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Research article

Corporate governance in Chinese manufacturing sector: Ownership structure, monitoring and firms' earning quality

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Abstract: In this study, we explore the impact of ownership structure on a firm's earnings quality in emerging markets. Using the Chinese manufacturing industry sample set, we demonstrate that higher profitability performance could increase earnings quality. Higher concentrated shareholding and institutional shareholding reduce information asymmetry and improve external monitoring, improving earnings quality. Well-studied independent board members do not improve but contribute negatively to earnings quality. Such a result may be due to the lack of variation in the number of independent board members in each list of firms. Almost all firms choose to have three independent board members. Finally, bond debt increases asset size and agency costs; the impact of bond debt on earnings quality is negative. When considering the interaction between bond covenants and external monitoring, including independent board members and institutional shareholdings, the interactive effects reduce the negative effect of the bond debt on earnings quality. This study contributes to discovering that both direct and indirect monitoring of ownership structure contributes to the firm's management and provides some useful insight to reduce agency costs.

Keywords: ownership structure; earning quality; information asymmetry; agency cost; debt covenants; external monitoring

JEL Codes: G10, G30, G32

1. Introduction

The ownership structure not only reflects the firm's simple ownership but also delivers information about the quality of the firm's potential corporate governance. The different backgrounds and expertise of shareholders could contribute to monitoring the firm's management level and operations. Some institutional investors have a high level of industrial knowledge, which may even help the firm's management (Demsetz & Villalonga, 2001). Upstream and downstream industry investors can identify potential conflicts or problems within a short time when they observe abnormalities (Jiang & Kim, 2020). The diversity of ownership could significantly reduce the agency problem between shareholders and managers (Ang et al., 2000; Shui et al., 2022), but the disadvantage is also prominent: The likelihood of reaching a consensus among shareholders is low when many shareholders believe they are experts and demand that the firm develop following their suggestions. This is especially true when the power of each major shareholder is almost equal; the type two agency costs become higher (Purkayastha et al., 2022).

Corporate governance could directly affect the firm's performance (Bhagat & Bolton, 2008). Good corporate governance increases production and management efficiency and lowers agency costs. All stakeholders are well considered, and managers put shareholders' interests ahead of their own (Zaid et al., 2020; Sahasranamam et al., 2020). Such a manager's ethical behavior may arise from a well-designed compensation contract. Smaller fixed but larger incentive contracts could align managers' interests with shareholders (Hong et al., 2016). It is common for managers to receive shares in the firm after having served the firm for many years and achieving the targeted earning aims. When managers have significant shares of the firm in their personal wealth portfolio, they become shareholders. In such a way, managers and shareholders have the same interests when making investment decisions (Hong et al., 2016).

Operating transparency refers to the level of information asymmetry between managers and shareholders. Managers, as insiders, know much more than shareholders. The information flow may be less timely, and disclosures may not happen on time. Many academic studies focus on how independent board members could reduce the agency problem and increase transparency (Conyon & He, 2011; Wongchoti et al., 2021). Information flow could also affect independent board members since they are not insiders (Aksoy et al., 2021). Such information could be accounting, legal or any information related to firm operation and production. Managers try to hide information that could negatively affect them, usually for remuneration reasons (Chen et al., 2017). For example, managers may try to smooth earnings when they have experienced an unexpected good year to offset other bad years and meet the earning target requirements (Saona et al., 2020). Higher earnings quality usually reflects better operating transparency (Wang et al., 2016).

Here, we consider the agency problem as a significant challenge for corporate governance and focuses on how different ownership structures affect earning quality, defined as the uncertainty of accounting income collection. Using earning quality as the agency indicator, do different internal and external monitoring levels, from ownership structure to creditor oversight, reduce the agency problem? Conversely, managers always seek more manager power, and the larger asset size could reflect such power. The external debt could increase the external oversight, but the larger asset size also increases the manager's power and may deteriorate the agency's problem. From such an aspect, is it true that the external debt may not lower but increase the agency problem?

We consider the Chinese market is a good candidate to investigate the ownership structure effect on the agency problem. The significant number of state-owned enterprises and family-oriented businesses provides a good sample size to understand the impact on a firm's operating transparency from different types of ownership structures (Gao et al., 2019; Wang et al., 2021). The Chinese financial market experienced significant growth after 2010, and the number of mutual funds rapidly increased (Gao et al., 2021). The investment mutual funds in the equity market are the more sophisticated institutional investors monitoring the firm's managers and providing extra minority investor protections (Qi et al., 2020). The development of the Chinese corporate bond market allows us to observe when firms experience higher analysis focus and coverage and whether the extra monitoring could increase transparency (Abbassi et al., 2022).

