. The possible reason may be due to, comparing with developed countries, the threat of costly investor litigation faced

by Chinese auditors is not severe (Sami and Ye, 2005). For example, before 1999, there was no litigation risk against auditors as the Chinese law and judicial interpretations did not have an explicit and specific liability mode to CPA's legal liability for third parties.

Therefore, the main purpose of this paper is to investigate the association between the external audit quality, and earnings management, and based on the institutional background and market characteristics of China. To some extent, the results will make up for the shortcomings of the auditor industry expertise research both in China and abroad. The remainder of the paper is organised in the following manner. In section 2, it reviews the extant literatures from three aspects, earnings management proxy, audit size and industry specialization. In section 3, it would explain sample selection process, variables measurement and hypotheses testing models. Section 4 presents empirical results with detailed analysis, and section 5 is the conclusion including practical implications and suggestions for further study, as well as states potential limitations.

2. Literature Review

In this section, background and institutional features of Chinese stock market and audit market are firstly reviewed. Then an extensive body of earnings management literatures has been developed. After that, it critically reviews previous literatures about the effect of audit quality and industry specialization to earnings management. All the preparation works help to establish appropriate models and select useful data.

2.1 Institutional features of Chinese stock market and audit market

Earnings management in China has different features compared with US market and other developed markets. The reason is that China is in the process of transferring from centrally-planned economy to market-oriented economy (Qiu, 2004). Chinese domestic stock market becomes one of the most volatile and speculative markets in the world as it grows so fast (Sami and Ye, 2005). Firstly, Chinese government regulations can regulate the capital market and the listed companies because the largest owners of most listed firms are government entities (DeFond et al. 1999). Rights offering, IPO and delisting regulations provide incentives for managers to boost reported earnings. In order to meet the rights offering profitability regulations set by central government, managers try to manipulate earnings to achieve the required ROE levels. Then, good listed firms could obtain equity financing from investors (Qiu, 2004). However, the influence of rights offering regulation to listed firms in US market is significantly lower, rather than a large number of firms are motivated to manipulate financial reports. Similar as IPO regulations, the necessary criteria for intended IPO firms is at least two years' operating profits. Also, the government requires intended IPO firms to set the initial price at a P/E ratio of 12 to 15. Thus, managers are strongly motivated to increase profits and earnings intentionally (Qiu, 2004). About delisting regulations in China, Special Treatment (ST) and Particular Transfer (PT) firms are subject to regulatory scrutiny and some business limitations. All the rules set by regulators create incentives and motivations for earnings management.

The second feature of earnings management in China is that earnings management is more likely to be achieved by real transactions, rather than accounting policy choices and accounting estimates. Typically, related-party transactions among affiliated firms or member firms help to decrease unnecessary transaction costs. This kind of real actions is not always unfair as a matter of fact. However, related-party transactions among controlling shareholders create opportunistic

interest for them. The term "tunneling" can be used to explain their opportunistic activities, transferring firms' resources away to controlling shareholders (Qiu, 2004). According to Qiu's study, there are 949 firms (about 93%) out of 1,018 Chinese listed firms had related-party transactions[1]. There is serious agency problem between controlling shareholders and minority shareholders in China, and tunneling activities are more likely to occur because of the over-centralization of ownership by controlling shareholders (Qiu, 2004).

In general, government's regulation and rules create stronger earnings management motivations and Chinese listed firms use real actions to manipulate earnings, rather than accounting choices. The two background differences between Chinese market and US developed market with regard to earnings management draw the researcher's attention to undertake further research in Chinese market.

In China, the Chinese Institute of Certified Public Accountants (CICPA) is the main institution to monitor and discipline independent audit firms. In 1993, the CPA Law of China was established to regulate CPA firms, and the legal penalties were set up for violating GAAP and laws. In 1995, the Ministry of Finance (MOF) released new Independent Auditing Standard to regulate audit quality, audit procedure and auditor independence (Sami and Ye, 2005). Before 1999, there was no serious litigation risk against auditors as the Chinese law and judicial interpretations did not have an explicit and specific liability mode to CPA's legal liability for third parties. Following several high-profile financial scandals in the early 2000s, such as the collapse of ZhongTianQin (ZTQ), CSRC provided stricter and more detailed requirements for audit firms. For examples, there were more than 900 such cases accepted by local courts in China in 2002, firms sued for fraudulent reporting or false information disclosure were investigated and fined by CSRC (Li et al., 2004). Accordingly, fines, administrative punishment, cancellation of the license and imprisonment are all legal penalties (Sami and Ye, 2005). Therefore, Chinese audit firms face serious litigation risk from central government.

However, compared to US market, Chinese audit firms may not face the severe threat of costly investor litigation. Sometimes, Chinese investors are unsophisticated and some speculative investors do not get concerned about corporate management, making them difficult to observe opportunistic behaviors by managers. Furthermore, as the law enforcement in China is relatively weak, when investors of company submitted civil lawsuits to local courts or Middle court of China, the court will not accept and process them for indemnification. Given different legal environment and market features in China, it is necessary to conduct a research on the topic earnings management and audit quality based on empirical results for US, Taiwan and other markets.

2.2 Earnings management literatures

The conflict of interest between companies' dispersed shareholders and directors who are hired to determine the overall operations and strategies is the central tension in the corporate governance. The separation of the ownership and management creates the opportunity of discretionary accounting choices to executives. Healy (1985) is the first person to explicitly indicate the adoption or modification of managers' bonus plan might cause the changes in the accounting

[1] Data from: *"Securities Market Press"* March, 2011.

procedures, and income-reporting incentives which based on their bonus contracts were associated with accrual policies.

