

The Influence of Supervisory Board Composition on Discretionary Accruals in China

Mengjia Li

School of economics and management, Gannan Normal University, Jiangxi, China
School of business and economics, Universiti Putra Malaysia, Selangor, Malaysia
Email: gs62480@student.upm.edu.my

Saidatunur Fauzi Saidin

School of business and economics, Universiti Putra Malaysia, Selangor, Malaysia
Corresponding Author Email: saidatunur@upm.edu.my

Yeng Wai Lau

School of business and economics, Universiti Putra Malaysia, Selangor, Malaysia
Email: wai_ly@upm.edu.my

Jingxuan Teng

School of business and economics, Universiti Putra Malaysia, Selangor, Malaysia
Email: gs62332@student.upm.edu.my

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Abstract

Effective corporate governance (CG) is crucial in mitigating earnings management, especially in emerging economies like China, where the two-tier board system presents unique challenges and opportunities. This study examines the impact of supervisory board (SB) composition on discretionary accruals (DA) in Chinese listed companies, emphasizing the importance of SBs in enhancing CG practices. Limited research had adopted in SB under the two-tier CG structure, even less had investigated the field of the SB composition with DA. Moreover, previous research on SB mainly based on developed countries like German and Japan, it is necessary and urgent to examining the effectiveness of SB in constraining DA in emerging economy like China. Based on 3,094 listed companies on Shanghai and Shenzhen Stock Exchange during 2018 to 2022, the fixed effects regression model is conducted through the balanced panel data of 15,470 observations to test the hypotheses. Result shows SB size is negatively related with DA, while female supervisors and labor representatives in SB significantly constrain firm level DA. Supervisor's financial background presented no significant impact on inhibiting DA. The result is robust and stable through a series of alternative tests addressed multicollinearity issue and endogeneity problems. Empirical

results from China, the world's second-largest economy, offers valuable insights and serves as a guide for emerging economies and countries considering adopting the two-tier system to enhance CG structure. Future research can adopt qualitative methodology like in-depth interview or semi-structure interviews to explore the personal characteristics of supervisors in detail and corresponding impacts on CG.

Keywords: Two-Tier Board, Supervisory Board, Discretionary Accruals, Earnings Management, Corporate Governance.

Introduction

With the high-speed economic growth and development in recent decades, China has become the second-largest economy, as well as the total market value of Chinese stock market has ranked second in the world only after the US. Along with the Chinese stock market opening up policy to foreign investors, the demand for high quality financial reporting is raised by market participant and stakeholders (Firth et al., 2007). A qualified financial report should reflect firm's economic performance accurately, disclosure transparently and follow prudent accounting policies (Rajgopal & Venkatachalam, 2011; Shah & Wan, 2024). Corporate governance (CG) refers to the rules, regulations and practices for the operation and control of businesses (OECD, 2015), regarded as the most crucial pattern to secure the financial reporting quality (FRQ) and improve transparency through the reporting process (Hasan et al., 2022).

Notably, Chinese listed companies have their unique CG pattern that are distinct from other countries. Specifically, CG structures can be generally classified into two main types: the unitary board system and the two-tier board system (Ran et al., 2015). In a unitary board system, a single board of directors (BOD) is responsible for both managing and monitoring the firm, mainly adopted in civil law countries like UK and US. Meanwhile, a two-tier board system comprised both a BOD and a supervisory board (SB), BOD handles daily management routine, while the SB undertakes the monitoring role; the two-tier structure mainly adopted in common law countries like Germany, Japan and China. Despite all as two-tier system countries, compared to German and Japan, Chinese SB had different position and function in its own CG structure.