This research contributes to the current research in the following ways. First, the current ownership structure research focuses on firm performance, but the connection between ownership structure and operating transparency is less common. This research fills such a gap. Second, most discussions of board monitoring focus on board members and independent board members. We discuss the indirect monitoring effect of debt issuance and the interactive effect of potential debt contract constraints and market coverage with the more traditional independent board member's effect on the firm's operating transparency.

The rest of the paper is organized as follows. This section introduces the general concepts and reasons why the Chinese market is a suitable candidate to be analyzed. The next section reviews the literature and proposes hypotheses. A discussion of the data collection and empirical methodology follow. The empirical results are analyzed in section four. Finally, section five concludes the paper.

2. Literature review and hypotheses

We consider three aspects of ownership structure and internal control: Independent board members, ownership as divided between institutional versus individual investors, and share concentration, which may increase earning quality and alleviate agency problems. Past research agrees that independent board members as the inside "external" members can efficiently alleviating agency problems, but most Chinese listed firms choose to have three independent board members to exactly meet the minimum number required by the regulation, putting such alleviation effect in question (Bathala & Rao, 1995). Institutional investors have more sophisticated management and investment knowledge and can provide extra monitoring than ordinary individual investors (McConnell & Servaes, 1990). Higher share concentration usually increases management power, but it reduces conflicts between shareholders and helps smooth the firm's decision-making process. The bond and interest-bearing liabilities levels are used to test the external monitoring effects. Both increase the external oversights and the management power simultaneously, making their effect on earning quality and agency problems arguable (Harris & Raviv, 1990; Park, 2000).

This research evaluates the agency problem through earning quality measure based on the idea of Dechow and Dichev (2002). Earning quality indicates the solidness of the earning and its growth. The high-earning quality growth reflects the ability and certainty the accounting revenue could be successfully turned into cash revenue. The low earning quality usually refers to a large amount of accounting revenues becoming uncollectable. Such measure indicates earning quality is usually questionable when the accrual earnings do not confirm the cash flow when the accrual basis earning is much larger than the cash basis, and the deviation is large. Our estimation of the earning quality is a

two-step method. First, we estimate the firm's accrual using the previous, current and one-year-later operating cash flows (CFO). Second, earning quality is estimated utilizing the absolute value of the unexplained residual which is considered abnormal accrual. Note that the larger such an absolute value of the residual is, the lower the earnings quality. Furthermore, from the operating cashflow model, the sales and the plant property equipment (PPE) change should also be well considered to judge whether the accrual is abnormal. This research considers the absolute residual of the model from Deng et al. (2017) as the baseline measure of earnings quality as specified by Equation (1).

$$Accruals_{i,t} = \alpha_0 \frac{1}{Asset_{i,t-1}} + \alpha_1 \frac{CFO_{i,t-1}}{Asset_{i,t-1}} + \alpha_2 \frac{CFO_{i,t}}{Asset_{i,t-1}} + \alpha_3 \frac{CFO_{i,t+1}}{Asset_{i,t-1}} + \alpha_4 \frac{\Delta sale_{i,t}}{Asset_{i,t-1}} + \alpha_5 \frac{PPE_{i,t}}{Asset_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

2.1. Performance and quality

Performance is closely connected with the capital structure and the credit sale decision. A higher profit margin allows firms to have more ability to negotiate with their customers. When there is no pressure on profit, the firm can always choose the customer with faster cash conversion to lower the risk of cash receiving. Investors also react more favorably to more cash-based operating profits than to more accruals-based profits in the financial market (Ball et al., 2016; Du et al., 2020). When firms experience high-speed growth, the accrual model may be misspecified in detecting earnings manipulation (Almand et al., 2023). The accrual reversal effect and the low persistence of accrual for the growth firm with increasing profitability may be due to future growth seeking (Fairfield et al., 2003). In the different industries and at the different life stages of the firm, the variation of accrual is dispersed (Dopuch et al., 2012; Ze-To, 2012). Managers are incentivized to manage and smooth earnings for their bonus incentives. When managers believe that the firm's performance will meet their target, the sentiment to manage and smooth earnings is low (Moradi et al., 2015).

H1. Higher earnings performance would increase the earnings quality (a lower earnings quality index means higher earnings quality).

2.2. Independent board members and quality

Independent board members could significantly reduce the agency's costs. They serve investors' best interests by monitoring the manager's behavior, auditing process and making large investment decisions jointly with other board members (Song et al., 2013). When independent board members possess expertise, for example, they are experts in financial management and accounting, they have specific local market knowledge, or they can increase the transparency of the firm's corporate governance (James et al., 2017; Chen et al., 2020). If independent board members are more dominant on the board, passive smaller investors are better protected (Lu et al., 2022). One of the key factors for independent board members to contribute lies in how well they are informed about firm operations. If they suffer a significant information shortage, the independence is netted off, and then the contribution of the independent board member is limited (Cavaco et al., 2017; Armstrong et al., 2014).