Earnings management is usually regarded as a negative factor affecting the quality of financial report. There are a lot of literatures focused on incentives of earnings management. Hayn (1995) find that many firms report positive profit which is just above zero. Burgatahler and Dichev (1997) find some further evidence, which stated that firms prefer to report an increasing figure of profit and fewer companies has reduction in earnings. Brown (1998), and Burgstahler et al (1998) and Degeorge et al (1999) noticed that financial analyst often had nearly zero forecast error which may indicate that firms had incentives to meet the forecasted figure.

2.3 Audit firm size and earnings management

DeAngelo (1981) states that Big 6 audit firms[2] are the largest audit firms in US market, larger size audit firms often have higher the expected audit quality, less opportunistic behaviors of auditors are found. They are more likely to report fraud, error and irregularities and less likely to accept questionable accounting estimates. Becker et al. (1998) experimentally support the positive relationship between audit firm size and audit quality, and they also examine the effect of audit quality to earnings management. The results show that the companies audited by non-Big 6 audit firms have higher discretionary accruals than the companies audited by Big 6. However, they test only for income-increasing earnings management which results do not apply to income-decreasing discretionary accruals. Zhou and Elder (2002) have examined that higher audit quality as evidenced by larger audit size and high industry specialization is associated with lower earnings management for IPO firms in US. They also find that Big 5 auditors and industry specialists have less managerial earnings in Seasoned Equity Offering firms. The results indicate that higher audit quality is related to less accounting flexibility. In the same context, the research of Choi et al. (2010) for Taiwanese companies has concluded that Big 5 auditors are related to lower abnormal accruals. Inaam et al. (2012) has conducted a research in Tunisian context to find the association of audit quality and earnings management. They report that there are negative and significant relationship between Big 4 auditors and the earnings management measured by discretionary accruals. Also, they find real earnings management (REM)[3] in Tunisian market have positive relationship with audit firm size.

On the whole, most literatures support the negative relationship between audit firm size and earnings management. However, some Chinese scholars also find positive relationship or no relationship between them given the specific institutional features in China. Liu and Xu (2002) argue that international Big 4 in China face moral hazard problems, which negatively influence their ability to control earnings management. Also Zhou (2005) reviews Arthur Andersen case and a series of scandals exposed from Big 4, she finds that not larger firms supervise earnings management better. Furthermore, from the aspect of the soundness of the accounting surplus, there is strong evidence that the international Big 4 are even less robust than non-international Big 4 (Liu and Zhou, 2007). Basically, the relationship between audit firm size and earnings

[2] The “BIG” audit firm group was previously known as the "Big 8", and was reduced to the "Big 6" and then "Big 5" after some mergers. For instance, when Price Waterhouse merged with Coopers & Lybrand to form PricewaterhouseCoopers in July 1998, the Big 6 became the Big 5. The Big 5 became the Big 4 after the collapse of Arthur Andersen in 2002 because of its failure in Enron scandal.

[3] REM (Real earnings management) includes sakes manipulation, overproduction and reduction of discretionary expenditures. (Inaam et al., 2012)

management is still a complex empirical question in China. Positive relationship and no obvious relationship are also possible conclusions.

2.4 Industrial specialization and earnings management

Bonner and Lewis (1990) think audit firms with industry expertise have more professional knowledge and skills, which help them to find accounting misstatements easily and constrain false falsification of accounting surplus of conduct. O'Keefe et al. (1994) find that compared with non-specialist auditors, specialist auditors comply with accounting and auditing standards more strictly, and legal proceedings received are significantly less. Krishnan (2003) has used clients of Big 6 auditors as the sample and industry portfolio shares method as the measurement of industry expertise. He finds that "Big 6" with industry expertise have more limited accruals in earnings management. Because they provide service lines by re-engineering business processes, which help to improve audit effectiveness and efficiency and thereby increase the reliability of accounting information. Kwon et al. (2007) conduct the similar research in the international context. Using a sample from 28 countries over 1993-2003, they report that clients of specialist auditors have high earnings response coefficients with lower abnormal accruals. Namely, the role of auditor industry specialization in improve audit quality and reduce earnings manipulation is increasingly important. The similar results from Inaam et al. (2012), relative to non-specialist auditors, specialist auditors have more extensive auditing experience and staff training for the special industry, and they are more likely to make expensive investments in information technology. Sun and Liu (2013) also report that auditor industry specialization improves the effectiveness of board governance in lowering abnormal accruals. They document evidence on examining the interaction effects between them. The conclusion is specialist auditors help to enhance board governance mechanisms, so as to constrain opportunities of earnings management.

However, Albert (2004) argues that the negative relationship between industrial specialization and earnings manipulation in big clients is not significant. Large bargaining power is the main reason. The complex business activities of big and top clients need complex industry expertise, which may not be acquired by auditors. Therefore, these clients often negotiate with auditors successfully, which create opportunities for managers' manipulation.

3. Research Methodology

3.1 Variables measurement

In order to investigate the relationship of earnings management and audit quality, abnormal accruals[4] would be researched as dependent variable, which as the proxy of earnings management, while independent variable is audit quality. Furthermore, due to audit quality is not intuitionistic, and two proxy variables of audit quality are chosen to conduct the research, which are audit firm size and industry specialization. According to the analysis of the past literatures in China or overseas, earnings management also effects by operating cash flow, firm size, total

[4] Following conventional practice, "discretionary accruals", "abnormal accruals" and "managed accruals" can be used interchangeably throughout the paper. Similarity, the terms "normal accruals" "non-discretionary accruals" and "unmanaged accruals" are used interchangeably.

accruals, and the debt to asset ratio etc. Therefore, these variables would be controlled for the accuracy of research as the control variables.

3.2 Hypotheses

According to previous studies regarding with audit quality, the common practice is to define Big 4 firms as large size auditors and non-Big 4 firms as small size ones. It found that based on sufficient capital, super software technology, qualified professionals and other capabilities, larger audit firms are likely to provide higher quality audits. High audit quality can protect their investment in reputation capital, which is significantly greater than non-Big 4 firms. Therefore, the first objective of this research is to investigate whether large audit firms with high quality works can reduce the level of information asymmetry and level of earnings management in China, and the first hypothesis arises,

Hypothesis 1: Chinese Listed Firms with Big 4 auditors report relatively lower abnormal accruals compared to firms with non-Big 4 auditors.