The SB had been a legally requirement for listed company in China since 1993, unlike the strong-powered Germany SB which is authorized to discipline directors and managers, Chinese SB initially acted only as a friendly advisor (Liu, 2022), until 2005 the revised Chinese *Company Law* strengthen SB with substantial monitoring power. The most essential duty of Chinese SB is to be an effective monitor in safeguarding the FRQ. The discretionary accruals (DA) is a widely used measurement for FRQ, for the accrual-based accounting system provides managers discretion in determining the reporting time of actual earnings in a certain period (Sun et al., 2024; Xie et al., 2003), the more DA indicating more earnings management (EM) activities and lower FRQ. Due to there is limited literature in SB, and most focus on relationship between SB and firm's performance or SB in developed countries (e.g. Dienes and Velte, 2016; Lu et al., 2022; Wagner, 2011), we are motivated to investigate how SB functioned in monitoring DA in Chinese market.

To fill this gap, differed from previous studies involve agency theory (Jensen & Meckling, 1976) to explain CG issues, we adopted the institutional theory (Scott, 2004) to address the

uniqueness of SB in China, from a legal perspective by comparing SB related principals in different countries to explore whether SB is effective in reduce DA manipulation activities. Moreover, compared previous research (M. Bai & Pan, 2023; Lu et al., 2022; Noureldeen et al., 2024) examined SB as a whole, we investigate SB composition in 4 detail aspects to provide how each SB characteristic contributes to the monitoring role. As an emerging economy, the evolving legal and regulatory landscape of China, combined with the distinctive features of the two-tier board system, creates a unique institutional CG context for our research to contribute to institutional theory and CG literature in the field of SB.

Our finding suggested SB composed with more female and labor represent supervisors can significantly constrain firm's DA activities, while the larger SB size appeared with less efficiency in monitoring accruals, additionally supervisor's financial background presented no significant impact on inhibiting DA. Our result is robust and stable through a series of alternative tests. The empirical finds can be implicated by regulators and policymakers to obtain supervisors with highlighted SB composition aspects to improve the SB performance; additional, our results can serve as guide for SB in other countries or countries considering adopting the two-tier system.

Remaining parts are organized as follow. Section 2 provides literature review and hypotheses development; Section 3 details the methodology, data and models; Section 4 presents empirical results with discussion and robustness checks; Section 5 draws conclusion, discusses the implications and limitations.

Literature Review and Hypotheses Development

Institutional Background of SB in China

In China, SB was first mentioned in 1993 in Chinese *Company Law*, which required listed companies established the two-tier CG system with both BOD and SB under shareholders' general meeting (SGM) as governance and supervision branch respectively. Compared with other two-tier countries like German and Japan, Chinese SB has it unique features. In German, under the SGM, SB is in charge of BOD as upper mechanism, not only monitoring finance but also holding control power on important decision such as investment and financing; while in Japan, SB is operated parallelly with BOD and responsible to SGM by fulfill its monitoring role (M. Bai & Pan, 2023). However, China's SB system drawing from both German and Japan, then adopted its own hybrid mode that composition like German model with shareholder and labor representatives as supervisors, while its function and parallel status with BOD is like Japan.

Chinese *Company Law* declared that SB is authorized to inspect firm's finance, monitoring directors and managers performance, and insist on necessary changes (M. Bai & Pan, 2023). Specifically, to fulfill the monitoring role effectively, supervisors are expected to be professional or have adequate experience in accounting or relative fields (Noureldeen et al., 2024). Moreover, SB can also call on outside experts to assist in examining finance independently, with expenses covered by the firm (Firth et al., 2007). Further empowered by the revised *Company Law* in 2005, the SB has the authority to propose removal of senior executives and the right to prosecute against them when they violated the laws or administrative regulations; researchers regard the strengthen of SB power as a symbol of the

transformation of SB's function from formal ineffective advisor to current effective monitor (Ran et al., 2015; Shao, 2018)

Institutional theory Scott (2004), posits that organizational behavior and structures are shaped by the norms, rules, and routines as authority guidelines; and how they are built, adopted and adapted over time. We adopted institutional theory as theoretical framework to explain the relationship between SB composition and DA in the context of Chinese two-tier system, and how it shaped by institutional pressures to conform to societal expectations and regulatory standards.