H2. More independent board members increase the monitoring level and, therefore, the earnings quality.

2.3. Share concentration and quality

Family-owned and state-owned enterprises (SOEs) are common in the Chinese market, and the shares are concentrated in those firms. There are advantages and disadvantages to having concentrated shareholding by a dominant major shareholder. The investment decision is easy to make, and the type two agency problem, which indicates the conflicts of interest among shareholders, is smaller. A smaller conflict would increase information transparency and increase decision efficiency (Choi et al., 2023) and productivity (Janang et al., 2015). The information flow from the manager to the board of directors is easier, but disclosure to public investors may become more difficult (Jiang et al., 2011). When firms have a strong single dominant shareholder, the smaller conflict of interest among shareholders could provide a strong incentive for the dominant shareholder to optimize firm performance, and smaller investors can free ride on such efficient and expertise management (Huang, 2020; Akhigbe et al., 2017).

H3. Higher concentrated shareholding increases decision efficiency and, therefore, earnings quality.

2.4. Institutional shareholding and quality

Institutional investors possess more knowledge than individual investors and are usually less risk-averse to short-term volatilities. When making share investment decisions, they usually understand the target firm well. They can also monitor management behavior and reduce agency costs (Chang et al., 2016). Significant institutional ownership leads firms to use more incentive contracts to reward managers rather than high fixed-term wages (Khan et al., 2005). Most institutional investors have higher dividend demands, increasing the cash conversion requirements in the target firms' operation (Short et al., 2002). The tight cash conversion cycle could increase earnings quality since the uncertainty of future cash collection is reduced. Furthermore, the higher cash position the firm maintains alleviates the creditor's concerns about debt repayment and could reduce the cost of debt (Elyasiani et al., 2010).

H4a. Higher institutional share ownership increases the monitoring level and the earnings quality.

2.5. Outstanding bond debt and quality

The bond issuance requires the issuer to follow the bond contract covenants. Covenants give firms some constraints and usually favor and protect creditors (Berlin & Loeys, 1988; Docgne, 2022). In such cases, the agency cost is reduced since the managers cannot choose high-risk projects to maximize personal interests (Reisel, 2014). Additionally, issuing bonds increases financial analysts' coverage. The monitoring level increases with higher attention, and any abnormal situation is more likely to be disclosed to the public quickly (Fong et al., 2022).

On the other hand, issuing bonds would increase the asset level and the manager's power. Larger management power is associated with higher agency costs. In addition, the agency problem is associated with the debt length. The shorter debt duration represents a smaller agency, but the longer duration of the debt indicates a more significant agency problem (Arslan & Karan, 2006). The debt durations of the manufacturing firms are not disclosed, but the length of the loans from the banks is certainly longer than payables. The interest-bearing liability percentage is used to confirm such longer debt higher agency problem logic. If the interest-bearing and the bond liability both decrease the earning quality, then such an outcome could indirectly confirm and being in line with the debt length

could negatively contribute to the agency problem. Following the previously mentioned logic, we propose two subhypotheses.

H5a. More bond issuance indicating higher leverage increases the agency problem, lowering earnings quality.

H5b. More bond issuance increases the level of covenant constraints, increasing earnings quality.

3. Data and methodology

3.1. Data

This research collects data from Eastmoney (Choice). The sample period covers the years of 2017 to 2021. All stock exchange-listed firms from the manufacturing industry in the Chinese market are included. There are 3556 firms in each observation year, so the final sample has 17780 observations. Table 1 shows the variable definitions and the treatment for each variable collected.

Table 1. Variable definitions.

Variable	Unit	Symbol	Variable Treatment
Earnings quality, measured by the variation of accrual earnings not explained by the cash flows and asset size change	Residual estimates	Earning Quality	The absolute residual from the Dechow & Dichev method (Equation 1)
The change in earnings quality	Difference between residual estimates	ΔQuality	The first difference of the Earning Quality variable
Return on equity	Percentage	ROE	Net profit/Total equity
Number of independent board member	Number of persons	IDPboard	Observed from dataset
Top ten shareholders' position in percentage	Percentage	TOPshare	Percentage of shares hold by the largest top ten shareholder
Percentage of total shares hold by institutional investors	Percentage	INSTshare	Observed from dataset
Outstanding bond debt	10 million RMB	Bond	Observed from dataset
Current ratio	Percentage	Current	Current Asset/Current Liability
Earnings before interest and tax (EBIT) to interest expense	Percentage	EBITratio	EBIT/Interest expense
Liability ratio	Percentage	Liab	Total Liability/Total Asset
Growth rate of earning per a share	Percentage	EPS	Observed from dataset
Difference between firms' interest-bearing liability over total asset minus the industry average	Percentage	Diff	Interest-bearing liability/Total asset is used to measure the interest-bearing liability percentage
Difference between firms' interest-bearing liability over total asset minus the sub-industry average	Percentage	Diffsub	Interest-bearing liability/Total asset is used to measure the interest-bearing liability percentage