As new developed examination about audit quality, industry specialization means auditors can devote resources and competences to develop special industry knowledge, and then they will be able to lower the knowledge-developing expenses and achieve economy of scales (Jiang et al., 2012). They can deliver quality-differentiated services so that experts earn fee premiums that they can reinvest in industry knowledge of the client (DeAngelo, 1981). So, whether auditor industry specialization helps to constrain earnings management will be examined in this research:

Hypothesis 2: Chinese listed firms audited by industry specialist auditors express less abnormal accruals than those audited by non-industry specialist auditors.

3.3 Model

The estimation of discretionary accruals follows the approach used in studies by Peasnell, et al. (2000, 2005), denoted PPY hereinafter. They use a cross-sectional version of the modified Jones model and focus on working capital accruals rather than total operating accruals. Their rationale for this focus is that systematic earnings management via the depreciation accrual is likely to have limited potential (see Beneish, 1999). Therefore, this paper follows PPY directly, and according to Jones (1991) and Al-Attar et al. (2008), an equation can be established by lagged total assets:

$$WC_{it} = a_0 + a_1(\Delta REV_{it} - \Delta REC_{it}) + a_2 PPE_{it} + \varepsilon_{it} \qquad (1)$$

Here, ΔREV_{it} is the change in revenue for company i from year $t-1$ to t, ΔREC_{it} is the change in account receivable for company i from year $t-1$ to t , PPE_{it} is the gross property plant and equipment after depreciation and impairment for company i in year t.The a_1 and a_2 are estimated firm-specific parameters. And the residual error ε_{it} gives the estimate of abnormal accruals, which is denoted "AA" from the modified Jones Model.

Specifically, the WC_{it} represents the working capital accruals, it equals to the change in non-cash current assets minus the change in current liabilities (Moradi et al., 2011).

$$WC_{it} = (\Delta CA_{it} - \Delta CASH_{it}) - \Delta CL_{it} \qquad (2)$$

Where ΔCA_{it}: Changing current assets which is the difference of current assets at the beginning and end of the same year, current assets include cash flows, short term investments, receivables

accounts, inventory and so on; $\Delta CASH_{it}$*: Changing cash flow which is the difference of cash flow in the end of every year with cash flow at the beginning of the same year;* ΔCL_{it}*: Changing current liability which is the difference of current liability in the beginning and end of the same year, and CL include payable accounts, accrued expenditures, short-term notes and so on.*

Regarding with the audit firm size variable, this study will use the firm brand name to distinguish them, which represents as dummy variable of Big 4 or Non-Big 4. Big 4 in China include *ERNST & YOUNG HUAMING CPA FIRM (E&Y), KPMG CPA FIRM (KPMG), PRICEWATERHOUSECOOPERS ZHONGTIAN CPA FIRM (PWC) and DELOITTE TOUCHE TOHMATSU CPA FIRM (Deloitte)*. And the other audit firms will be Non-Big 4 firms, examples are as follows[5].

Table 1: Examples of Non-Big 4 Audit Firm

Examples of Non-Big 4 Audit Firm
ASCENDA CERTIFIED PUBLIC ACCOUNTANTS CO., LTD.
BDO CHINA LI XIN DA HUA CPA CO., LTD
BEIJINGZ HONGZHENG TIANTONG CPA CO., LTD.
BEIJING XINGHUA CPA FIRM
BEIJING YONGTUO CPA FIRM
BEIJING ZHONGZHUN CPA FIRM CO., LTD.
CHINA AUDIT ASIA PACIFIC CPA FIRM
CHINA AUDIT INTERNATIONAL CPA FIRM
DAXIN CPA FIRM
EANDA CERTIFIED PUBLIC ACCOUNTANTS
JIANGSU TIANHENG CPA FIRM
PAN-CHINA CPA FIRM
REANDA CPA CO., LTD.
RSM CHINA CPAS
SHANDONG ZHENGYUAN HEXIN CPA CO., LTD.
SHENZHEN PENGCHENG CPA FIRM
SHINE WING CPA FIRM
SICHUAN HUAXIN GROUP CPA FIRM
TIANZHI INTERNATIONAL CPA FIRM
WUHAN ZHONGHUAN CPA FIRM
WUZHOU SONGDE UNITED CPA FIRM
ZHONGXINGCAI GUANGHUA CPA CO., LTD.
…

In addition, this study will use auditor market share as a proxy for the industry-specific experience of the audit firm, which is the extent of industry specialists. Moreover, prior studies have used industry market share, based on total client sales, client asset or client numbers audited within each industry in a particular two-digit industry code to measure industry specialization. Client-based market share and sales-based market share methods are usually used. Sales-based market share method is as follows:

[5] Source from: CSMAR database, GTA.

$$MS_{ik} = \frac{\sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}{\sum_{i=1}^{I_k} \sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}} \quad (3)$$

Where: i*=1,2,..., I: audit firm index.*
j*=1,2,..., J: client firm index.*
k*=1,2,..., K: client industry index.*
A_{ijk}*: Total sales of client firm* j *in industry* k *audit by auditor* i*.*
I_k *: The number of audit firms* i *in industry* k*.*
J_{ik} *: The number of clients served by audit firm* i *in industry* k*.*
MS_{ik}*: Market share for auditor* i *in industry* k*.*

However, this method is relatively complicated as total sales of each industry are difficult to find in database. This research will try to measure market share using client numbers in specific industry, a client-based market share (*MS*) measure be used to determine industry specialisation in this study:

$$MS = \frac{M}{N} \quad (4)$$

Where: *M= number of firms audited by same auditor in a two-digit SIC code industry*
N= number of firms audited in a two-digit SIC code industry

When the audit firm i's market share is greater than ***8%*** in one industry, the auditor i is an industry specialist, or it is not considered to be an industry specialist in the following regression analysis. According to previous research, the threshold rate is often set at 10%, 15% or 20%. However, market shares are extraordinary decentralized in Chinese audit market. Besides, most listed firms are audited by Non-Big 4, so ***8%*** is ad hoc and more suitable for Chinese audit market.

