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A comparative study of earnings quality of firms listed in the NEEQ market and the Growth Enterprise Market

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ABSTRACT

This paper explores the differences in earnings quality between the National Equities Exchange and Quotations (NEEQ) companies and the Growth Enterprise Market (GEM) companies. The study finds that NEEQ companies and GEM companies have different characteristics in earnings quality. NEEQ companies have a significantly higher level of upward earnings management than GEM companies, while GEM companies have stronger incentives to manage earnings downward through a 'big bath' than NEEQ companies, owing to the special treatment and delisting regulations for GEM firms. We also find that the unique institutions of NEEQ have significant impacts on the earnings quality of companies. Innovation-layer companies, companies applying for IPOs, companies with independent directors, companies trading with market makers, companies with private equity (PE) or venture capital (VC) investment have higher earnings quality.

KEYWORDS

earnings quality; GEM; NEEQ

1. Introduction

This paper explores the differences in earnings quality between the National Equities Exchange and Quotations¹ (NEEQ) companies and the Growth Enterprise Market² (GEM) companies. There is a large amount of literature discussing the earnings quality of listed companies from different perspectives (Dechow, Ge, & Schrand, 2010). However, the earnings quality of unlisted companies is seldom explored in the academic field. In China, the rapid expansion of the National Equities Exchange and Quotations (NEEQ) provides an important opportunity to study the earnings quality of unlisted companies in China.³

A study of the earnings quality of NEEQ companies is important for several reasons. First, the registration-based stock listing system of the IPO has been regarded as the goal of the market reform in China.⁴ How the registration-based stock listing system

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¹The National Equities Exchange And Quotations Co., Ltd. is a Chinese over-the-counter system for trading the shares of a public limited company that is not listed on either the Shenzhen or Shanghai stock exchanges.

²The Growth Enterprise Market is named as Chinext by the Shenzhen Stock Exchange.

³According to the decision of the State Council on issues concerning national equities exchange and quotations, NEEQ companies are unlisted companies.

⁴China is in the process of transition, from an approval-based system for IPOs to a registration-based system, registration-based stock listing system or registration-based IPO system that is commonly used in the USA, UK and HK capital market. On 27 December 2015, the state council implemented the reform of a registration-based stock listing system, which was authorised by the top legislature of China to amend the law. On 24 February 2018, the standing committee of the National People's Congress approved the extension of this authorisation period for two years to 29 February 2020.

affects the earnings quality is a key issue of whether the reform can operate normally. The listing procedure in the NEEQ is very close to the registration-based stock listing system for an IPO (the difference is the lack of new shares issued in the NEEQ). A study of the earnings quality of NEEQ companies can provide implications for the implementation of the registration-based stock listing system in China.

Second, there is little evidence about the earnings quality of unlisted companies. Compared with listed companies, the number of unlisted small and medium-sized enterprises (SMEs) is extremely large.⁵ Research on the earnings quality of these enterprises can provide implications for the government to develop a more efficient regulation system. Ball and Shivakumar (2005) discussed the earnings quality for unlisted companies in the UK, which is one of the few prior papers discussing this issue. However, due to differences between the Chinese and British systems, the applicability of the conclusion needs further testing. Their research focuses on accounting conservatism, while this research provides more perspectives on earnings quality. Yuan, Lou, and Cao (2016) conducted a case study on the earnings quality of an unlisted joint venture in China. Unlike previous research, this study is an empirical study based on large samples.

Third, the research on the earnings quality of NEEQ companies further provides evidence on how institutions affect earnings quality. Compared with listed companies, NEEQ companies share similarities in terms of preparation, disclosure and auditing.⁶ However, there are differences with regards to the trading system and the regulatory system. This study discusses how the differences affect the earnings quality. On the one hand, since stock issuance and trading on the NEEQ are not active, whether a lower demand for high-quality information in the NEEQ reduces the earnings quality can be explored. On the other hand, many studies show that Chinese listed companies have strong incentives to manage earnings due to the implementation of strict accounting-based regulations.⁷ Without similar accounting-based regulations in financing and delisting, whether NEEQ companies reduce the incentive of earning management will be discussed.

Fourth, there are some specific regulations in the NEEQ such as the unique market maker system, and corporate governance. The influence of these unique systems on the earnings quality of NEEQ companies is a matter of great concern among regulators, companies and investors.

The study finds that NEEQ companies and GEM companies have different characteristics in respect of earnings quality. The NEEQ companies have a significantly higher level of upward earnings management than GEM companies, while GEM companies have stronger incentives to manage earnings downward through a 'big bath' than NEEQ companies due to the special treatment, delisting and other special regulations for GEM firms. The unique institutions of NEEQ have a significant impact on the earnings quality

⁵According to the National Bureau of Statistics, in 2016, there were 370,000 small and medium-sized enterprises above designated size, and 9,633 are large industrial enterprises. Small and medium-sized industrial enterprises account for 97.5%.

⁶NEEQ companies need to prepare financial reports according to China Accounting Standards for Enterprises. Disclosure of an annual report and semi-annual report is required. The audit firm must have a related qualification of securities and futures. In addition, China's tax law is the same with listed companies and unlisted companies.

⁷See Chen and Wang (2007); Chen and Yuan (2004); Chen, Xiao, and Guo (2000); Li (2001); Lin and Wei (2000); Lu (1999).

of companies. Innovation-layer companies, companies applying for IPOs, companies with independent directors, companies trading with market makers, companies with private equity (PE) or venture capital (VC) investment have higher earnings quality.

Our research contributes to the literature in several ways. First, the study enriches the literature on earnings quality of unlisted companies. Different from Ball and Shivakumar (2005), we find that the earnings quality of unlisted companies and listed companies in China does not differ in accounting conservatism. Second, the listing procedure in NEEQ is similar to that of a registration-based stock listing system. The research on the earnings quality of NEEQ companies provides some implications for the implementation of the registration-based stock listing system in China. Our study also provides policy implications for the accounting regulation of unlisted companies. Third, we provide evidence of the impact of the unique institutions of the NEEQ on earnings quality.

The paper is structured as follows: the second part develops the research hypotheses; the third part presents the research design; the fourth part reports the data and descriptive statistics; the fifth part is the empirical results; the sixth part shows the robustness test; the seventh part reports a further test; and the final part concludes this study.

2. Research hypothesis

2.1. Development of Hypothesis 1

There are many accounting-based regulations such as rights offering, public offer of new shares, special treatment and delisting for listed companies. The existence of profit indicators in regulation will lead to strong incentives to manage earnings for listed companies (Chen & Wang, 2007; Chen & Yuan, 2004). On the contrary, the regulations on financing and delisting in the NEEQ market do not specify an accounting indicator⁸ and thus may reduce the incentive for earnings management in NEEQ companies. In this view, the level of earnings management of NEEQ companies should be lower than that of GEM companies.

However, NEEQ companies still have incentives to manage earnings. In particular, many NEEQ companies have the incentive to attract investors' attention by increasing profitability. Investors in the NEEQ market make insufficient demand for high-quality accounting information and they cannot provide effective monitoring of NEEQ companies' earnings quality. This can be observed from two aspects. First, the trading in the NEEQ is extremely inactive. Take the year 2016 as an example, the GEM annual trading volume was 216, 83.162 billion yuan, while that of the NEEQ was 1, 91.229 billion yuan, only 0.88% of the GEM's. Eighty-five percent of NEEQ companies had fewer than 50 shareholders. However, the median number of shareholders of GEM companies was 18,442. Therefore, market participants' demand for financial reporting in the NEEQ is much lower than that of the GEM. Second, the financing system of the NEEQ is more flexible. When a company applies for private placement of stock, it may apply for the approval of shelf registration. If

⁸According to the Implementation Rules for the Termination of Listing of NEEQ Stocks, NEEQ companies will be forced to terminate their listing under 11 circumstances (such as failing to disclose regular reports, or unreliable information disclosure).

certain requirements are met,⁹ the company shall file issuance information for the CSRC within five working days after completion of each issuance. In this case, the accounting report will not be reviewed by the regulatory authorities and the earnings quality may be reduced. Due to a lack of investor demand, other oversight mechanisms such as media monitoring, auditing, and financial analysts following will decline.¹⁰ Therefore, the earnings quality of NEEQ companies will be lower than that of GEM companies.