Table 2 shows the general statistics. Interestingly, according to Chinese Corporate Law, the exchange-listed firm should have at least one-third independent board members. Most exchange list firms choose to have nine board members, three of which are independent board members. This fact is reflected by the variable "Idp". The firms with three independent members are more than half the sample. The variable "Top" reflects the unique Chinese market feature. Most family-oriented and state-owned enterprises (SOEs) have largely concentrated shares held by the top ten largest shareholders. The variable "Inst" is also affected by the nature of the firm. Most SOEs have more institutional shareholders, and their institutional holdings percentage tends to be larger than that of non-SOEs.

Table 2. General statistics.

Statistic	N	Mean	St. Dev.	Min	Pctl (25)	Pctl (75)	Max
Earning Quality	17,780	398.941	1,477.092	0.000	72.417	266.685	61,270.110
ROE	17,780	7.327	176.853	−15,824.420	4.232	17.860	1,104.102
IDPboard	17,780	3.021	0.506	2	3	3	9
TOPshare	17,780	56.860	28.397	0.000	43.940	75.310	100.030
INSTshare	17,780	22.655	24.826	0.000	0.000	42.414	138.248
Bond	17,780	1.932	13.646	0	0	0	521
Current	17,780	3.098	3.599	0.161	1.347	3.450	66.611
EBITratio	17,780	89.023	2,057.475	−16,417.840	0.000	16.040	171,920.300
Liab	17,780	40.286	138.081	0.000	23.604	52.213	17,834.550
EPS	17,780	−16.263	655.684	−25,000.000	−19.099	46.154	9,900.000
ΔQuality	14,224	50.638	1,103.657	−46,800.930	−59.335	90.104	39,008.070
Interest-bearing liability	17,780	13.209	55.772	−0.129	0.919	20.388	7,046.318

3.2. Methodology

3.2.1. Performance and quality

The first test involves the firm's profitability performance and earnings quality. Higher profitability performance would allow managers to choose the clients and require the clients to finish the payment in the short term. Short- and long-term debt payment ability, current capital structure, operating leverage and potential revenue growth could all affect the earnings quality, and the managers may carefully consider them when making credit sale decisions. Equation (2) checks the causality relationship between profitability performance and earnings quality. "IND" indicates the individual controls clustering by subindustry in the manufacturing sector, and "YEAR" indicates the time control.

$$\text{Earning } Quality_{i,t} = \beta_0 + \beta_1 ROE_{i,t} + \beta_2 Current_{i,t} + \beta_3 EBITratio_{i,t} + \beta_4 Liab_{i,t} + \beta_5 EPS_{i,t} + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (2)$$

3.2.2. Independent board member and quality

The second test explores the relationship between the number of independent board members and earnings quality. Since most firms choose to have three independent board members, such small

variations could largely affect the result. The number of independent board members should be determined by the management difficulties and based on the independent board members' expertise. Usually, larger firms with more assets and more variation in business and products should have more independent board members to monitor the management level better and reduce agency costs. Equation (3) shows the test of how the number of independent board members affects earnings quality.

$$\begin{aligned}\text{Earning } Quality_{i,t} = \beta_0 + \beta_1 IDPboard_{i,t} + \beta_2 Current_{i,t} + \beta_3 EBITratio_{i,t} + \\ \beta_4 Liab_{i,t} + \beta_5 EPS_{i,t} + \sum IND + \sum YEAR + \varepsilon_{i,t}\end{aligned} \tag{3}$$

3.2.3. Share concentration and quality

The third test focuses on the share concentration and earnings quality. The more share-concentrated firms indicate that shareholders have more wealth invested in the firm. As mentioned, more concentrated firms usually have lower type two agency costs. If information asymmetry is reduced because of more direct control from the dominant shareholders, a higher level of monitoring may increase efficiency and reduce agency costs. Equation (4) shows the relationship between share concentration and earnings quality. The interactive term between the number of independent board members and share concentration is also tested to understand how external monitoring from independent board members affects share concentration's effect on earnings quality.