The following OLS regression will be used to test the relationship between the dependent variable earnings management and the independent variables audit quality:

$$AA_{it} = \beta_0 + \beta_1 AUDIT_{it} + \beta_2 SPEC_{it} + \beta_3 ABSTA_{it} + \beta_4 LEV_{it} + \beta_5 OCF_{it} + \beta_6 LOGTA_{it} + \beta_7 LOSS_{it} + \varepsilon_{it} \quad (5)$$

Where i*: Client firm index;* t*: Year index;* β_0 *denotes the constant of the models;* $\beta_1 \dots \beta_7$ *denote the regression coefficients of related variables, and* ε_{it} *as the residual of the model. The definition of the variables is summarized in Table 2.*

The regression model is mainly used to test the two hypotheses, the associations of audit firm size and industry specialization to discretionary accruals. Specially, AUDIT and SPEC are two explanatory variables in this research, which are proxy for audit quality as discussed. If the audit firm is Big 4, the AUDIT equals to 1 and 0 otherwise. Similarly, 1 if the auditor is an industry specialist (market share >8%) and 0 otherwise. Other variables also play important role in determine the abnormal accruals. This study focuses on five control variables in this study. Becker et al. (1998) find that absolute value of total accruals ($ABSTA_{it}$) is associated with abnormal accruals. They also provide evidence that clients audited by Big 4 firms and non-Big 4 firms have significantly different operating cash flows (OCF_{it}). The absolute value of total accruals is the absolute value of net income less operating cash flows. When the firm is among

high leverage by year and industry, the debt covenant violation is high which indicates high income-increasing discretionary accruals. Thus, leverage (LEV_{it}) is a key variable added to the regression analysis to determine the discretionary accruals (Zhou and Chen, 2006). Zhou and Chen also find managers manage reported earnings to avoid earnings decreases and losses. Accordingly, a variable $LOSS_{it}$is added in the regression. If the observation incurs a loss, the LOSS equals to 1 and 0 otherwise. Further, the log of total assets ($LOGTA_{it}$) is used to control possible effect of firm size on earnings management.

Table 2: Summary of variables

Variable name	Abbreviation	Unit
Delta current asset	ΔCA	Yuan
Delta cash	$\Delta CASH$	Yuan
Delta current liability	ΔCL	Yuan
Working capital accruals	WC	Yuan
Delta revenue	ΔREV	Yuan
Delta receivables	ΔREC	Yuan
Delta revenue less Delta receivable	$REVREC$	Yuan
Property, plant and equipment	PPE	Yuan
Lagged total asset	TA	Yuan
Abnormal accruals	AA	Yuan
Audit size	$AUDIT$	Big 4=1, otherwise=0
Industry specialization	$SPEC$	Market Share >8%=1, otherwise=0
Absolute value of total accruals	$ABSTA$	Yuan
Leverage	LEV	Yuan
Operating cash flows	OCF	Yuan
Log of total assets	$LOGTA$	Yuan
Loss	$LOSS$	incur loss=1, otherwise=0

3.4 Data

The sample is selected from the period between 2008 and 2011 using the CSMAR (China Stock Market & Accounting Research) Database, which contains 10,208 firm-year observations from 2,552 A-stock Chinese listed firms. In order to make the data more accurate, the sample of financial industry has been eliminated. Meanwhile, based on the consideration of prudent principle, we make data processing on the extreme value according to 'Winsorize' method (at 1% upper and lower). Panel A of Table 3 shows the step-by-step data selection process, and the final sample size is 4,640 firm-year observations. Panel B shows client based market share about sample distribution by year and by audit size. There are 1,175 (25.3%), 1,108 (23.9%), 1,080 (23.3%), 1,277(27.5%) observations respectively in 2008, 2009, 2010 and 2011. Total 330 observations are audited by Big 4 auditors, and the Non-Big 4 audits more than 90% over the period analyzed.

Panel C distributes the sample firm according to industry. There are five general industry categories and 125 sub-sectors. The 4,640 observations are segmented according to the five categories: Real Estate, Commercial, Conglomerates, Public Utility and Manufacturing. The Manufacturing has the largest percentage of the sample, with more than 60% of the total observations. According to the information in the database, A01 Agriculture, A03 Forestry, A05

Animal husbandry, A07 Fishery industry are all included in Conglomerates. Public Utility contains transport, tourism, public facilities services, computer application service and other public services. For the Real Estate category, there are 244 (5.3%) observations in the two industry code, *J01 Real Estate Development and Management & E01 Civil Engineering Construction*. After calculating client-based market share for each auditor, this study finds that 72 samples, which represent more than 8% in Real Estate, are audited by TIANJIAN CPA CO. LTD., SHULUN PAN CPA CO., LTD and SHENZHEN PENGCHENG CPA CO., LTD. Therefore, 72 observations are industrial specialization which will be value at "1". Also, there are 344 observations in Commercial, examples are: *H11 Retail Trade; H01 Wholesale of Food, Beverage, Tobacco & Household Products; H03 Wholesale of Energy, Material and Machine Electric Equipment.* By calculating industry market share, number of specialist observations is 82. Similarly, 48, 83, 369 observations in Conglomerates, Public Utility and Manufacturing are audited by specialist auditors. Total 654 out of 4,640 observations are industry specialist from 2008-2012. The audit industry market share information is shown in Panel D.