For the two predictions on the earnings quality of NEEQ companies, which one dominates is an empirical issue. During the sample period, the vast majority of GEM companies chose to refinance through private offering, which only requires two consecutive years of profitability¹¹ and is relatively easy to achieve. It is anticipated that financing regulation will not exert much impact on GEM companies, and the lack of high-quality information demand will reduce the earnings quality of NEEQ companies. Based on this, Hypothesis 1 (H1) is proposed.

H1: NEEQ companies have a higher level of upward earnings management than GEM companies.

2.2. Development of Hypothesis 2

Ball and Shivakumar (2005) argue that accounting conservatism is an important mechanism to improve corporate governance and decision-making efficiency. Their research finds that the accounting conservatism of UK unlisted companies is weaker than that of listed companies due to the lack of demand for high-quality accounting information. This finding may not explain the differences between the two types of companies in China. First, Ball, Kathari, and Robin (2000) find that accounting information of listed companies is less conservative due to weak investor protection under the code law system. Ball, Robin, and Wu (2003) further find that listed companies' accounting information may not be conservative due to weak enforcement of law even in the common law countries. The investor protection is still relatively weak in China's securities market, and listed companies may not be conservative.

Second, deficit GEM companies have a strong incentive to manage earnings in order to avoid special treatment (ST)¹² or delisting regulations. In particular, companies with poor performance may adopt a 'big bath' for profit manipulation, thereby improving accounting performance in other years. Li and Li (2005) and Qiu and Qu (2009) found that the recognition of big losses exhibited by Chinese listed companies may be caused by the 'big bath' and supports the downward earnings management hypothesis. The delisting system of NEEQ is different from that of GEM. Deficit

⁹Where the accumulated number of shareholders of a NEEQ company does not exceed 200 after issuance of stock to specific parties or the accumulated amount of funds raised by a public company from issuance of stock within 12 months is less than 20% of the net assets of the company, the company shall be exempt from application to the China Securities Regulatory Commission (CSRC) for confirmation.

¹⁰According to the Straight Flush Database, there are very few financial analysts following NEEQ companies.

¹¹When a listed company issues shares privately to raise funds for acquisition and merger, it is not restricted by the profit indicator.

¹²According to the regulations of the Shenzhen Stock Exchange and the Shanghai Stock Exchange, ST applies when a listed company suffers losses for two consecutive years or other abnormal conditions that make investors unable to judge the future of the company. Since the above scenarios may endanger the interests of investors, these shares will be marked ST ahead and traded in the risk-alert board. When the losses of the company return to profit or the abnormal conditions return to normal operations, the ST will be removed.

companies do not face the risk of being delisted so they do not have the motivation to manipulate earnings downwards. Based on the differences in the regulatory system, it is speculated that GEM companies have stronger incentives to manage earnings downward than NEEQ companies. Based on the above analysis, we propose Hypothesis 2 (H2).

H2: GEM companies have stronger incentives to manage earnings downward through a 'big bath' than NEEQ companies.

3. Research design

3.1. Regression model to test earnings management

The discretionary accrual (*DA*) is used as an indicator to measure the degree of earnings management of the company. The regression model (1) is used to examine the difference in earnings management between the NEEQ and the GEM companies.

$$\begin{aligned}
 DA_{it} = & \beta_0 + \beta_1 NEEQ_{it} + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Shrcr1_{it} + \beta_5 InsHold_{it} \\
 & + \beta_6 State_{it} + \beta_7 BigAuditor_{it} + \beta_8 SEO_{it} + \beta_9 Dvd_{it} + \beta_{10} EqtComp_{it} \\
 & + \beta_{11} MtrIMA_{it} + \beta_{12} ROA_{it} + \beta_{13} Loss_{it} + \beta_{14} LossAvoid_{it} + \beta_{15} Growth_{it} \\
 & + \beta_{16} CFO_{it} + \sum \beta_j YearDummies + \sum \beta_k IndustryDummies
 \end{aligned} \quad (1)$$

NEEQ is our main explanatory variable. The NEEQ companies are represented as 1 and the GEM companies are represented as 0. Coefficient β_1 is predicted as significantly positive.

To control the impact of company characteristics on earnings management, a series of control variables is included in the model. Three corporate governance variables are controlled, which are the shareholding ratio of large shareholders (*Shrcr 1*), the shareholding ratio of institutional investors (*InsHold*) and state-owned enterprises (*State*) (Chen, Firth, Gao, & Rui, 2006; Chen, Firth, & Xu, 2009; Ding, Zhang, & Zhang, 2007; Liu & Lu, 2007; Lo, Wong, & Firth, 2010). The auditor size (*Big Auditor*) variable is added to control the quality of the company's audit. Based on prior literature (Bergstresser & Philippon, 2006; Chen & Yuan, 2004; Liu, Su, & Li, 2013), several variables are included to control various incentives for earnings management and these include refinancing (*SEO*), cash dividends (*Dvd*), equity incentive (*EqtComp*), loss-avoidance motivation (*LossAvoid*) and asset restructuring (*MtrIMA*). Finally, several financial indicators such as company size (*Size*), financial leverage (*Leverage*), return on total assets (*ROA*), whether loss or not (*Loss*), growth (*Growth*) and net cash flow from operation (*CFO*) are added to control their effects on discretionary accruals (Dechow, Kothari, & Watts, 1998; Kothari, Leone, & Wasley, 2005; Lu, 1999; Wang, Wu, & Bai, 2005; Watts & Zimmerman, 1986). All variables mentioned in this paper are defined in Table 1.

3.2. Regression model to test accounting conservatism

This study uses two models to test the accounting conservatism of NEEQ and GEM companies. The first model is the persistence of earnings changes model, which was developed by Basu (1997).

Table 1. Variable definitions.

Variable	Description
<i>DA</i>	Discretion accrual calculated according to the modified Jones model (Dechow et al., 1995).
<i>DA_J</i>	Discretion accrual calculated according to Jones model (Jones, 1991).
<i>NEEQ</i>	Dummy variable. It is 1 if the company is a NEEQ companies, otherwise it is 0.
<i>Size</i>	The logarithm of the company's total assets.
<i>Leverage</i>	Total liabilities divided by total assets.
<i>Shrcr1</i>	The shareholding ratio of the largest shareholder.
<i>InsHold</i>	The shareholding ratio of institutional investors.
<i>State</i>	Dummy variable. It is 1 for state-owned enterprises and 0 for non-state-owned enterprises.
<i>BigAuditor</i>	Dummy variable. It is 1 if the auditor is among the top ten auditors, otherwise it is 0.
<i>SEO</i>	Dummy variable. It is 1 if the company implements refinancing, otherwise it is 0. Refinancing includes allotment and issuance.
<i>Dvd</i>	Dummy variable. It is 1 if the company pays dividends in the current year, otherwise it is 0.
<i>EqComp</i>	Dummy variable. It is 1 if the company's annual executive compensation includes equity incentives, otherwise it is 0.
<i>MtrlMA</i>	Dummy variable. It is 1 if the company is in the three years after the completion of the major asset restructuring (including the year of completion), otherwise it is 0.
<i>ROA</i>	Return on total assets
<i>Loss</i>	Dummy variable. It is 1 if there is current loss, otherwise it is 0.
<i>LossAvoid</i>	Dummy variable. It is 1 if the ROE in the current period is in (0, 2%), otherwise it is 0.
<i>Growth</i>	(Operating income – previous operating income)/previous operating income
<i>CFO</i>	Net operating cash flow
<i>CXC</i>	Dummy variable. It is 1 if the NEEQ companies belongs to the innovation layer, otherwise it is 0.
<i>IPO</i>	Dummy variable. It is 1 if the company is an IPO applicant, otherwise it is 0.
<i>IndDrt</i>	Dummy variable. It is 1 if the NEEQ companies has independent director, otherwise it is 0.
<i>MktMck</i>	Dummy variable. It is 1 if the market making method is applied, otherwise it is 0.
<i>MktMckerNo</i>	The number of market makers. If the transfer method is non-market transfer, it is 0.
<i>PEVC</i>	Dummy variable. It is 1 if the NEEQ companies has PE/VC, otherwise it is 0.
<i>QckRatio</i>	Quick ratio. (Current assets – inventory)/current liabilities.
<i>AsstTurn</i>	Total asset turnover rate. Total operating income/(total assets at the beginning of the period + total assets at the end of the period)*2.
ΔNI_t	The change in profit from $t-1$ to t divided by total assets at the beginning of year t .
$D\Delta NI_{t-1}$	Dummy variable. It is 1 if ΔNI_{t-1} is a negative value, otherwise it is 0.
ACC_t	Annual deducted net profit in year t divided by total assets at the beginning of year t .
CFO_t	Annual net cash flow from operation in year t divided by total assets at the beginning of year t .
$DCFO_t$	Dummy variable. It is 1 if the CFO_t is negative value, otherwise it is 0.
CFO_{t+1}	Net cash flow from operation in year $t+1$ divided by total assets at the end of year t .
NI_{t-1}	Net profit in year $t-1$ divided by the total assets at the end of the year $t-2$.
ΔNI_t	The net profit change for the $t-1$ to t year is divided by the total assets at the end of the $t-1$ year.
$I_{\Delta NI < 0}$	A dummy variable representing a negative profit change. It is 1 if $\Delta NI_t < 0$, otherwise it is 0.
$I_{\Delta NI \geq 0}$	A dummy variable representing a positive profit change. It is 1 if $\Delta NI_t \geq 0$, otherwise it is 0.