The effectiveness of Chinese supervisory boards is debated. Early studies suggested that SBs were ineffective due to their advisory role, lack of disciplinary power over poorly performing executives, and absence of financial incentives for supervisors (Dahya et al., 2002; Xiao et al., 2004). However, in 2005 revised *Company Law* strengthened the supervisory authorities, enhanced SB's impact on CG. For instance, the SB size and meeting frequency began to significantly affect executives' pay-performance sensitivities post-amendment (Ding et al., 2010). Ran et al (2015), highlight that some specific characteristics of supervisors, such as expertise, compensation and female supervisors can enhance the quality of accounting information and overall effectiveness of SB. Despite these improvements, some studies found that SBs still struggle with certain issues. Ding *et al* (2010), found SB to be ineffective in curtailing future fraudulent activities, while Shan (2013), argued SB cannot significantly impact the magnitude of majority shareholder tunneling activities.

Supervisory Board Size (SBSize) and DA

The SB size in this research refers to the population of supervisors in the boardroom. According to the *Company Law* (2018, Article 51), the SB for listed company shall consist no less than three members, and listed solely state-owned companies required for more than 5 members. The size of a SB in a two-tier system can significantly influence its supervision efficiency and effectiveness. The relationship between SB size and DA in academic literature yield with mixed results.

Referenced from the unitary board size research, Ran *et al* (2015), argued an excessively large SB may encounter difficulties in coordination and productivity, while an too small SB might fail to perform its supervisory duties effectively. This creates an uncertain relationship between SB size and accounting information quality.

Firth et al (2007), suggested that larger SB may equipped with more financial expertise, are better positioned to enhance financial reporting quality. They posit that a larger SB is more likely to exert pressure on the company to improve accounting practices and is better able to resist management's attempts at aggressive or fraudulent accounting, echo with Lin and Liu (2009), pointed out a larger SB enhances oversight over management activities. Lin *et al* (2016), also reported SB size is positively related to the informativeness of earnings. These findings suggest that a larger SB, with its increased expertise and independence, can significantly enhance the monitoring function, thereby improving the quality of financial disclosures and reducing the risk of earnings manipulation.

Although the optimal size of a supervisory board may vary depending on the specific context, the evidence generally supports the notion that larger SBs contribute to less DA by strengthening monitor role and reducing financial statement risks. Therefore, we propose the hypothesis:

H1: There is a negative association between SBSize and DA.

Supervisory Board Gender Diversity (SBGD) and DA

Gender diversity brings the female supervisors' perspective to SB, enriched the cognitive diversity in working process, reducing errors from subjective preferences and optimized the decision-making procedure. (Green & Homroy, 2018; Zalata et al., 2018). In some European countries adopted the two-tier board system, they have explicit requirement of the proportion of female supervisors on SB. Such as in German, according to law (2015, FöPoG), listed companies are required to have at least 30% female on SB; while in France, according to the Copé-Zimmermann Law (2011, French Commercial Code), listed companies are required to have at least 40% female on SB.

When connected female supervisors with their monitoring role in DA, some concepts of female were often mentioned by prior research. First, for female's nature of more sensitive to reputation with higher ethical standard (Jouber, 2021), leading to their less tolerance on DA which may mislead investors. Secondly, females presented to be more risk aversion (García-Sánchez et al., 2017; Li et al., 2021), which makes female supervisors prefer more conservative accounting policies in constrain discretionary accruals. Thirdly, female exhibiting better communication skills and cooperation (Pucheta-Martínez et al., 2019), enhanced their efficiency of monitoring EM activities. All these female characteristics benefits their monitor role of constraining DA, which also been empirically documented by previous studies (Damak, 2018; Dobija et al., 2022; Saona et al., 2020; Srinidhi et al., 2011). Although these empirical evidences are mainly from gender diversity in one-tier board, limited literature regard on two-tier system especially of supervisors' gender diversity, we propose the hypothesis:

H2: There is a negative association between SBGD and DA.