$$\begin{aligned}\text{Earning } Quality_{i,t} = \beta_0 + \beta_1 TOPshare_{i,t} + \beta_2 IDPboard_{i,t} + \\ \beta_3 Current_{i,t} + \beta_4 EBITratio_{i,t} + \beta_5 Liab_{i,t} + \beta_6 EPS_{i,t} + \\ \beta_7 [EBITratio_{i,t} * TOPshare_{i,t}] + \sum IND + \sum YEAR + \varepsilon_{i,t}\end{aligned} \tag{4}$$

3.2.4. Institutional shareholding and quality

Institutional investors provide some level of monitoring and could reduce agency costs. Institutional investors also have more investment and financial management expertise, which could give the invested firm suggestions and even up- and downstream related transactions. It is expected that higher institutional investors' ownership could improve the earnings quality. Equation (5) shows such a test between institutional ownership and earnings quality.

$$\begin{aligned}\text{Earning } Quality_{i,t} = \beta_0 + \beta_1 INSTshare_{i,t} + \beta_2 IDPboard_{i,t} + \beta_3 Current_{i,t} \\ +\beta_4 EBITratio_{i,t} + \beta_5 Liab_{i,t} + \beta_6 EPS_{i,t} + \beta_7 \left[IDPboard_{i,t} * INSTshare_{i,t}\right] \\ +\sum IND + \sum YEAR + \varepsilon_{i,t}\end{aligned} \tag{5}$$

3.2.5. Outstanding bond debt and quality

A firm with a bond issue typically attracts more analysts to cover the firm. Such extra monitoring could reduce agency costs, but with the issued bond to make extra investments, the firm has a larger asset base, and such an increase in assets increases agency costs. The larger asset base, which increases agency costs, may be the more dominant effect. Equation (6) tests such a relationship.

$$\text{Earning } Quality_{i,t} = \beta_0 + \beta_1 Bond_{i,t} + \beta_2 Current_{i,t} + \beta_3 EBITratio_{i,t} + \beta_4 Liab_{i,t} + \beta_5 EPS_{i,t} + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (6)$$

3.2.6. Robustness and endogeneity check

To alleviate the endogeneity problem, the first difference between the variable "Quality" and redoing the test involves independent board members. Then, performance, independent board members and the institutional investor's shareholding interact with the variable "Bond" to show when managers are under different external monitors and how the bond covenant under different external monitors affects earnings quality. Equation (7) reflects the change of measure on the dependent variable, and Equations (8) to (10) test the interaction between outstanding bond debt and profitability, number of independent board members and percentage shares held by institutional investors.

$$\Delta Quality_{i,t} = \beta_0 + \beta_1 ROE_{i,t} + \beta_2 Current_{i,t} + \beta_3 EBITratio_{i,t} + \beta_4 Liab_{i,t} + \beta_5 EPS_{i,t} + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (7)$$

$$\Delta Quality_{i,t} = \beta_0 + \beta_1 ROE_{i,t} + \beta_2 Bond_{i,t} + \beta_3 Current_{i,t} + \beta_4 EBITratio_{i,t} + \beta_5 Liab_{i,t} + \beta_6 EPS_{i,t} + \beta_7 [ROE_{i,t} * Bond_{i,t}] + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (8)$$

$$\Delta Quality_{i,t} = \beta_0 + \beta_1 IDPboard_{i,t} + \beta_2 Bond_{i,t} + \beta_3 Current_{i,t} + \beta_4 EBITratio_{i,t} + \beta_5 Liab_{i,t} + \beta_6 EPS_{i,t} + \beta_7 [IDPboard_{i,t} * Bond_{i,t}] + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (9)$$

$$\Delta Quality_{i,t} = \beta_0 + \beta_1 INSTshare_{i,t} + \beta_2 Bond_{i,t} + \beta_3 Current_{i,t} + \beta_4 EBITratio_{i,t} + \beta_5 Liab_{i,t} + \beta_6 EPS_{i,t} + \beta_7 [INSTshare_{i,t} * Bond_{i,t}] + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (10)$$

4. Results

4.1. Performance and quality

The results of the causality relationships between a firm's profitability and earnings quality are shown in Table 3. The return on equity is used to measure the firm's profitability performance. All three columns with and without fixed and time controls show a significant negative relationship between ROE and the earnings quality index, indicating that the accruals have smaller residuals unexplained by the operating cash flow. Such a smaller residual indicates a better earnings quality. The results support hypothesis one.

Table 3. Performance and quality.