Table 3: Sample Selection

Panel A: Sample selection criteria

	Number of firm-year observations
2008 to 2011 A-share Chinese Listed Companies from CSMAR database	10,208
Less:	
Observations with no financial statements in the database	(3,834)
Observations with insufficient financial statement data to calculate working capital: (14+23+58+68)	(163)
Less:	6,211
Companied in financial institutions or no industry information: (108+106+107+104)	(427)
	5,784
Less:	
IPO observations : (13+66+109+71)	(259)
	5,525
Less:	
Companies with insufficient auditor information : (150+240+304+191)	(885)
Final Sample	4,640

Panel B: Sample Description: Market Share Client Based for Observations by Year and by Auditor types

Year/Number(%) of observations	2008	2009	2010	2011	Total
Big 4	89 (7.6%)	76 (6.9%)	79 (7.3%)	87 (6.8%)	331 (7.1%)
Non-Big 4	1086 (92.4%)	1032 (93.1%)	1001 (92.7%)	1190 (93.2%)	4309 (92.9%)
Total Freq.	1175 (25.3%)	1108 (23.9%)	1080 (23.3%)	1277 (27.5%)	4640 (100%)

Panel C: Industry Distribution

Industry	Industry code	Observation	Freq.
Real estate	J01, E01	244	5.3%
Commercial	H21, K32, H11, H01, H03	344	7.4%
Conglomerates	M, A05, A07, A01, A09, A03	350	7.5%
Public Utility	F07, L01, B50, F11, G85, G87…	515	11.1%
Manufacturing	C43, C81, C73, C31, C47, C31…	3,187	68.7%
Total		**4,640**	**100%**

Panel D: Audit Industry Market Shares for 4,640 Observations in year 2008 to 2011

Industry	Obs.	Industry Client-based Market Share Examples Number (%)					No. of specialist observations (>=8%)
Real estate	244	TJ 28(11.5%)	SLP 24(9.8%)	SZPC 20(8.2%)	SZNFM 18(7.4%)	DT 10(4.1%)	72
Commercial	344	TJ 48(14.0%)	SLP 34(9.9%)	BJJD 20 (5.8%)	WZ 19(5.5%)	SC 18(5.2%)	82
Conglomerate	350	SLP 48(13.7%)	TJ 25(7.1%)	SZPC 22(6.3%)	REANDA 17(4.8%)	ZL 9(2.6%)	48
Public Utility	515	TJ 45(8.7%)	PWC 38(7.3%)	SLP 32(6.2%)	BJJD 32(6.2%)	SZPC 23(4.7%)	83
Manufacturing	3187	TJ 369(11.5%)	SLP 246(7.7%)	RSM 122(3.8%)	SZPC 117(3.7%)	ZL 70(2.2%)	369
Total	4640						654

Notes:
SLP: SHULUN PAN CPA CO., LTD.;
SZPC: SHENZHEN PENGCHENG CPA CO., LTD.;
SZNFM: SHENZHEN NANFANG MINHE CPA FIRM CO., LTD.; TJ: TIANJIAN CPA CO.;
DT: Deloitte & Touche;
BJJD: BEIJING JINGDU CERTIFIED PUBLIC ACCOUNTANTS CO., LTD.;
WZ: WUHAN ZHONGHUAN CERTIFIED PUBLIC ACCOUNTANTS CO., LTD;
SC: SHANGHAI CERTIFIED PUBLIC ACCOUNTANTS CO., LTD.
PWC: PRICEWATERHOUSECOOPERS ZHONGTIAN CPA FIRM

SZH: SHANGHAI ZHONGHUA HUYIN CPA FIRM
SW: SHINE WING CPA FIRM
JT: JIANGSU TIANHENG CPA FIRM
ZL: ZHONGLEI CPA FIRM
REANDA: REANDA CPA FIRM
E&Y: ERNST & YOUNG HUAMING CPA FIRM
RSM: RSM CHINA CPAS

4. Results and Analysis

By conducting the research under the methodology defined and sample selected, empirical results are obtained. This section firstly demonstrates the descriptive statistics of the sample. Then, multivariate analysis should also be conducted in order to avoid multicollinearity problem. After that, results of OLS model are analyzed in details, as well as the results of additional tests. Finally, robustness tests are introduced to test the sensitivity of the results.

4.1 Descriptive statistics

Table 4 provides descriptive statistics of the sample. Panel A describes the mean, standard deviation, minimum, median and maximum value for each variable in the PPY Model. Panel B in Table 4 is presented to show the regression results of detecting abnormal accruals. The mean coefficient of REVREC (0.52) represents positive correlation with working capital accruals. Besides, the t-value is 172.48, which is statistically significant at 99%[6] confidence level. As the coefficient of PPE is -0.48, there is negative association between PPE and working capital accruals. Similarly, the t-value also represents 99% confidence level. Based on the firm-year observation, the regression demonstrates the characteristic of firm behaviour. From the Table, the adjusted R^2 for the 4,640 observations is 86.52%, which means a good fit and explanatory power of PPY Model. Additionally, the adjusted R^2 given here also allows the following hypothesis available by using regression residuals computed by this model.

Panel C of Table 4 provides descriptive statistics of the sample for the OLS model. The mean value and standard deviation of discretionary accruals are 2.89^{e-08} and 2.007. The results reveal that Big 4 auditors represent 7.13% of the sampled companies, while companies audited by the Non-Big 4 audit firms represent more than 90% of the sample. About 14.48% firms cooperate with industry specialist auditors. About 14.5% observations reported losses during the sample period. The median and average absolute values of total accruals are 0.059 and 0.194 respectively. The mean and median leverage are 0.788 and 0.530. The mean and median operating cash flow are 0.049 and 0.052, and the average log of total assets is 9.296 with a standard deviation of 0.519.

[6] For the significance levels at the .01 (.05) (.10) based on a one-tail test, boundary values are 2.32, 1.6449, 1.2816 respectively.