$$\begin{aligned} \Delta NI_t = & \alpha_0 + \alpha_1 D\Delta NI_{t-1} + \alpha_2 \Delta NI_{t-1} + \alpha_3 D\Delta NI_{t-1} \times \Delta NI_{t-1} + \alpha_4 \times NEEQ \\ & + \alpha_5 \times NEEQ \times D\Delta NI_{t-1} + \alpha_6 \times NEEQ \times \Delta NI_{t-1} \\ & + \alpha_7 \times NEEQ \times D\Delta NI_{t-1} \times \Delta NI_{t-1} + \varepsilon_t \end{aligned} \quad (2)$$

In model (2), $D\Delta NI_{t-1}$ is a dummy variable representing whether the earnings change is negative. The coefficient of positive earnings change for the GEM companies is α_2 , and the coefficient of negative earnings change for the GEM companies is $\alpha_2 + \alpha_3$. Since negative earnings change is easier to reverse than positive earnings change, it is predicted that $\alpha_3 < 0$. The coefficient of the positive earnings change for NEEQ companies is $\alpha_2 + \alpha_6$, and the coefficient of the negative earnings change for NEEQ companies is $\alpha_2 + \alpha_3 + \alpha_6 + \alpha_7$. If the conservatism of the NEEQ companies is lower than that of the GEM companies, then $\alpha_7 > 0$. α_7 is the variable of our main concern.

The second model is accrual to the cash flow model, developed by Ball and Shivakumar (2005).

$$\begin{aligned}
ACC_t = & \beta_0 + \beta_1 \times DCFO_t + \beta_2 \times CFO_t + \beta_3 \times DCFO_t \times CFO_t \\
& + \beta_4 \times NEEQ + \beta_5 \times NEEQ \times DCFO_t + \beta_6 \times NEEQ \times CFO_t \\
& + \beta_7 \times NEEQ \times DCFO_t \times CFO_t + v_t
\end{aligned} \quad (3)$$

In model (3), $DCFO_t$ is a dummy variable that represents whether the cash flow from the operation is negative. When the cash flow of GEM companies is positive, It is predicted that $\beta_2 < 0$. When the cash flow is negative, the negative correlation between accruals and cash flow may be reduced. It is predicted that $\beta_3 > 0$. When the NEEQ companies have positive cash flow, coefficients of accruals and cash flow from operation is $\beta_2 + \beta_6$. When the NEEQ companies have negative cash flow, the coefficient of cash flow is $\beta_2 + \beta_3 + \beta_6 + \beta_7$. It is assumed that the accounting conservatism of the NEEQ companies is weaker than that of GEM companies, so it is predicted that $\beta_7 < 0$.

We use Ball and Shivakumar's (2005) model to test the GEM's downward earnings management hypothesis through a 'big bath'. The basic idea is that timely recognition of losses (conservatism) contains information to predict changes of future cash flows, but earnings management does not contain information to predict future cash flows.

$$\begin{aligned}
CFO_{t+1} = & a_0 + a_1 \times NI_{t-1} + a_2 \times I_{\Delta NI < 0} + a_3 \times I_{\Delta NI \geq 0} \times \Delta NI_t + a_4 \times I_{\Delta NI < 0} \times \Delta NI_t \\
& + a_5 \times NEEQ + a_6 \times NEEQ \times NI_{t-1} + a_7 \times NEEQ \times I_{\Delta NI < 0} \\
& + a_8 \times NEEQ \times I_{\Delta NI \geq 0} \times \Delta NI_t + a_9 \times NEEQ \times I_{\Delta NI < 0} \times \Delta NI_t + \varepsilon_{t+1}
\end{aligned} \quad (4)$$

The variables in model (4) are defined in Table 1. Dummy variables $I_{\Delta NI \geq 0}$ and $I_{\Delta NI < 0}$ are added to represent positive and negative unexpected earnings of the model year t . Meanwhile, $I_{\Delta NI \geq 0}$ and $I_{\Delta NI < 0}$ are multiplied with ΔNI_t , the unexpected earnings. a_3 and a_4 represent the information content of the positive and negative earnings changes of GEM companies (to predict future cash flows) and their signs should be positive. If the negative earnings change on the GEM firms is due to earnings management, then a_4 is not statistically significant. If the information content of the changes in the earnings of the NEEQ companies is less than that of GEM companies, then the incremental coefficients a_8 and a_9 should be negative.

4. Data and descriptive statistics

4.1. Sample selection and data source

The study uses a sample of companies in NEEQ and GEM from the year 2014 to the year 2016. It includes 17,506 observations after excluding 180 observations of delisted companies in the GEM and 236 observations of financial industry companies. In addition, 4,907 observations with either missing DA or missing data for control variables are excluded when testing model (1).

The data of NEEQ companies are collected from the Straight Flush Database (SFD) and the data of GEM companies are collected from the Chinese Stock Market Research (CSMAR) database. Other data, including the institutional investors' shareholding, equity incentives, major asset restructuring and Private Equity / Venture Capital (PE/VC) investment, are collected from the Wind database.

4.2. ROE histograms of NEEQ and GEM companies

As is shown in Figures 1 and 2, histograms of the ROE of the NEEQ and the GEM are used to compare the distribution differences between the two types of companies. Comparing Figure 1 with Figure 2, conclusions can be drawn as follows.

- (1) The ROE distribution of NEEQ companies is closer to the normal distribution. There are very few loss companies in the GEM, but there are a large number of loss companies in the NEEQ. This is mainly because GEM companies have strong incentives to avoid losses in case of the risk of delisting once they have been losing money for two consecutive years.

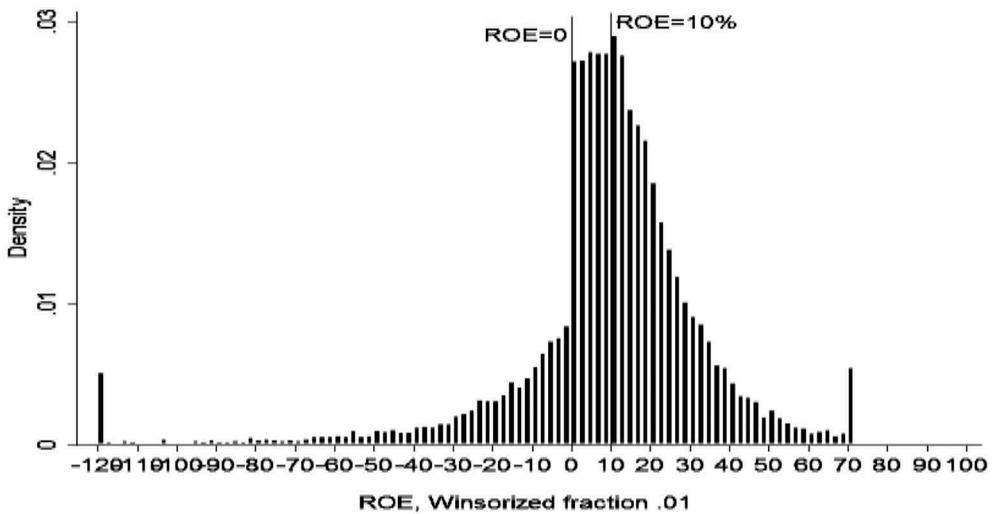


Figure 1. The histogram of the ROE distribution of NEEQ companies.