	Dependent variable:		
	Earning Quality		
	(1)	(2)	(3)
ROE	−0.155**	−0.151**	−0.158**
	(0.062)	(0.062)	(0.062)
Current	−31.513***	−31.522***	−25.739***
	(3.075)	(3.072)	(3.102)
EBITratio	−0.002	−0.002	−0.002
	(0.005)	(0.005)	(0.005)
Liab	0.244***	0.242***	0.222***
	(0.080)	(0.080)	(0.080)
EPS	−0.041**	−0.041**	−0.044***
	(0.017)	(0.017)	(0.017)
Constant	487.347***	392.987***	349.446***
	(15.063)	(26.660)	(42.293)
IND	N	N	Y
Year	N	Y	Y
Observations	17,780	17,780	17,780
R^2	0.008	0.010	0.042
Adjusted R^2	0.007	0.009	0.040
Residual Std. Error	1,471.745 (df = 17774)	1,470.320 (df = 17770)	1,447.491 (df = 17742)
F Statistic	26.880*** (df = 5; 17774)	19.239*** (df = 9; 17770)	20.853*** (df = 37; 17742)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

4.2. Independent board members and quality

The independent board members could effectively monitor the manager's behavior and share their expertise when making important decisions. Independent board members should effectively improve earnings quality, but this effect does not appear in this research. The influence of independent board members on earnings quality is shown in Table 4. The number of independent board members significantly negatively impacts the earnings quality in the tests. Hypothesis two is rejected. The results may be biased since most exchange-listed firms have three independent board members, and very few firms have more than three. The variation may be too small. Larger firms with more assets tend to have more independent board members and may have larger unexplained accruals of operating cashflow. The significant coefficient of the liability to asset ratio term also reflects this. Larger firms usually

involve higher operating leverage, increasing the residual unexplained by cash flows and negatively contributing to earnings quality.

Table 4. Independent board members and quality.

	Dependent variable:		
	Earning Quality		
	(1)	(2)	(3)
IDPboard	483.561***	483.551***	454.965***
	(21.627)	(21.605)	(21.576)
Current	−24.487***	−24.493***	−19.438***
	(3.049)	(3.046)	(3.079)
EBITratio	−0.001	−0.001	−0.001
	(0.005)	(0.005)	(0.005)
Liab	0.227***	0.225***	0.200**
	(0.079)	(0.079)	(0.079)
EPS	−0.046***	−0.046***	−0.048***
	(0.017)	(0.017)	(0.016)
Constant	−995.646***	−1,090.417***	−1,035.627***
	(67.931)	(71.244)	(77.762)
IND	N	N	Y
Year	N	Y	Y
Observations	17,780	17,780	17,780
R^2	0.034	0.036	0.065
Adjusted R^2	0.034	0.036	0.063
Residual Std. Error	1,451.727 (df = 17774)	1,450.263 (df = 17770)	1,429.953 (df = 17742)
F Statistic	126.341*** (df = 5; 17774)	74.765*** (df = 9; 17770)	33.202*** (df = 37; 17742)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

4.3. Share concentration and quality

Share concentration allows better information flow from managers to board members and reduces information asymmetry costs. Smaller investors could also benefit if the larger shareholders implement strict monitoring of decision-making. The results of the effect of share concentration on earnings quality are shown in Table 5. In all three columns, the coefficient of the share concentration is negative, but the coefficient in Column (3) is insignificant. The results partially support hypothesis three; share concentration could improve the earnings quality.

Table 5. Share concentration and quality.

	Dependent variable:		
	Earning Quality		
	(1)	(2)	(3)
TOPshare	−5.167**	−5.669**	−2.532
	(2.380)	(2.380)	(2.359)
IDPboard	361.278***	357.313***	391.066***
	(49.576)	(49.538)	(48.998)
Current	−23.849***	−24.038***	−19.120***
	(3.055)	(3.053)	(3.085)
EBITratio	−0.001	−0.001	−0.001
	(0.005)	(0.005)	(0.005)
Liab	0.232***	0.228***	0.204***
	(0.079)	(0.079)	(0.079)
EPS	−0.048***	−0.047***	−0.049***
	(0.017)	(0.017)	(0.016)
IDPboard*TOPshare	2.232***	2.291***	1.182
	(0.796)	(0.796)	(0.789)
Constant	−717.121***	−775.927***	−898.118***
	(150.508)	(151.523)	(152.922)
IND	N	N	Y
Year	N	Y	Y
Observations	17,780	17,780	17,780
R^2	0.035	0.037	0.065
Adjusted R^2	0.035	0.037	0.063
Residual Std. Error	1,450.933 (df = 17772)	1,449.684 (df = 17768)	1,429.697 (df = 17740)
F Statistic	93.406*** (df = 7; 17772)	62.692*** (df = 11; 17768)	31.725*** (df = 39; 17740)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

4.4. Institutional shareholding and quality

Institutional investors are sophisticated and could provide additional monitoring effects. The contributions of institutional shareholding to earnings quality are shown in Table 6. In all three columns, the coefficient of institutional shareholding is negative and significant, indicating that larger institutional holdings could reduce the unexplained residuals of operating cashflow and increase earnings quality. Such results support hypothesis four; higher level of shares held by

institutional investors could provide an extra monitoring effect and make managers more cautious about high accruals.