Table 4: Descriptive Statistics for 4,640 Firm-year Observations

Panel A: Descriptive Statistics for the PPY Model

Statistics	Mean	Stdev	Minimum	median	Maximum
CA	2.79e+08	2.16e+09	-3.35e+10	3.54e+07	5.58e+10
CASH	6.33e+07	1.13e+09	-4.67e+10	4153158	3.00e+10
CL	3.24e+08	2.18e+09	-2.00e+10	4.34e+07	6.53e+10
WC	-1.08e+08	1.36e+09	-3.38e+10	-1.15e+07	1.46e+10
REV	7.99e+08	7.69e+09	-9.64e+09	9.63e+07	2.47e+11
REC	1.71e+07	3.80e+08	-9.96e+09	2174423	1.02e+10
REVREC	7.82e+08	7.68e+09	-8.86e+09	9.84e+07	2.57e+11
PPE	2.12e+09	1.32e+10	8317.6	4.32e+08	4.03e+11
TA	5.60e+09	2.94e+10	222849.1	1.82e+09	1.19e+12

Panel B: Regression result of the cross-sectional PPY Model

Source	SS	df	MS
Model	120076.699	2	60038.3494
Residual	18694.1596	4637	4.0315203
Total	138770.858	4639	29.9139596

```
Number of obs =    4640
F(  2,  4637) =14892.24
Prob > F      =  0.0000
R-squared     =  0.8653
Adj R-squared =  0.8652
Root MSE      =  2.0079
```

wcta	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
revrecta	.521855	.0030257	172.48	0.000	.5159232	.5277867
ppeta	-.4876779	.1558357	-3.13	0.002	-.79319	-.1821658
_cons	.1223885	.0562744	2.17	0.030	.012064	.2327131

Panel C: Descriptive Statistics for the OLS Model

Statistics	Mean	Stdev	Minimum	median	Maximum
AA	2.89e-08	2.007432	-24.29178	-.020092	132.3383
AUDIT	.0713362	.2574134	0	0	1
SPEC	.1448276	.3519648	0	0	1
ABSTA	.194303	5.466529	7.99e-07	.0590745	359.8972
LEV	.780155	12.90217	.0091224	.5295648	877.2559
OCF	.0490426	.3784153	-24.97394	.0522407	.891969
LOGTA	9.296245	.5193827	5.348011	9.260571	12.07733
LOSS	.1452586	.3523994	0	0	1

4.2 Multivariate analysis

In order to assess if the sample suffered from multicollinearity problem, the correlation coefficient between all the dependent variables and independent variables of the OLS model should be calculated. The correlation matrix for is shown in Table 5. As expected, the correlation between audit firm size and industry specialization is positive. However, the correlation is comparatively low as not all Big 4 audit firms are industry specialists. Although some

independent variables are significantly correlated with each other, none of the correlation coefficients is too high (>85%). Therefore, no significant multivariate problems existed in further regression analysis. Additionally, Table 6 shows the variance inflation factors for the independent variables. Mean VIF are below the value of 3 and all 1/VIF exceed 0.05, which means no multicollinearity problems between the variables.

Table 5 also presents that abnormal accruals are negatively related to audit size and industry specialization. This suggests that Big 4 and industry specialized auditors provide high audit quality, which force firms to produce less discretionary accruals. Abnormal accruals are positively associated to the ABSTA, which shows that firms with large total accruals engage in income-increasing activities opportunistically through abnormal accruals. Abnormal accruals are negatively related to operating cash flows, which suggests that firms with large operating cash flows are less likely to incur earnings management behaviors using discretionary accruals.

Table 5: Correlation Matrix for Dependent and Independent Variables: (n=4640)

	AA	AUDIT	SPEC	ABSTA	LEV	OCF	LOGTA	LOSS
AA	1.0000							
AUDIT	-0.0599	1.0000						
SPEC	-0.005	0.0309	1.0000					
ABSTA	0.322	0.0239	0.0035	1.0000				
LEV	-0.114	-0.0268	-0.0034	-0.7979	1.0000			
OCF	-3.870	0.0248	-0.0062	0.1945	-0.1951	1.0000		
LOGTA	0.032	-0.3939	-0.0160	-0.1153	0.1231	-0.1143	1.0000	
LOSS	0.219	-0.0245	0.0585	0.1440	-0.1452	0.0474	0.1629	1.0000

Table 6: Variance inflation factors for the independent variables

Variable	VIF	1/VIF
AUDIT	1.19	0.842073
SPEC	1.00	0.995127
Lev	1.02	0.982057
OCF	1.01	0.989176
ABSTA	1.09	0.872776
LOGTA	1.26	0.795043
LOSS	1.04	0.957027
Mean VIF	1.09	

4.3 Results of the regressions

Regressions of abnormal accruals on audit firm size and industry specialization for the period 2008 to 2011 are tested. Table 7 shows the regression results of two hypotheses tests, which allow us to explain the effect of audit quality on earnings management. The first two models report the results using separate audit firm size and industry specialization measures. The third model presents the result using both measures.

As the table shows, audit firm size is negatively related to abnormal accruals at 10% level (t value=1.59) when excluding the industry specialization variable. When including the industry specialist variable, there is also negative correlation (coefficient=-0.0599) between audit size and abnormal accruals at the 10% level. The results mean that Big 4 auditors are more effective in limiting managers' accrual choices than Non-Big 4 auditors. This is consistent with the auditor size and earnings management arguments in hypothesis development. Therefore, it provides evidence for the Hypothesis 1 that audit firm size plays an important role in constraining earnings management for Chinese listed firms. Namely, Hypothesis 1 is accepted.

There is negative correlation (coefficient=-0.006 and -0.005) between industry specialization and abnormal accruals when excluding audit size. As the t-value are -0.25 and -0.20 less than the 10% significance level, the negative relationship is insignificant. The possible explanation is that Chinese audit market is more dispersed, and industry specialization is still in an early stage. Although industrial specialized auditors can increase audit quality and help to reduce abnormal accruals, the effects are insignificant. This is not consistent with industry specialization and earnings management arguments in hypothesis development. Therefore, Hypothesis 2 is rejected.