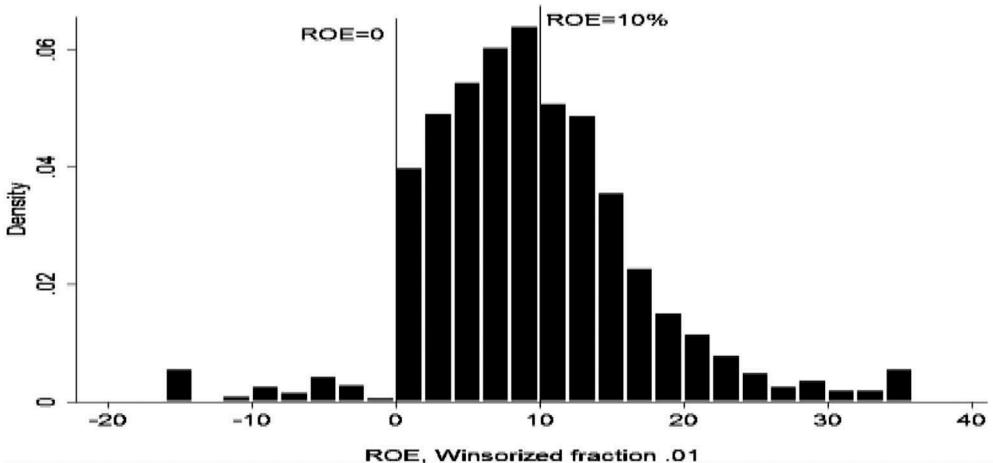


Figure 2. The histogram of the ROE distribution of GEM companies.

- (2) The ROE distribution of GEM companies is different from the study of Chen and Wang (2004). In their study, due to the requirements of accounting performance indicators regarding public offerings and right offerings, companies at 6% and 10% level are the most concentrated. ROE distribution of GEM companies does not have the similar pattern because most GEM companies have adopted a private offering to refinance, while private offering only requires two consecutive years of profitability, which is relatively easy to achieve. In this way, the motivation to manipulate accounting profits to meet requirement has greatly declined.
- (3) NEEQ companies' ROE distribution is more dispersed than that of GEM companies. ROE of NEEQ companies range from -130% to 70%, while ROE is concentrated between -20% and 40% for GEM companies.
- (4) There is a huge jump when ROE equals 0 for both markets. The number of companies with ROE between 0 to 2% is much more than those with ROE between -2% to 0%. Companies will turn 'small losses' into 'earnings' through earnings management. The cases of ROEs jumping over 0 are more prominent among the GEM companies due to the existence of special treatment and delisting regulations.

4.3. Comparison of financial characteristics between NEEQ and GEM companies

Panels A and B of Table 2 describe financial data of NEEQ and GEM companies respectively.

The biggest difference between the NEEQ and the GEM companies is the size of the company. The average total asset of NEEQ companies is 186 million yuan, while that of the GEM companies is 2.267 billion yuan, which is more than 10 times that of NEEQ companies. The average leverage of NEEQ companies is 40.3%, which is higher than the 29.7% of GEM. This result is not surprising because the ability to raise equity financing is very poor for NEEQ companies.

For operating income, the average value of NEEQ companies is 138 million yuan while that of GEM companies is 985 million yuan, which is more than seven times that of NEEQ

Table 2. Comparison of financial characteristics between NEEQ and GEM companies.

	TA (million)	Leverage (%)	Revenue (million)	OI/TA _{t-1} (%)	NOI/TA _{t-1} (%)	NI/TA _{t-1} (%)	NOCF/TA _{t-1} (%)	Accruals/ TA _{t-1} (%)
Panel A: NEEQ companies (N=15,961)								
Mean	186	40.30	138	5.79	3.26	7.37	0.73	6.42
Std deviation	276	20.70	221	20.50	4.57	18.60	23.90	23.50
Skewness	3.62	0.20	3.98	-0.18	2.50	-0.18	-0.87	1.41
Median	94.70	39.60	68.70	5.11	1.66	6.35	2.76	2.60
Panel B: GEM companies (N=1518)								
Mean	2267	29.70	985	6.91	1.13	6.88	4.54	2.28
Std deviation	2365	16.10	1108	7.03	1.20	6.26	9.03	8.23
Skewness	3.22	0.52	3.17	0.69	2.01	0.66	-0.30	0.84
Median	1506	27.40	628	6.24	0.76	6.25	4.73	1.12
t statistic	103.99***	-19.41***	81.02***	1.96**	-16.72***	-0.93	5.71***	-6.31**
Chi ²	1700***	304.72***	1700***	18.30***	358.36***	0.48	56.12***	35.11***

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

TA = Total assets, FA = Fixed assets, OR = Operating revenue, OI = Operating income, NOI = Non-recurring income, NOCF = net operating cash flow,

companies. NEEQ's non-recurring profit and loss to average beginning balance of total assets is 3.26%, which is higher than the 1.13% of the GEM's. The operating income of the NEEQ companies is weaker, and the non-recurring profit and loss is higher, indicating that the accounting persistency is weaker for the NEEQ companies than GEM companies. NEEQ companies' profitability indicators are negatively skewed, indicating a large number of loss companies.

NEEQ companies' NOCF (deflated by total assets) is much lower than that of GEM companies, with an average of 0.73% and 4.54% respectively. On the contrary, the NEEQ companies have high accruals, with an average of 6.42%, which is much higher than the GEM's (2.28%). This shows that the earnings quality of NEEQ companies is relatively low.

5. Empirical results

5.1. Test of Hypothesis 1

5.1.1. Descriptive statistics of variables

Table 3 reports the descriptive statistics of all variables used in the empirical analysis. The mean and median of the sample of NEEQ companies and GEM companies are calculated. All continuous variables are winsorised at the 1% level except *Size* because it has already taken the form of natural log. Panel A provides the variables description of the earnings management regression model. Panels B and C provide the variables description of the accounting conservatism model.

In Panel A, the average of the NEEQ companies' *DA* is 0.047, which is greater than the 0.013 of the GEM companies. The difference between the two markets is statistically significant. The characteristics for corporate governance of companies on both markets are quite different. The shareholding ratio of major shareholders on the NEEQ is 49.2% and is significantly higher than that on the GEM (30.7%). The shareholding ratio of institutional investors in NEEQ companies is only 0.8%, which is far lower than that of GEM companies (10.9%), indicating that institutional investors do not have strong supervision over NEEQ companies. As for the nature of the company, the proportion of state-owned enterprises in both companies is not high (only about 3%) and is statistically insignificant. GEM companies are more willing to hire large audit firms. Among the variables controlling the earnings management incentives of companies, the proportion of private placement of NEEQ companies is significantly higher than that of GEM companies, which may be because private placement is the only way of equity financing for NEEQ companies. Eighty-eight percent of GEM companies paid dividends, which is much higher than that of NEEQ companies. The proportion of equity incentive in NEEQ companies (only 0.8%) is significantly lower than that of GEM companies. Compared with GEM companies, NEEQ companies are less inclined to carry out major asset restructuring. The ROA level of NEEQ companies is higher than that of GEM, but it is not statistically significant. The proportion of loss companies on the NEEQ is 19.6%, which is significantly higher than that on the GEM market. The growth potential and operating cash flow of GEM companies are higher than that of NEEQ companies.

In Panel B, the change of net profit of NEEQ companies is almost the same as that of GEM companies, and is statistically insignificant. However, the change of net profit in the

Table 3. Descriptive statistics of variables for regression models.