Supervisor's Financial Background (SBFin) and DA

Considering only a few countries have SBs, based on institutional theory (Scott, 2004), the settings of SB's duty and rights differed from each country's legal requirement, the relationship of supervisor's personal characters such as financial back ground had seldom been examined before. Declared by *Company Law* (2018, Article 53), Supervisors in China are authorized to inspect the company finances, require management to correct misbehavior. Moreover, the Code of Corporate Governance for Listed Companies in China required supervisor have adequate knowledge and experience to be competency in supervision process effectively (Noureldeen et al., 2024).

Qi and Tian (2012), pointed out with certain knowledge base in business fields enables people interpreting and processing information with comprehensive perspective and optimal methods.

For the complex nature of accruals in EM, which requires certain finance and accounting background to recognize and monitor it. Ran *et al* (2015), suggested SB member's accounting

background affect the effectiveness in supervision work. In the context of unitary board, prior studies found when directors with financial background were more sensitive in detecting management's manipulation activities and required them to correct it timely; while a director without certain financial knowledge is more likely to be involved in EM (Park & Shin, 2004; Xie et al., 2003).

Interestingly, a contrasting view was present by Qi *et al.* (2018), they argued that financial expertise enable managers navigating the complexities and flexibilities of accounting standards in DA to beat earnings targets. In align with empirical evidence from Putra and Setiawan (2024) claimed financial background helped CEOs to avoid accrual barriers and regulator's monitoring. With the mixed results in relationship of supervisor's financial background and DA, we propose the hypothesis to explore it:

H3: There is a negative association between SBFin and DA.

Supervisory Board Labor Representative (SBLbr) and DA

Different from one-tier board, in two-tier board system, SB always had legal requirement on ratio of labor representative. In German, according to Codetermination laws (GmbH), listed companies one-third SB seats should be filled with employee representatives; if a company's staff is over 2000, the labor proportion of SBLbr raised to one-half (Gorton & Schmid, 2004). While in China, *Company Law* (2018, Article 51) required listed companies establish SB with at least one-third supervisors consisted of employee representatives (board directors and senior management executives are excluded), to keep the effectiveness of monitoring.

As no such requirement on unitary board, and seldom literature had investigated SB labor proportion with DA, we try to explain from the institutional theory perspective. Regulation on requirement of labor proportion in SB enhanced the legitimacy and transparency of corporate governance, making supervision more comprehensive and effective. Labor representatives participate in monitoring role, not only aligned employees with the mission of company, but also promoting information flow and decision-making democratization (Addison et al., 1997; Levine, 1990). Since employees and managers were deeply involved in working routine simultaneously, which reduced information asymmetry, hence, significant labor participation enhanced the supervision on management and mitigate the earnings manipulation. Therefore, we propose the hypothesis:

H4: There is a negative association between SBLbr and DA.

Methodology

Data and Sample

The initial sample consisted of a population of 3,565 A-share listed companies for 2018 from the Shanghai and Shenzhen Stock Exchange Market in China of the CSMAR database. However, 106 companies in finance & insurance sectors are excluded due to different business features, together with 256 special treatment (ST) and delisted companies (Almarayeh et al., 2024; Du et al., 2017), 94 new listed companies in 2018 which do not have adequate data from last year to calculate accruals and 15 with missing data on variables. The

final sample consisted of 3094 Chinese A-share listed companies with continuous data from 2018 to 2022 to make a balanced panel dataset of 15,470 firm-year observations.

Variable Measurements

Dependent variable DA is measured by performance-matched discretionary accruals (DA) model proposed by (Kothari *et al.*, 2005). Compared to modified Jones model (Dechow *et al.*, 1995), Kothari *et al.* (2005), added ROA as a variable to eliminate poor or superior performance caused EM. The residual ε in Equation (1) represent the unexplained abnormal DA, the DA is represented by absolute value of residual $|\varepsilon|$, that is, $DA = |\varepsilon|$, which ranges from 0 to 1, the higher value of the $|\varepsilon|$ implies more EM activities, vice versa (Pathak & Gupta, 2022; Ran *et al.*, 2015).

$$\frac{TA}{A_{-1}} = \beta_0 + \beta_1 \frac{1}{A_{-1}} + \beta_2 \frac{\Delta REV - \Delta AR}{A_{-1}} + \beta_3 \frac{PPE}{A_{-1}} + \beta_4 ROA + \varepsilon \quad \text{Equation (1)}$$

The Equation (1) reflected that total accruals (TA) are regressed on annual changes in operating revenues (ΔREV), annual changes in accounts receivable (ΔAR) and property, plant and equipment (PPE), return on asset (ROA); for accruals varies with firm size, all items exclude ROA are divided by the firm's lagged total assets (A_{-1}) to mitigate heteroscedasticity (Kassamany *et al.*, 2017).