In the third model, several control variables have significant correlations with abnormal accruals. Both operating cash flows (OCF) and leverage (LEV) are negatively related to abnormal accruals and their coefficients are highly significant at 1% level. The results suggest that firms with good operating cash flow position and high leverage ratio are less likely to use abnormal accruals to manage earnings or obtain debt covenant requirements. The absolute value of total accruals (ABSTA) is significantly positive, suggesting that firms with more discretion on accruals are more likely to use the discretion in increase earnings opportunistically for Chinese listed firms. The significance of LOGTA (0.032 with t=1.66) supports the importance of controlling for the self-selection bias. The positive relationship between firm size and abnormal accruals is explained that large firm size engage more in income-increasing earnings management. The LOSS variable is negatively associated with abnormal accruals. For the purpose of avoiding the occurrence of loss, loss firms are more likely to manage reported earnings.

Table 7: Regression of Abnormal Accruals on Auditor Firm Size and Industry Specialization (n=4640)

	Model 1 AA		Model 2 AA		Model 3 AA	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
INTERCEPT	-0.274	-1.55*	-0.381	-2.33***	-0.274	-1.55*
AUDIT	-0.060	1.59*			-0.0599	1.58*
SPEC			-0.006	-0.25	-0.005	-0.20
ABSTA	0.322	17.29***	0.323	17.33***	0.322	17.29***
LEV	-0.114	-14.87***	-0.114	-14.90***	-0.114	-14.87***
OCF	-3.870	-55.10***	-3.87	-55.07***	-3.870	-55.09***
LOGTA	0.0321	1.66***	0.044	2.48***	0.032	1.66***
LOSS	-0.219	8.32***	-0.218	8.27***	0.219	8.32***
Adj. R^2	90.75%		90.75%		90.75%	

****, **, * indicate significant at the .01 (.05) (.10) level based on a one-tail test, where the boundary values are 2.32, 1.6449, 1.2816 respectively.*

4.4 Additional tests of the two hypothesis

Additional tests are applied on the two hypotheses to further understand the phenomenon of earnings management in Chinese market, and its relationship with audit size and industry specialization. This research devides the total observations into two groups: 2,057 observations with positive abnormal accruals and 2,583 observations with negative abnormal accruals. In the left part of Table 8, regression results of observations with positive abnormal accruals are shown. The negative correlation between audit size and abnormal accruals is highly significant at 1% level, which is consistent with the evidence shown in Table 8. The t-value is 4.77, which is higher than whole 4640 observations. The results suggest that the ability of Big 4 auditors to restrict income-increasing earnings management is high more significantly. However, there is no sinificant relation found between positive abnormal accruals and industry specialization

In the right part of table 8, it is the regression results of observations with negative abnormal accruals. It indicates that industry specialization is negatively related to negative abnormal accruals at 10% significance level. It reflects that firms audited by industry specialist auditors are more likely to constrain income-decreasing earnings management. Therefore, industry specialization in China is also a factor to increase aduit quality, and then to reduce earnings manipulation behaviors. However, no significant relationship retween audit size and the negative abnormal accruals is finded.

Table 8: Regression of Positive and Negative Abnormal Accruals on Auditor Firm Size and Industry Specialization (n=4640)

	+AA (n=2057)		-AA (n=2583)	
	Coefficients	t-value	Coefficients	t-value
INTERCEPT	1.33	9.24***	0.130	2.16**
AUDIT	-0.147	4.77***	-0.011	0.83
SPEC	0.177	0.83	-0.013	-1.56*
ABSTA	0.844	50.76***	-1.252	-152.27***
LEV	-0.328	-48.02***	-0.011	-3.38***
OCF	-2.060	-33.17***	-0.053	-1.51
LOGTA	-0.105	-6.67***	-0.010	-1.51
LOSS	-0.038	9.24***	-0.075	-8.17***
Adj. R^2	98.72%		90.75%	

****, **, * indicate significant at the .01 (.05) (.10) level based on a one-tail test, where the boundary values are 2.32, 1.6449, 1.2816 respectively.*

4.5 Robustness tests

In order to test the sensitivity of the results to different variables and model specifications, several robustness tests are performed. The corresponding regression results are shown in Table 9. Firstly, to test the first hypothesis about audit firm size and abnormal accruals, six regression models are tested by excluding different control variables. The results are presented in Panel A of Table 9. Not surprisingly, the regression results are quite similar to the original ones in Table 7. Audit firm size is negatively associated with abnormal accruals at 1% significance level in model 4, at 5% level in model 1 and 2, and at 10% in model 5 and 6. Therefore, stronger evidences support the Hypothesis 1: Chinese listed firms with Big 4 auditors report relatively lower abnormal accruals compared to firms with non-Big 4 auditors.

Like the tests for the audit size arguments, similar additional tests are used for Hypothesis 2: industry specialization. In panel B of Table 9, when the industry specializaiton variable is added, audit size still has the expected correlation coeffienct value and similar statistically significant level. It supports the argument that industry specializaiton is not an important factor in constraining abnormal accruals. In addition, the negative correlations are insignificant in all six models. This futher corroborates with the findings in section 4.3. Therefore, it can be concluded that earnings management of Chinese listed firms audited by industry specialist auditors has no significant differences with those audited by non-industry specialist auditors. Still, Hypothesis 2 is rejected. To summarize it, the robusteness tests demonstrate that the reported results in the original regression results are not very sentitive to different variables and model specifications.