	NEEQ Market		GEM		t statistic	Chi ²
	Mean	Median	Mean	Median		
Panel A: variables for discretionary accrual model						
<i>DA</i>	0.05	0.02	0.01	0.01	-5.18***	23.73***
<i>Size</i>	18.55	18.55	21.33	21.27	83.17***	1400***
<i>Leverage</i>	0.39	0.38	0.30	0.28	-14.74***	178.99***
<i>Shrcr1</i>	0.49	0.48	0.31	0.29	-34.68***	784.71***
<i>InsHold</i>	0.01	0	0.11	0.09	98.30***	3100***
<i>State</i>	0.03	0	0.04	0	1.10	1.22
<i>BigAuditor</i>	0.36	0	0.54	1	12.89***	164.01***
<i>SEO</i>	0.37	0	0.14	0	-16.62***	270.37***
<i>Dvd</i>	0.27	0	0.88	1	47.29***	1900***
<i>EqComp</i>	0.01	0	0.46	0	84.46***	4600***
<i>MtrlMA</i>	0.00	0	0.25	0	55.90***	2500***
<i>ROA</i>	0.07	0.06	0.07	0.06	-1.00	0.83
<i>Loss</i>	0.20	0	0.05	0	-13.02***	167.19***
<i>LossAvoid</i>	0.06	0	0.09	0	5.18***	26.80***
<i>Growth</i>	0.29	0.13	0.33	0.21	1.52*	67.00***
<i>CFO</i>	0.01	0.02	0.04	0.04	6.72***	49.89***
	N=11,324		N=1275			
Panel B: variables for persistence of earnings changes model						
ΔNI_t	0.01	0.01	0.02	0.01	0.27	0.30
ΔNI_{t-1}	0.05	0.02	0.01	0.01	-7.28***	162.93***
$D\Delta NI_{t-1}$	0.33	0	0.37	0	2.95***	8.73***
	N=15,896		N=1150			
Panel C: variables for accrual to cash flow model						
ACC_t	0.03	0.00	0.01	0.00	-2.88***	0.14
CFO_t	0.01	0.03	0.05	0.05	5.66***	55.43***
$DCFO_t$	0.42	0	0.25	0	-11.88***	140.04***
	N=15,896		N=1289			

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

lag period is significantly higher than that of GEM. The proportion of companies with decrease in earnings in the last period of the NEEQ market is 32.6%, and that in the GEM is 36.9%, which is significantly higher. In Panel C, the accrual of NEEQ companies is significantly higher than that of GEM, but the net cash flow from operation is significantly lower than that of GEM companies.

5.2. Regression model analysis

Table 4 shows the results of model 1. Column (1) and column (2) are the results of full sample regression, where the dependent variable *DA* in column (1) and *DA_J* in column (2) are calculated by a modified Jones model and a Jones model respectively. Columns (3) and (4) are the result of paired sample regression.

Column (1) show that the coefficient of *NEEQ* is 0.0635, which is significant at the 1% level, indicating that NEEQ companies are more likely to manage earnings upward than GEM companies after controlling for the influence of other variables. The result of column (2) is similar to that in Column (1). Both results support Hypothesis 1.

To further control the effect of firms' characteristics on earnings quality, the sub-samples are paired according to the industry, company size and ROE. Through the repeatable matching method, companies in the same industry whose size difference does not exceed $\pm 30\%$ with a close ROE are selected as matching samples. Among the

Table 4. Multivariate evidence on the different discretionary accrual (earnings quality) between NEEQ and GEM companies.

Variables	(1) full sample (DA)	(2) full sample (DA_J)	(3) Matched Sample (DA)	(4) Matched Sample (DA_J)
<i>NEEQ</i>	0.064*** (11.360)	0.066*** (12.330)	0.022*** (2.611)	0.026*** (3.158)
<i>Size</i>	0.026*** (18.170)	0.027*** (19.530)	0.003 (0.418)	0.006 (0.754)
<i>Leverage</i>	-0.043*** (-5.102)	-0.056*** (-6.960)	-0.073** (-2.492)	-0.083*** (-3.067)
<i>Shrcr1</i>	0.007 (1.011)	-0.009 (1.450)	-0.026 (-0.843)	-0.022 (-0.776)
<i>InsHold</i>	-0.038 (-1.343)	-0.029 (-1.156)	0.035 (0.979)	0.044 (1.415)
<i>State</i>	0.002 (0.305)	0.001 (0.146)	0.000 (0.034)	-0.001 (-0.104)
<i>BigAuditor</i>	-0.007*** (-3.067)	-0.008*** (-3.676)	-0.004 (-0.977)	-0.005 (-1.195)
<i>SEO</i>	-0.001 (-0.264)	-0.003 (-1.211)	-0.011 (-1.286)	-0.011 (-1.317)
<i>Dvd</i>	0.002 (0.814)	0.002 (0.899)	0.003 (0.445)	0.005 (0.887)
<i>EqComp</i>	-0.010** (-2.040)	-0.010** (-2.226)	-0.007 (-0.527)	-0.007 (-0.568)
<i>MtrlMA</i>	-0.008 (-1.219)	-0.010* (-1.816)	-0.005 (-0.694)	-0.005 (-0.734)
<i>ROA</i>	0.871*** (40.770)	0.791*** (38.980)	0.431*** (3.003)	0.358*** (2.829)
<i>Loss</i>	-0.026*** (-5.134)	-0.028*** (-5.890)	-0.025 (-1.229)	-0.029* (-1.805)
<i>LossAvoid</i>	-0.002 (-0.664)	-0.002 (-0.424)	-0.044 (-1.480)	-0.041 (-1.426)
<i>Growth</i>	-0.032*** (-7.963)	-0.042*** (-10.910)	-0.015* (-1.670)	-0.022*** (-2.755)
<i>CFO</i>	-1.303*** (-90.360)	-1.229*** (-89.300)	-1.069*** (-13.510)	-1.014*** (-13.150)
YEAR	CONTROL	CONTROL	CONTROL	CONTROL
INDUSTRY	CONTROL	CONTROL	CONTROL	CONTROL
Constant	-0.504*** (-16.240)	-0.527*** (-17.400)	0.018 (0.109)	-0.040 (-0.242)
Observations	12,599	12,599	2108	2108
R-squared	0.687	0.666	0.521	0.523

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

1275 samples of GEM companies, 1053 are matched, and the NEEQ had 1055 samples.¹³ The results of matched sub-sample regression show that the coefficients of NEEQ in two columns are 0.0218 and 0.0259 respectively, both significant at the 1% level, which indicates that the results are not affected by the characteristics of NEEQ and GEM companies.¹⁴

For control variables, *ROA*, *Loss* and *CFO*, and *BigAuditor* all have significant influence on *DA* and these results are consistent with prior studies. Variables on corporate governance and earnings management incentives are not significant. The coefficient

¹³There are two more observations from the NEEQ market than from the GEM, because there are two GEM listed companies that each have two matching companies in the sample from the NEEQ market with identical ROE and company size difference less than 30%.

¹⁴If a non-repeatable method is adopted for matching, the results are similar.

of *Size* is significantly positive and the coefficient of *Leverage* is significantly negative, which are inconsistent with the literature. The possible reason is that both NEEQ and GEM companies cannot be regarded as particularly large firms, and the hypothesis that large companies manage earnings downward due to higher political cost is not applicable here. Monitoring of a creditor may limit the company's upward earnings management and leads to a negative relation between *Leverage* and *DA*.

5.2.1. *The impact of institutional differences in the NEEQ market on profit quality*

It can be seen from Table 4 that NEEQ companies have more incentives for upward earnings management than GEM companies. As there are some specific institutions in the NEEQ market, this section further explores the influence of the unique institutions on the accounting quality of NEEQ companies. The factors that may affect the earnings quality of NEEQ companies are as follows.

- (1) The impact of the tiered system. Since 2016, the NEEQ has piloted the tiered system, which divides listed companies into an innovation layer and a base layer. The objective of the tiered system is to optimally allocate regulatory resources, reduce the cost of information collection for investors and attract high-quality enterprises. The tiered system has a major impact on the quality of earnings in two channels. First, the tiered system can filter out the high-quality companies. Innovation-layer companies not only need to meet the requirements of earnings, revenue, and transaction size, but also need to have a sound corporate governance, standard audit opinions and no disclosures of illegality. Second, companies in the innovation layer receive more attention from the regulatory authorities and investors. The market demand prompts such companies to provide higher quality financial reports, thus having a positive impact on their accounting quality. The earnings quality of the innovation-layer companies is expected to be higher than that of the base layer companies.
- (2) The impact of the IPO application by NEEQ companies. The profits of IPO applicants and other companies may differ significantly. On the one hand, a large amount of research literature indicates that the company has a strong incentive to manage earnings during the IPO process (Aharony, Lee, & Wong, 2000; Cai, Li, & He, 2013; Lin & Wei, 2000; Teoh, Welch, & Wong, 1998; Zhang & Huang, 2003). The NEEQ companies should also have a strong incentive for earnings management if they want to apply for listing, thus reducing the earnings quality of the IPO applicants. On the other hand, IPO applicants are subject to review and screening by the regulatory authorities, underwriters, the media and potential investors, which may also improve the earnings quality of such companies (Ball & Shivakumar, 2008). Since there are two competing predictions, empirical tests are needed to distinguish two predictions.
- (3) The impact of the independent director. According to the Guideline No. 3 for the Supervision of Unlisted Public Companies, the regulatory authorities do not mandate that the NEEQ companies should establish an independent director system. Unlike GEM companies, NEEQ companies can voluntarily choose whether to establish an independent director system or not. NEEQ companies, regulators and investors are deeply concerned about whether independent directors can

serve as an important mechanism of corporate governance for NEEQ companies and whether independent directors can influence the quality of financial reporting. The literature shows that the independent director with the background of an accounting professional can improve the earnings quality (Huang, Lv, & Ding, 2016; Wang, 2007). The establishment of independent directors of NEEQ companies represents a higher level of corporate governance. Therefore, it is predicted that the earnings quality of companies with independent directors will be higher.