Followed previous studies, independent variable *SBS*Size is measured by total number of supervisors in SB (Bai & Pan, 2023); *SBGD* is measured by ratio of female supervisors to the total supervisors; *SBFin* is measured by ratio of supervisors with financial background; *SBLbr* is measured by ratio of labor representative supervisors to the total number of supervisors (Ran *et al.*, 2015).

For control variables, firm size (*LnASSET*) measured the natural logarithm of firm's total asset at the end of the year, to control the systematic variation based on different firm size (Epps & Ismail, 2009; Putra & Setiawan, 2024), firm performance (*ROA*) measured by net profit divided by total assets (Cohen & Zarowin, 2010; Nahar Abdullah *et al.*, 2010). Audit quality (*AQ*) is dummy variable, equals 1 if audited by Big 4 or Chinese Big 10; 0 otherwise (Kusnadi *et al.*, 2016), leverage (*LEV*) measured by percentage of debt on asset, is involved to control the change in capital structure which may be correlated with errors in accrual measurements (Kalash, 2024; Peasnell *et al.*, 2005). The dummy variable industry distribution (*MAN*) equals 1 if the company belongs to the manufacturing industry, 0 otherwise is included to control for higher uncertainty in revenue and price adjustment in manufacturing companies (Dienes & Velte, 2016; Saona *et al.*, 2024).

Research Model Design

To test the relationship between DA and SB composition, this research involves with multivariate regression Model 2 as below:

$$DA = \alpha + \beta_1 SBS\text{Size} + \beta_2 SBGD + \beta_3 SBFin + \beta_4 SBLbr + \beta_5 LnASSET + \beta_6 ROA + \beta_7 Q + \beta_8 LEV + \beta_9 MAN + \gamma$$

Model (2)

Where:

DA	= discretionary accruals;
SBSize	= supervisory board size;
SBGD	= supervisory board gender diversity;
SBFin	= supervisory board director's financial background;
SBLbr	= supervisory board labor representees;
LnASSET	= firm size;
ROA	= firm performance;
AQ	= audit quality
LEV	= leverage;
MAN	= manufacturing industry;
α	= constant term;
β	= correlation coefficient;
γ	= error term.

Table 1 presented the regression model selection process. Through Chow test (significant at 1% level) we found fixed effects (FE) model is better than the pooled (POOL) model; through Breush-Pagan test (significance at 1% level) indicates the random effects (RE) model is better than POOL model; while the Hausman test (significance at the 1% level) showed FE model is better than the RE model. Above three tests indicating FE model suits this research best (Putra & Setiawan, 2024). Therefore, we involved FE model to analysis the relationship between DA and SB composition.

Table1

Model Selection

Test	Result	Notes
Chow	Probability = 0.000*	FE model is better than POOL model
Breush-Pagan Lagrange multiplier	Probability = 0.000*	RE model is better than POOL model
Hausman	Probability = 0.000*	FE model is better than RE model

Notes: * represent the 1% significance levels

Source : Authors' calculation by statistical output of STATA

Results and Discussion

Descriptive Statistics

Table 2 shows the descriptive statistics of variables, all firm-level variables are winsorized at 1% level. The skewness is less than 3 and kurtosis is less than 10 indicates the data is normally distributed (Bai & Ng, 2005; Seijas-Macias et al., 2023). The DA is represented by $|\varepsilon|$ from Equation 1, the mean value at 0.261 indicating recently DA in China is in a relative low level than previous findings at 0.659 (Ran et al., 2015). The mean of DA is higher than the median (at 0.232), indicating more firms engaged in significant EM than less EM.