Table 6. Institutional owner and quality.

	Dependent variable:		
	Earning Quality		
	(1)	(2)	(3)
INSTshare	−23.313***	−23.792***	−21.704***
	(2.492)	(2.494)	(2.489)
IDPboard	115.572***	116.187***	133.807***
	(31.014)	(31.002)	(30.824)
Current	−15.516***	−15.865***	−12.654***
	(3.067)	(3.067)	(3.100)
EBITratio	−0.0001	−0.0003	−0.001
	(0.005)	(0.005)	(0.005)
Liab	0.231***	0.230***	0.202***
	(0.078)	(0.078)	(0.078)
EPS	−0.043***	−0.043***	−0.045***
	(0.016)	(0.016)	(0.016)
IDPboard*INSTshare	10.201***	10.273***	9.332***
	(0.792)	(0.792)	(0.793)
Constant	−111.357	−171.804*	−223.707**
	(94.042)	(96.299)	(101.248)
IND	N	N	Y
Year	N	Y	Y
Observations	17,780	17,780	17,780
R^2	0.061	0.062	0.084
Adjusted R^2	0.060	0.061	0.082
Residual Std. Error	1,431.975 (df = 17772)	1,431.392 (df = 17768)	1,415.316 (df = 17740)
F Statistic	163.565*** (df = 7; 17772)	105.852*** (df = 11; 17768)	41.664*** (df = 39; 17740)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

4.5. Outstanding bond debt and quality

The results of bond debt issued and quality are shown in Table 7. The issuance of bond debt increases total asset control, but debt covenants could limit managers from taking on risky projects or

adding additional leverage. The results show that the "Bond" term has a significant positive coefficient in all three columns, indicating lower earnings quality. Such results indicate that a larger asset size confers higher agency problem, and this agency problem deteriorates earnings quality. Hypothesis 5Ha is supported, but H5b is rejected by the results.

Table 7. Bond issuance and quality.

	Dependent variable:		
	Earning Quality		
	(1)	(2)	(3)
Bond	50.570***	50.559***	49.296***
	(0.717)	(0.716)	(0.719)
Current	−18.599***	−18.605***	−15.105***
	(2.724)	(2.721)	(2.763)
EBITratio	−0.001	−0.001	−0.001
	(0.005)	(0.005)	(0.005)
Liab	0.175**	0.173**	0.164**
	(0.071)	(0.071)	(0.071)
EPS	−0.044***	−0.044***	−0.045***
	(0.015)	(0.015)	(0.015)
Constant	351.170***	263.852***	274.825***
	(13.450)	(23.626)	(37.620)
IND	N	N	Y
Year	N	Y	Y
Observations	17,780	17,780	17,780
R^2	0.224	0.226	0.242
Adjusted R^2	0.224	0.226	0.241
Residual Std. Error	1,301.074 (df = 17774)	1,299.500 (df = 17770)	1,287.264 (df = 17742)
F Statistic	1,028.184*** (df = 5; 17774)	577.827*** (df = 9; 17770)	153.168*** (df = 37; 17742)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

Table 8 shows how the interest-bearing liability affects the agency's problem. The first two columns are the difference between the individual firms' percentages and the whole industry average. The last two columns measure the effect of the difference between individual firms' percentages and the sub-industry average. The industry control is removed to allow the use of industry and sub-industry averages. All four columns show a positive significant contribution to the quality term, indicating a negative contribution to the agency problem. Such results enhance the robustness of the previous bond

table results and confirm indirectly with the past research evidence that shorter debt alleviates the agency problem.

Table 8. Interest paying liability percentage and quality.

	Dependent variable:			
	Earning Quality			
	(1)	(2)	(3)	(4)
Diff	11.571***	11.792***		
	(0.995)	(0.997)		
Diffsub			3.496***	3.551***
			(0.605)	(0.605)
Current	−28.207***	−28.152***	−30.525***	−30.515***
	(3.077)	(3.074)	(3.078)	(3.075)
EBITratio	−0.001	−0.001	−0.001	−0.002
	(0.005)	(0.005)	(0.005)	(0.005)
Liab	−4.328***	−4.419***	−1.023***	−1.046***
	(0.401)	(0.402)	(0.234)	(0.234)
EPS	−0.034**	−0.032*	−0.040**	−0.039**
	(0.017)	(0.017)	(0.017)	(0.017)
Constant	660.219***	552.771***	533.925***	435.376***
	(21.171)	(29.847)	(17.143)	(27.658)
Year Control	N	Y	N	Y
Observations	17,780	17,780	17,780	17,780
R^2	0.015	0.017	0.009	0.011
Adjusted R^2	0.014	0.017	0.009	0.011
Residual Std. Error	1,466.428 (df = 17774)	1,464.806 (df = 17770)	1,470.620 (df = 17774)	1,469.137 (df = 17770)
F Statistic	52.903*** (df = 5; 17774)	34.276*** (df = 9; 17770)	32.365*** (df = 5; 17774)	22.451*** (df = 9; 17770)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