- (4) The impact of the market maker system. The shares of the NEEQ market can be transferred in the form of agreement and market making. Unlike trading by agreement, market makers can offer two-way quotations to investors and improve the liquidity of the NEEQ market. The increase in liquidity may promote the demand for high-quality earnings. We predict that the larger the number of market makers, the higher the earnings quality of the company.
- (5) The impact of PE/VC investment. Most of the NEEQ companies are in the initial stage of financing and the investment by PE/VC is an important source for these companies. PE/VC investment affects the earnings quality of NEEQ companies in two ways. On the one hand, PE/VC investors and NEEQ companies have a valuation adjustment mechanism which is based on NEEQ companies' profit. These companies have the incentive of earnings management to satisfy the performance requirement set by the valuation adjustment mechanism.¹⁵ On the other hand, Cai (2015) finds that PE/VC has no incentive to assist the company in earnings management, which is different from IPO listed companies. If the company provides low-quality financial statements, they will be monitored by PE/VC and the accounting quality can be improved. Since there are competing predictions, empirical tests will find which prediction dominates the result.

The research model is as follows:

$$DA_{it} = \beta_0 + \beta_1 CXC_{it} + \beta_2 IPO_{it} + \beta_3 IndDrt_{it} + \beta_4 MktMckNo_{it} + \beta_5 PEVC_{it} + \sum \beta_i Controls_{it} + \sum \beta_j YearDummies + \sum \beta_k IndustryDummies \quad (5)$$

where

CXC is a dummy variable and it equals 1 if the NEEQ companies is an innovation layer company, otherwise it is 0;

IPO is a dummy variable and it equals 1 if the NEEQ companies has applied for an IPO, otherwise it is 0;

IndDrt is a dummy variable and it equals 1 if the NEEQ companies has established an independent director system, otherwise it is 0;

MktMckNo is the number of market makers of the NEEQ companies;

¹⁵When GEM companies purchase unlisted companies, some of the purchases have a valuation adjustment mechanism. However, the influence of a counterparty on listed companies and NEEQ companies is different. Earnings management for the valuation adjustment mechanism influences the financial reports. The acquired company accounts for a small proportion of the listed company. The financial reports of GEM companies are little affected by the earnings management problem caused by the valuation adjustment mechanism. Moreover, the listed company itself is counterparty to the valuation adjustment mechanism and will supervise the earnings management of the acquired party.

PEVC is a dummy variable and it equals 1 if the NEEQ companies has a PE/VC investment, otherwise it is 0.

The control variables are the same as model (1).

Panel A of Table 5 reports the descriptive statistics of variables. Due to further missing variables, the regression sample is reduced to 11,101 observations. During the sample period, 18.6% of NEEQ companies belong to the innovation layer and 9.3% of NEEQ companies have applied for IPO. Only 10.39% of the NEEQ companies have established the independent director system. The corporate governance of most NEEQ companies has failed to catch up with GEM companies. In total, 23.3% of the companies choose market-making transfer and 75.27% choose agreement transfer, indicating that the NEEQ market is still dominated by agreement transfer with low liquidity. In addition, the average (median) number of market makers in the selected market-making transfer sample is 4.67 (4), exceeding the minimum number (two) stipulated by the regulatory authorities. In addition, 10.3% of the samples obtain PE/VC investment, and the remaining 90% companies do not have such institutional investors.

Panel B of table 5 reports the results of multivariate analysis. The coefficient of the variable *CXC* is -0.0117 (t-value = -2.692), which is significant at the 1% level, indicating that the *DA* level of innovation-layer companies is significantly lower than that of base-layer companies, which is consistent with the prediction.¹⁶ The coefficient of *IPO* is -0.0240 and the t-value is -5.316 , indicating that the *DA* of companies applying for IPOs is significantly lower than that of other firms. The results are consistent with the findings of Ball and Shivakumar (2008). The coefficient of *IndDrt* is -0.0080 (t-value = -2.092), indicating that the *DA* of companies with independent director are significantly lower than that of other firms. The coefficient of *MktMckerNo* is -0.0017 (t-value = -2.833), indicating that the more market makers, the lower will be the discretionary accruals. The coefficient of the variable *PEVC* is -0.0149 , and the t-value is -3.331 , which is significant at the 1% level. The result indicates that PE/VC improves the earnings quality of NEEQ companies.

5.3. Test of Hypothesis 2

Table 6 shows the results of the conservatism test models. Panel A is the regression result of model (2) and Panel B is the result of model (3). According to Ball and Shivakumar (2005), we add $SIZE_t$ and industry dummy variables to control the influence of size and industry. $SIZE_t$ is the ranking of total assets of the company at the end of year t , and the value is between 0 and 1.

Panel A in Table 6 shows that $\alpha_3 = -0.459$, which is statistically significant, indicating the existence of accounting conservatism of GEM companies. The coefficient $\alpha_7 = 0.511$, which indicates that the negative earnings change of NEEQ companies is more difficult to reverse than that of GEM companies, and the accounting conservatism level is relatively poor.

¹⁶The higher earnings quality of innovation-layer companies may also be caused by the characteristics of the company, which leads to endogeneity problems. The regression results after matching the innovation layer with the base layer show that the *DA* of innovation-layer companies is significantly lower than that of the base layer.

Table 5. The effects of unique NEEQ Institutions on earnings quality.

Panel A: descriptive statistics		
Variables	Mean	Median
<i>CXC</i>	0.186	0
<i>IPO</i>	0.093	0
<i>IndDrt</i>	0.102	0
<i>MktMckerNo</i>	1.043	0
<i>PEVC</i>	0.103	0
N=11,101		
Panel B: multiple regression		
Variables	(1) DA	(1) DA_J
<i>CXC</i>	-0.012*** (-2.692)	-0.013*** (-2.933)
<i>IPO</i>	-0.024*** (-5.316)	-0.022*** (-5.127)
<i>IndDrt</i>	-0.008** (-2.092)	-0.007* (-1.901)
<i>MktMckerNo</i>	-0.002*** (-2.621)	-0.001** (-2.144)
<i>PEVC</i>	-0.015*** (-3.331)	-0.014*** (-3.069)
<i>Size</i>	0.033*** (17.670)	0.034*** (18.590)
<i>Leverage</i>	-0.053*** (-5.752)	-0.067*** (-7.466)
<i>Shrcr1</i>	0.002 (0.342)	0.006 (0.801)
<i>InsHold</i>	0.052 (0.691)	0.027 (0.377)
<i>State</i>	-0.001 (-0.202)	-0.001 (-0.110)
<i>BigAuditor</i>	-0.006** (-2.450)	-0.008*** (-3.112)
<i>SEO</i>	0.001 (0.178)	-0.002 (-0.590)
<i>Dvd</i>	0.005 (1.524)	0.005 (1.621)
<i>EqComp</i>	-0.041** (-2.483)	-0.039** (-2.425)
<i>MtrIMA</i>	0.014 (0.699)	0.012 (0.586)
<i>ROA</i>	0.871*** (39.020)	0.794*** (37.400)
<i>Loss</i>	-0.025*** (-4.789)	-0.028*** (-5.446)
<i>LossAvoid</i>	-0.006 (-1.303)	-0.005 (-1.239)
<i>Growth</i>	-0.032*** (-7.655)	-0.042*** (-10.290)
<i>CFO</i>	-1.307*** (-88.030)	-1.235*** (-86.960)
YEAR	CONTROL	CONTROL
INDUSTRY	CONTROL	CONTROL
Constant	-0.570*** (-16.020)	-0.5810*** (-16.760)
Observations	11,101	11,101
R-squared	0.692	0.670

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

Panel B in Table 6 shows that $\beta_3 > 0$, which indicates that in a year with negative cash flow, the negative correlation between accruals and cash flow becomes weaker, and it

Table 6. Results on accounting conservatism regression models.