Table 9 Robustness Tests:

Panel A: Regression of Abnormal Accruals on Auditor Size (n=4640)

	Model 1 AA	Model 2 AA	Model 3 AA	Model 4 AA	Model 5 AA	Model 6 AA
INTERCEPT	-0.437 -2.40***	-0.445 -2.47***	0.515 2.27***	0.016 0.68	0.350 -1.97**	-0.274 -1.55*
AUDIT	-0.076 1.94**	-0.071 1.84**	-0.027 0.56	-0.085 2.43***	-0.050 1.30*	-0.060 1.59*
ABSTA		0.046 26.57***	1.288 158.48***	0.323 17.36***	0.348 18.81***	0.322 17.29**
LEV	0.018 24.93***		-0.510 -148.38***	-0.115 -14.96***	-0.124 -16.38***	-0.114 -14.87****
OCF	-5.012 -204***	-4.849 -193.58***		-3.862 -55.10***	-3.772 -54.08***	-3.870 -55.10***
LOGTA	0.044 2.21***	0.046 2.31**	-0.038 -1-53*		0.060 3.15***	0.0321 1.66***
LOSS	0.295 11.01***	0.285 10.73***	-0.018 -0.54	0.227 8.75***		-0.219 8.32***
Adj. R^2	90.16%	90.31%	84.70%	90.75%	90.62%	90.75%

*The t-value in each second row is reported. ***, **, * indicate significant at the .01 (.05) (.10) level based on a one-tail test, where the boundary values are 2.32, 1.6449, 1.2816 respectively.*

Panel B: Regression of Abnormal Accruals on Industry Specialization (n=4640)

	Model 1 AA	Model 2 AA	Model 3 AA	Model 4 AA	Model 5 AA	Model 6 AA
INTERCEPT	-0.437 -2.40***	-0.445 -2.47***	0.515 2.27***	0.016 0.69	0.350 -1.97**	-0.274 -1.55*
AUDIT	-0.076 1.94**	-0.071 1.83**	-0.027 0.55	-0.085 2.43***	-0.050 1.31*	-0.0599 1.58*
SPEC	-0.446 -0.17	-0.004 -0.17	-0.010 -0.32	-0.004 -0.17	0.007 0.28	-0.005 -0.20
ABSTA		0.046 26.57***	1.288 158.46***	0.323 17.36***	0.348 18.80***	0.322 17.29***
LEV	0.018 24.93***		-0.510 -148.36***	-0.115 -14.96***	-0.124 -16.38***	-0.114 -14.87***
OCF	-5.012 -204***	-4.849 -193.55***		-3.862 -55.09***	-3.774 -54.07***	-3.870 -55.09***
LOGTA	0.044 2.21***	0.046 2.31**	-0.038 -1-52*		0.060 3.14***	0.032 1.66***
LOSS	0.295 11.00***	0.285 10.72***	-0.018 -0.52	0.227 8.74***		0.219 8.32***
Adj. R^2	90.16%	90.31%	84.69%	90.75%	90.61%	90.75%

*The t-value in each second row is reported. ***, **, * indicate significant at the .01 (.05) (.10) level based on a one-tail test, where the boundary values are 2.32, 1.6449, 1.2816 respectively.*

5. Conclusion

The results of this study show that there is a significant negative correlation between audit firm size and earnings management in the Chinese market. The results of all additional tests and robustness tests suggest that Big 4 auditors engage in constraining eanrings management in Chinese market, which is consistent with findings of some previous literatures (Becker et al., 1998; Zhou and Elder, 2002 and Francis and Yu 2009). Furthermore, the negative association between audit size and income-increasing earings management is higher significant. To explain it, Big 4 firms with high audit quality are related to low accounting flexibility as there is higher risk of damaging brand reputation. Therefore, they are more likely to report fraud and irregularities and less likely to accept questionable accounting estimates. Given the severe information asymmetry and earnings management incentives in Chinese stock market, audit firm size is an imporatant factor to effectively control purposeful income-increasing manipulations by managers. Clients served by larger auditors have lower opportunities to generate discretionary accruals, thus high-accrual firms should hire larger auditors to constrain opportunities for small positive earnings from the prior year.

However, no singificant relationship found between industry specialization and earnings management, especially the income-increasing earnings managemnt, which agree with the results of Albert (2004) research. Additionally, the research finds that there is relatively significant negative association between industry specialization and income-decreasing earnings management in China market. High industry expertise in industry specilist auditors will constrain income-decreasing abnormal accruals based on extensive auditing experience, information technology and higher audit effectiveness.

All the results support the policy of “become bigger and stronger” issued by Chinese government. From a certain extent, the results also illustrate that the audit quality of CPA audit firms can be further improved. From the view of audit markets of some developed countries, high-quality and large-scale audit firms are need to develop through a long period before maturity. There is no exception for Chinese audit market, which is only in the early stage of development. The empirical results of this article also show that China should enhance the improvement and maintenance of audit quality, and further strengthen accounting standards and rules effectively. Chinese audit market should continue to emphasize the implementation of the policy “become bigger and stronger audit firms”. In addition, the cultivation of industry experts is also a necessary and urgent developing strategy. With the promulgation and implementation of related measures, China's CPA audit quality will be substantially enhanced. The stock market and audit market will be more mature, standardized and effective.

According to the methodology and results in this research, further research can extend the study in two main aspects. Firstly, in Chinese audit market, some large local CPA (Certified Public Accountants) firms also possess large market share. Top 5-10 accounting firms with most professional auditing service are ShineWing Certified Public Accountants, ShuLun Pan Certified Public Accountants Co., Reanda Certified Public Accountants, Zhongshen-Yatai Certified Public Accountants Co., Vocation International and Tin Wha Certified Public Accountants. They also have professional qualified accountants, advanced information technology and industry expertise. In future study, Top 10 audit firms and other firms can be used to investigate the effect of audit firm size to earnings management. Secondly, sales-based market share may be better to measure

the level of industrial specialization than client-based market share. Because sometimes there are a large number of small clients audited by same auditors in one industry, the proportion of their sales is small in this industry. In future study, it can undertake the complicated but more accurate sales-based method to identify industry specialist auditors.

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