SBSize ranged from 3 to 7 supervisors, with mean level at 3.5, which meet the provision of China's *Company Law* required at least 3 supervisors to compose SB. SBGD on average at 34% indicating more than one-third female supervisors presented in the boardroom, which also promote than previous at 23% in China (Ran et al., 2015). SBFin showed around 30% supervisors have financial background, which benefit them to detect DA activities;

comparable to (Lu et al., 2022) reported at 29% in China. SBLbr indicating 42.5% supervisors is consist of labor representatives, more than the China's *Company Law* requirement at least one-third supervisors should be labor representatives.

Table 2

Descriptive statistics

Variable	N	Mean	p50	SD	Min	Max	Skewness	Kurtosis
DA	15470	0.261	0.232	0.192	0.0040	0.988	1.356	5.418
SBSize	15470	3.439	3	0.927	3	7	2.044	6.418
SBGD	15470	0.343	0.333	0.284	0	1	0.487	2.505
SBFin	15470	0.291	0.333	0.269	0	1	0.560	2.540
SBLbr	15470	0.425	0.333	0.159	0.250	1	1.740	5.417
LnAsset	15470	22.46	22.28	1.323	20.08	26.48	0.720	3.378
ROA	15470	0.0300	0.034	0.069	-0.227	0.173	-1.352	6.850
AQ	15470	0.578	1	0.494	0	1	-0.317	1.101
LEV	15470	0.436	0.430	0.196	0.0690	0.904	0.194	2.365
MAN	15470	0.654	1	0.476	0	1	-0.647	1.418

LnASSET with relevant higher SD indicates a large difference firm size; ROA at mean of 3%; LEV showed firm's leverage at mean of 43%. AQ indicates 58% firms are audited by Big 4 or Chinese big 10, MAN indicates on average 65% firms are in the manufacturing industry.

Table 3 presented the result of Pearson correlation matrix and variance inflation factor (VIF) value. DA is negative and significantly correlated to gender (SBGD), labor representee (SBLbr), ROA and MAN; while positive and significantly correlated with SBSize, LnAsset, AQ and LEV. Therefore, all correlations are less than 0.8 and VIF value less than 5, indicating multicollinearity problems are not an issue in this research (Hair, 2009).

Table 3
 Correlation matrix

	DA	SBSize	SBGD	SBFin	SBLbr	LnASSET	ROA	AQ	LEV	VIF
SBSize	0.097 ***									1.15
SBGD	-0.027* **	-0.125 ***								1.06
SBFin	0.0130	0.141 ***	0.130 ***							1.09
SBLbr	-0.020* *	0.086 ***	0.042 ***	-0.0120						1.02
LnASSET	0.038 ***	0.307 ***	-0.104 ***	0.207 ***	-0.035 ***					1.54
ROA	-0.055* **	0.00700	-0.040 ***	-0.020 **	-0.053 ***	0.070 ***				1.23
AQ	-0.024* **	0.014 *	-0.0130	-0.016 **	-0.0120	0.107 ***	0.103 ***			1.02
LEV	0.046 ***	0.179 ***	-0.033 ***	0.145 ***	0.0020 0	0.461 ***	-0.333 ***	-0.013 *		1.54
MAN	-0.017* *	-0.123 ***	-0.07 1***	-0.145 ***	0.0060 0	-0.200 ***	0.124 ***	0.011 0	-0.195 ***	1.09

Notes: *, ** and *** represent the 10%, 5% and 1% significance levels respectively
 Source: Authors' calculation by statistical output of STATA

Reression Results

The FE regression empirical result of relationship between SB composition and DA are presented in Table 4.