Panel A: lag earnings change regression			Panel B: accruals to cash flow regression		
Variables	Expected sign	ΔNI_t	Variables	Expected sign	ACC_t
$D\Delta NI_{t-1}$ (α_1)	?	-0.016 (-1.260)	$DCFO_t$ (β_1)	?	-0.011 (-0.722)
ΔNI_{t-1} (α_2)	?	-0.232** (-2.419)	CFO_t (β_2)	-	-0.604*** (-7.011)
$D\Delta NI_{t-1} \times \Delta NI_{t-1}$ (α_3)	-	-0.459** (-2.089)	$DCFO_t \times CFO_t$ (β_3)	+	0.428*** (3.541)
$NEEQ$ (α_4)	?	0.012*** (3.081)	$NEEQ$ (β_4)	?	0.013** (2.043)
$NEEQ \times D\Delta NI_{t-1}$ (α_5)	?	0.022*** (2.593)	$NEEQ \times DCFO_t$ (β_5)	?	0.024*** (2.579)
$NEEQ \times \Delta NI_{t-1}$ (α_6)	?	0.153* (1.720)	$NEEQ \times CFO_t$ (β_6)	?	0.047 (0.682)
$NEEQ \times D\Delta NI_{t-1} \times \Delta NI_{t-1}$ (α_7)	+	0.511** (2.537)	$NEEQ \times DCFO_t \times CFO_t$ (β_7)	-	-0.320*** (-3.595)
$SIZE_t$?	0.040*** (6.004)	$SIZE$?	0.067*** (7.185)
$SIZE_t \times D\Delta NI_{t-1}$?	-0.010 (-0.820)	$SIZE \times DCFO_t$?	0.019 (1.229)
$SIZE_t \times \Delta NI_{t-1}$?	0.317*** (6.711)	$SIZE \times CFO_t$?	0.102 (1.461)
$SIZE_t \times D\Delta NI_{t-1} \times \Delta NI_{t-1}$?	-0.485*** (-3.480)	$SIZE \times DCFO_t \times CFO_t$?	-0.922*** (-8.597)
INDUSTRY	?	CONTROL	INDUSTRY	?	CONTROL
Constant	?	-0.029*** (-3.437)	Constant	?	-0.052*** (-4.152)
Observations		17,046	Observations		17,185
R-squared		0.027	R-squared		0.513

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

can be explained that accounting conservatism exists in GEM companies. β_7 is the main concern of the variables. The regression results show that $\beta_7 < 0$, indicating that the degree of asymmetry between accruals and cash flow of NEEQ companies is less than that of GEM companies.

GEM companies have recognised the bad news in a timelier manner. However, GEM companies may have recognised a loss to manage earnings downward through a 'big bath'. In the case of earnings management, these accruals contain no information about future cash flow. Table 7 reports the results of model (4). The coefficient of the earnings of the previous year to the cash flow of the next year is positive, $\alpha_1 = 0.396$, which is statistically significant, indicating that the accounting earnings of GEM contains the information of future cash flow. The incremental earnings coefficient $\alpha_6 = -0.234$ of the NEEQ market is statistically significant, reflecting that the information content of accounting earnings of NEEQ companies is lower than that of GEM. Although the coefficient of negative unexpected earnings α_4 of GEM companies is positive, it is not significant. The results support the finding that the timely loss recognition of GEM companies is caused by downward earnings management.¹⁷

¹⁷If the methods of Chen, Chen, Lobo, and Wang (2010) and Li and Li (2005) are adopted to test the hypothesis of downward earnings management, the results remain consistent.

Table 7. The prediction power of Lagged earnings change on future cash flow.

Variables	Expected Sign	CFO_{t+1}
NI_{t-1} (α_1)	+	0.396*** (5.287)
$I_{\Delta NI < 0}$ (α_2)	?	-0.003 (-0.277)
$I_{\Delta NI \geq 0} \times \Delta NI_t$ (α_3)	+	0.176 (1.509)
$I_{\Delta NI < 0} \times \Delta NI_t$ (α_4)	+	0.322 (1.385)
$NEEQ$ (α_5)	?	-0.005 (-0.525)
$NEEQ \times NI_{t-1}$ (α_6)	-	-0.234*** (-2.979)
$NEEQ \times I_{\Delta NI < 0}$ (α_7)	?	0.018 (1.638)
$NEEQ \times I_{\Delta NI \geq 0} \times \Delta NI_t$ (α_8)	-	-0.242** (-1.986)
$NEEQ \times I_{\Delta NI < 0} \times \Delta NI_t$ (α_9)	-	0.214 (0.903)
Constant	?	0.018** (2.160)
Observations		7023
R-squared		0.063

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

6. Robustness test

6.1. Further control of differences in company characteristics

In Table 4, a pairing method is used to control the influence of the difference in characteristics of NEEQ and GEM companies on the regression results. In order to further control the differences in company characteristics and solve possible endogenous problems, the Propensity Score Matching (PSM) method is used for testing.

In the PSM approach, the following variables are chosen: company size (*Size*), financial leverage (*Leverage*), the largest shareholder equity ratio (a measure of corporate governance variables, *Shrcr1*), return on total assets (*ROA*) and net cash flow from operations (*CFO*). To save space, the regression results of the PSM prediction model are not reported here. Through 1:1 pairing of NEEQ and GEM companies, 1243 pairs of observations are obtained.

Table 8 shows the results of PSM sample. The coefficients of *NEEQ* in two columns are all significantly positive at the 1% level. It shows that the DA of NEEQ companies is still significantly higher than that of GEM after controlling the corporate characteristics. The results further support our Hypothesis 1.

6.2. Controlling the selective bias between listed and unlisted companies

If the earnings quality is important to determine whether the company is qualified for going public, the binary variable *NEEQ* is endogenous. The coefficient of *NEEQ* observed in Table 4 may be biased due to a possible self-selection problem. So the Heckman two-stage method is used to solve this problem (Heckman, 1979).

Table 8. The effect of firms' characteristics on earnings quality: PSM analysis.

Variables	(1) DA	(2) DA_J
<i>NEEQ</i>	0.038*** (3.551)	0.038*** (3.640)
<i>Size</i>	-0.018 (-1.298)	-0.012 (-1.088)
<i>Leverage</i>	-0.090** (-2.399)	-0.106*** (-2.936)
<i>Shrcr1</i>	0.082* (1.801)	0.077** (2.072)
<i>InsHold</i>	0.060 (1.312)	0.061 (1.508)
<i>State</i>	0.028** (2.015)	0.024* (1.890)
<i>BigAuditor</i>	-0.011 (-1.491)	-0.007 (-1.021)
<i>SEO</i>	0.007 (0.593)	0.005 (0.489)
<i>Dvd</i>	-0.008 (-0.588)	-0.008 (-0.624)
<i>EqComp</i>	0.007 (0.920)	0.005 (0.654)
<i>MtrIMA</i>	0.006 (0.730)	0.003 (0.404)
<i>ROA</i>	0.652*** (4.429)	0.565*** (4.146)
<i>Loss</i>	-0.022 (-0.800)	-0.031 (-1.205)
<i>LossAvoid</i>	-0.014 (-1.182)	-0.011 (-1.026)
<i>Growth</i>	-0.023 (-1.581)	-0.026* (-1.869)
<i>CFO</i>	-1.495*** (-12.480)	-1.399*** (-12.520)
YEAR	CONTROL	CONTROL
INDUSTRY	CONTROL	CONTROL
Constant	0.432 (1.539)	0.315 (1.357)
Observations	2486	2486
R-squared	0.717	0.723

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

In the first stage, a Probit model is used to estimate *NEEQ*. Variables of company size (*Size*), financial leverage (*Leverage*), return on total assets (*ROA*), revenue growth (*Growth*), quick ratio (*QckRatio*) and total assets, the turnover rate (*AsstTurn*) are used as explanatory variables. Quick ratio and total asset turnover are exogenous variables, which respectively measure the company's liquidity and operating capacity. Column 1 of Table 9 shows the results of the first stage. Except for the growth rate of revenue, all other variables are significant.