DA	Coef.	t-value	Sig.
SBSize	0.018	11.77	***
SBGD	-0.009	-1.86	**
SBFin	-0.005	-0.92	
SBLbr	-0.021	-2.48	***
LnASSET	0.012	9.92	***
ROA	-0.197	-9.36	***
AQ	-0.009	-3.26	***
LEV	0.004	0.52	
MAN	0.004	1.36	*
_cons	-0.072	-2.79	***
R-squared		0.033	
Number of obs.		15470	

Notes: *, ** and *** represent the 10%, 5% and 1% significance levels respectively

Source: Authors' calculation by statistical output of STATA

SBSzie (0.018***) is positive and strongly significant related to DA, indicating firms with more supervisors in SB exhibit more earnings manipulation activities, which rejected hypothesis 1. The significantly positive relationship between SBSize and DA is differed from neither result of Ran *et al.* (2015) with no significant association, nor negative relationship found by Firth *et al.* (2007). But interestingly, this result similar to previous research on one-tier board, when board size expand the efficiency decrease, leading to more EM activities (Hasan *et al.*, 2022; Sáenz González & García-Meca, 2014). Considering there is very limited literature on SB size and DA, we referenced from results of one-tier board size and DA, therefore, we argued that a larger SB may face “free-riding” phenomenon, reduced monitoring effectiveness, increased information asymmetry, and heightened conflicts of interest, all of which can contribute to a positive correlation with DA.

SBGD (-0.009**) showed the gender diversity is negative and significant related to DA, indicating higher proportion of female supervisors can enhance the supervision and constrain earnings manipulations. Our finding is consistent with the empirical result from Ran *et al.* (2015), female supervisors' rigorous attitude benefit firm's financial reporting quality. Hence, hypothesis 2 is accepted.

SBFin (-0.005) showed negative but not significant relationship with DA, the negative coefficient indicating supervisors' financial background helps to mitigate earnings manipulation but not in a significant level, therefore, rejected hypothesis 3. Our empirical result is in align with Habbash *et al.*(2014), who documented supervisors' financial expertise fail to constrain DA.

SBLbr (-0.021**) showed the labor representatives is negative and strongly significant related to DA, consequently, hypothesis 4 is accepted. Our empirical result indicating the election of employees as supervisors is an effective method to constrain firm level DA. Our finding differed from previous research of Ran *et al.* (2015), where coefficient between labor supervisors and DA is negative but not in a significant level, we owing our significant result to the increasing proportion of labor supervisors in Chinese listed companies during recent years, the higher employee participation enhance the decision-making democratic and benefit the monitoring role.

Meanwhile, the coefficient of LnASSET and MAN is significant and positive suggesting that larger companies and companies in manufacturing industry are more likely to manage its earnings. On the other hand, the coefficient of ROA and AQ are both significant and negative suggesting profitable companies and audited by reputable firms are less likely to manage their earnings. The effect of leverage is only marginal.

Robustness Checks

Several robustness tests have been adopted to verify the stableness of our research. In Table 5, column 1 presented the result of the alternative regression model, while column 2 presented the result of alternative variables. In general, results conducted by both methods of robustness tests are consistent with the original result.

Firstly, the endogeneity issue is a common concern in econometric modeling, where independent variables may be correlated with residuals (Lu *et al.*, 2018). To inspect the endogeneity issue in our research, following previous research (Putra & Setiawan, 2024), the two-stage least squares (2SLS) regression model employed as an alternative method of our original FE model. Followed Almarayeh *et al* (2024), method, we treated SB relative variables SBSize, SBGD, SBFin and SBLbr as endogenous variables, then used the lagged endogenous variables as instrument variables in the 2SLS model. The 2SLS regression results in Table 5 column 1 maintained same direction and significance with original FE model. So, we can conclude that the results are robust to various model specifications and not affected by endogeneity problems.

Secondly, the original model was re-estimated by alternative variables. Followed prior research by Hasan *et al.* (2022), we re-measuring the hypotheses variables, replaced SBGD from ratio to number of female on SB (SBGDno.), replaced SBFin from ratio to number of supervisors with financial background (SBFinno.), replaced SBLbr from ratio to number of labor representatives on SB (SBLbrno.). Then, we re-runned the FE model regression with above replaced variables, and results in Table 5 column 2 maintained same direction and significance with original FE model, which confirms the stability and replicability of this research.