In the second stage, the Inverse Mills Ratio (IMR) estimated by Probit regression is added to the model to adjust the possible selectivity bias of the original multiple regression. Column 2 of Table 9 shows the results of the second stage. The coefficient of IMR is -0.0445, which is significant at the 1% level and proves the existence of endogenous problems. However, after controlling for the endogenous problem, the coefficient of *NEEQ* remains significantly positive ($T=12.61$) and the results still support Hypothesis 1.

Table 9. The effect of self-selection problem on earnings quality: two-stage analysis.

Variables	(1) First Stage NEEQ	(2) Second Stage DA
<i>NEEQ</i>		0.107*** (12.610)
<i>Size</i>	-1.686*** (-37.210)	0.032*** (21.990)
<i>Leverage</i>	4.997*** (19.610)	-0.056*** (-8.133)
<i>Shrcr1</i>		0.008 (1.172)
<i>InsHold</i>		-0.041 (-1.213)
<i>State</i>		0.004 (0.618)
<i>BigAuditor</i>		-0.007*** (-2.924)
<i>SEO</i>		-0.001 (-0.355)
<i>Dvd</i>		0.003 (0.889)
<i>EqComp</i>		-0.005 (-0.862)
<i>MtrIMA</i>		0.002 (0.311)
<i>ROA</i>	2.060*** (6.154)	0.862*** (80.300)
<i>Loss</i>		-0.024*** (-5.666)
<i>LossAvoid</i>		-0.003 (-0.610)
<i>Growth</i>	0.084 (1.582)	-0.034*** (-18.100)
<i>CFO</i>		-1.291*** (-135.600)
<i>QckRatio</i>	0.024** (2.172)	
<i>AsstTurn</i>	0.297*** (3.588)	
<i>YEAR</i>		CONTROL
<i>INDUSTRY</i>		CONTROL
<i>IMR</i>		-0.045*** (-8.119)
Constant	33.000*** (36.990)	-0.656*** (-19.610)
Observations	11,413	11,413
R-squared	0.751	0.682

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

6.3. Excluding the earnings reversal hypothesis of listed companies

The lower *DA* of GEM companies observed in model (1) may be caused by the reversal of earnings after IPO. In order to exclude the alternative hypothesis, the observations in the first and second years after IPO of GEM firms are deleted, and the model (1) is tested again. The results are shown in Table 10.

The coefficient of *NEEQ* is 0.0623 (t-value = 10.38) in column (1) and 0.0645 (t-value = 11.24) in column (2). Therefore, this alternative hypothesis cannot overturn

Table 10. Excluding the effect of earnings reversal on the earnings quality.

Variables	(1) DA	(2) DA_J
<i>NEEQ</i>	0.062*** (10.380)	0.065*** (11.240)
<i>Size</i>	0.026*** (18.170)	0.027*** (19.460)
<i>Leverage</i>	-0.043*** (-5.098)	-0.056*** (-6.902)
<i>Shrcr1</i>	0.007 (1.020)	0.009 (1.419)
<i>InsHold</i>	-0.035 (-1.139)	-0.024 (-0.911)
<i>State</i>	0.001 (0.219)	0.000 (0.060)
<i>BigAuditor</i>	-0.007*** (-3.084)	-0.009*** (-3.712)
<i>SEO</i>	-0.001 (-0.279)	-0.003 (-1.213)
<i>Dvd</i>	0.002 (0.803)	0.002 (0.912)
<i>EqComp</i>	-0.014** (-2.566)	-0.014*** (-2.871)
<i>MtrIMA</i>	-0.007 (-1.008)	-0.009 (-1.507)
<i>ROA</i>	0.873*** (40.660)	0.793*** (38.890)
<i>Loss</i>	-0.025*** (-5.023)	-0.028*** (-5.781)
<i>LossAvoid</i>	-0.002 (-0.652)	-0.002 (-0.428)
<i>Growth</i>	-0.032*** (-7.963)	-0.042*** (-10.890)
<i>CFO</i>	-1.303*** (-90.090)	-1.229*** (-89.050)
YEAR	CONTROL	CONTROL
INDUSTRY	CONTROL	CONTROL
Constant	-0.505*** (-16.120)	-0.526*** (-17.230)
Observations	12,425	12,425
R-squared	0.688	0.667

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

the original hypothesis, and the conclusion that NEEQ companies have a higher level of upward earnings management is still in place.

7. Further test

In this section, the method of Barth, Landsman, and Lang (2008) is used to further compare the differences between NEEQ and GEM companies.¹⁸ NEEQ and GEM companies are paired 1:1 according to size. We get 350 unique firms for each market and the firm-year observations are 1421 and 1867 respectively. Five measures of earnings quality – the volatility of ΔNI^* , the volatility of $\Delta NI^*/\Delta CCF^*$, the correlation coefficient between ACC^*

¹⁸Due to space limitations, the research model is not detailed here. For interested readers, please refer to the research of Barth et al. (2008).

and CF^* , the regression coefficient of small positive income ($SPOS$), and the regression coefficient of large losses ($LNEG$) – are reported.¹⁹ The first three are used to measure the earnings smoothness. The higher the value, the lower the earnings smoothness and the higher the earnings quality. A positive coefficient of $SPOS$ means that the frequency of small positive net income of NEEQ companies is higher than that of GEM companies, and a negative coefficient means the opposite. The coefficient of $LNEG$ is negative, which means that the frequency of large losses of GEM companies is higher than that of NEEQ companies, and a positive coefficient means the opposite.

The results are reported in Table 11. The volatility of ΔNI^* of NEEQ companies is 0.0030, which is significantly higher than that of GEM companies, indicating that the volatility of NEEQ companies' profit is higher than that of GEM companies and it is less likely to conduct earnings smoothing. After controlling the impact of cash flow changes, the volatility of $\Delta NI^*/\Delta CF^*$ of NEEQ companies is less than that of GEM companies, but not statistically significant. The correlation coefficient between ACC^* and CF^* of NEEQ companies is -0.7139 , which is larger than that of GEM companies (-0.8078). It is significant at the 1% level, indicating that GEM companies conduct more earnings smoothing.

The coefficient of $SPOS$ in Table 11 is -0.8748 , which is statistically significant, indicating that the frequency of small positive earnings of GEM companies is higher than that of the NEEQ companies. GEM companies are more like to manipulate loss to small profit. This result supports the finding that the GEM companies are more strongly motivated to avoid losses than the NEEQ companies.

The coefficient of huge losses ($LNEG$) is -1.7620 , which is significant at the level of 10%, indicating that the frequency of large losses of GEM companies is higher than that of NEEQ companies. This is consistent with Hypothesis 2, indicating that GEM companies are more likely to conduct downward earnings management through a 'big bath'.

8. Conclusions

The study finds that NEEQ companies and GEM companies have different characteristics in earnings quality. We find the NEEQ companies have a significantly higher level of upward earnings management than do GEM companies, while GEM companies have stronger incentives to manage earnings downward through a 'big bath' than do NEEQ companies, due to the special treatment, delisting and other special regulations for GEM firms. We also find that the unique institutional factors of NEEQ have a significant impact on the earnings

Table 11. Further comparison of earnings quality indicators between NEEQ and GEM companies.

Earnings quality indicators	Expected sign	NEEQ ($N=1421$)	GEM ($N=1867$)
Earnings management indicators:			
ΔNI^* volatility	NEEQ>GEM	0.003	0.001***
ΔNI^* volatility/ ΔCF^* volatility	NEEQ>GEM	0.872	1.331
ACC^* and CF^* correlation coefficient	NEEQ>GEM	-0.714	-0.808 ***
Small positive income ($SPOS$)	–		-0.875^*
Timely loss recognition:			
Large losses ($LNEG$)	–		-1.762^*

*, **, *** denote significant at the 10%, 5%, and 1% level, respectively.

¹⁹When ROA is greater than 0 and less than 1%, it is defined as small positive income; when ROA is less than -20% , it is defined as a large loss.

quality of companies. Innovation-layer companies, companies applying for IPOs, companies with independent directors, companies trading with market makers, companies with private equity (PE) or venture capital (VC) investment have higher earnings quality.

Our study enriches the literature on the earnings quality of unlisted companies and has implication for the regulation of unlisted companies by government. Our study also has policy implications for the implementation of the registration-based stock listing system in China.

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