Table 5

Robustness check

DA	(1) 2SLS	(2) Alternative variable
SBSize	0.0183***(14.264)	0.0214***(10.274)
SBGD	-0.0100**(-2.107)	
SBFin	-0.0054(-1.103)	
SBLbr	-0.0300***(-3.487)	
LnASSET	0.0114***(8.085)	0.0119***(9.713)
ROA	-0.1917***(-8.746)	-0.1971***(-9.354)
AQ	-0.0092***(-3.407)	-0.0088***(-3.288)
LEV	0.0043(0.518)	0.0042(0.509)
MAN	0.0034(1.216)	0.0038*(1.326)
SBGDno.		-0.0039***(-2.781)
SBFinno.		-0.0002(-0.105)
SBLbrno.		-0.0060***(-2.448)
_cons	-0.0518**(-1.695)	-0.0789***(-3.085)
N	15470	15470

Notes: *, ** and *** represent the 10%, 5% and 1% significance levels respectively, with t-value in parentheses.

Source: Authors' calculation by statistical output of STATA

Conclusion

This research investigates the impact of supervisory board composition on firm's discretionary accruals. The motivation of our research is powered by the distinctive Chinese SB under the two-tier system. Apart from the unitary board system in common law countries like the US and UK, the SB system in China is also differed from traditional German and Japan two-tier SBs. The most significant difference is Chinese SB can be regarded as a combination of German mode and Japan mode, Chinese SBs shared the parallel status with BOD like Japan, but played the monitoring role of supervision on BOD like Japan. In addition, China is an emerging economic, with relative weak corporate governance structure, the effectiveness of SB is still on debate, previous research (Bai & Pan, 2023; Firth et al., 2007; Lu et al., 2022) on SB regard it as a whole, while we analyzed SB composition characteristics in detail to offer more insight evidences to fill the gap.

We involved a panel data set of 3094 listed companies on Shanghai and Shenzhen Stock Exchange from 2018 to 2022, and measured DA by performance-matched discretionary accruals (Kothari et al., 2005). Through the FE regression model, we found SB composed with more female and labor represent supervisors can significantly constrain firm's EM activities, while the larger SB size appeared with less efficiency in monitoring accruals, additionally supervisor's financial background presented no significant impact on inhibiting DA. Our result is robust and stable through a set of tests, such as 2SLS model and alternative variable, indicating the research is not suffered from multicollinear issue and endogeneity problems. Overall, our research suggested that SB under the circumstance of two-tier board system in China is effective in constrain firm's earning manipulations, which is in contrast with previous research argued SB in China is ineffective (Dahya et al., 2003; Habbash et al., 2014). specifically, we recommend to promote the proportion of female and employee in SB to

enhance the supervision power; and suggest firms not to obtain too large SB size to reduce efficiency.

Our research enriched the limited literature on supervisory board and two-tier corporate governance structure, and compared Chinese SB with German, Japan and French SB from a legal perspective; moreover, it also enriched literature on earnings management by elaborated how each SB composition aspect affected firm's DA with recent data. For theoretical contribution, we further broaden the institutional theory (Scott, 2004) by employing it to explain the legislation development in Chinese SB and how it shape the SB effectiveness in the corporate governance field.

For practical implications, firstly, the regulators and policymakers in China can obtain supervisors with our highlighted SB composition aspects to improve the SB performance. Moreover, as an developing country, China exhibit some similar characteristics such as less effective CG mechanism and relative weak legal system with other transitional and emerging markets (Noureldeen et al., 2024), our findings can serve as guide for SB in other countries or countries considering adopting the two-tier system. Finally, the factors we found help to constrain DA benefits a firm's financial reporting quality, which in align with the interest of investors, stakeholders and users of annual reports, especially take the fact into account that China is the world's second largest economic and continues gaining global investment.

For limitations, as we used quantitative method to investigate relationship of SB composition and DA, future research of SB can adopt qualitative methodology like in-depth interview or semi-structure interviews to explore the personal characteristics of supervisors in detail.

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