4.6. Robustness and endogeneity

The dependent variable earnings quality is remeasured using the first difference (the latter minus the earlier) of what is not explained by the operating cash flow. A positive number means that the unexplained residual becomes larger (worse earnings quality), and a negative value indicates that the unexplained residual decreases (better earnings quality). The independent board members and bond tests are repeated to ensure that they have similar outcomes. The results are shown in Table 9 and Table

10. Both independent board members and the bond term have the same sign coefficients, indicating the tests' reliability.

Table 9. Change the dependent measure.

	Dependent variable:		
	ΔQuality		
	(1)	(2)	(3)
IDPboard	60.841***	60.841***	56.067***
	(18.354)	(18.352)	(18.585)
Current	−3.155	−3.151	−2.338
	(2.588)	(2.587)	(2.652)
EBITratio	−0.002	−0.002	−0.002
	(0.004)	(0.004)	(0.004)
Liab	−0.030	−0.028	−0.043
	(0.060)	(0.060)	(0.061)
EPS	−0.079***	−0.079***	−0.079***
	(0.014)	(0.014)	(0.014)
Constant	−123.993**	−127.267**	−111.270*
	(57.645)	(59.825)	(66.356)
IND	N	N	Y
Year	N	Y	Y
Observations	14,224	14,224	14,224
R^2	0.003	0.004	0.006
Adjusted R^2	0.003	0.003	0.004
Residual Std. Error	1,101.980 (df = 14218)	1,101.860 (df = 14215)	1,101.657 (df = 14187)
F Statistic	9.665*** (df = 5; 14218)	6.803*** (df = 8; 14215)	2.435*** (df = 36; 14187)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

Table 10. Bond and change of quality.

	Dependent variable:		
	ΔQuality		
	(1)	(2)	(3)
Bond	7.743***	7.755***	7.548***
	(0.653)	(0.653)	(0.662)
Current	−2.031	−2.023	−1.473
	(2.568)	(2.567)	(2.632)
EBITratio	−0.002	−0.002	−0.002
	(0.004)	(0.004)	(0.004)
Liab	−0.036	−0.034	−0.047
	(0.060)	(0.060)	(0.061)
EPS	−0.078***	−0.079***	−0.078***
	(0.014)	(0.014)	(0.014)
Constant	41.316***	38.704*	46.985
	(12.621)	(20.329)	(34.658)
IND	N	N	Y
Year	N	Y	Y
Observations	14,224	14,224	14,224
R^2	0.012	0.013	0.015
Adjusted R^2	0.012	0.012	0.012
Residual Std. Error	1,096.991 (df = 14218)	1,096.854 (df = 14215)	1,096.996 (df = 14187)
F Statistic	35.675*** (df = 5; 14218)	23.121*** (df = 8; 14215)	5.812*** (df = 36; 14187)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

In Table 11, the interactive relation between outstanding bond debt and ROE, independent board members and institutional shareholdings are tested. The three interactive terms weaken the negative agency costs effect from the outstanding bond debt. The agency problem becomes enlarged when the managers feel it is impossible to meet their targeted aim and reach the remuneration contract requirements. When the firm experiences better profitability performance, such a problem alleviates and makes managers more likely to have goals similar to those of shareholders. The other two interactive terms, independent board members and institutional shareholding, both have a monitoring influence on managers' behaviors. They could efficiently limit the agency problem caused by the bond debt and the increasing asset size and monitor the managers to follow the bond covenants to ensure that repayment could happen.

Table 11. Bond and its interactive terms.

	Dependent variable:		
	ΔQuality		
	(1)	(2)	(3)
ROE	−0.069		
	(0.046)		
IDPboard		59.634***	
		(18.729)	
INSTshare			0.515
			(0.392)
Bond	8.121***	42.305***	40.216***
	(0.654)	(3.642)	(1.998)
Current	−1.447	0.197	0.918
	(2.599)	(2.638)	(2.656)
EBITratio	−0.002	−0.002	−0.002
	(0.004)	(0.004)	(0.004)
Liab	−0.052	−0.052	−0.051
	(0.060)	(0.061)	(0.060)
EPS	−0.071***	−0.077***	−0.077***
	(0.013)	(0.013)	(0.013)
Bond*ROE	−0.288***		
	(0.015)		
Bond*IDPboard		−9.183***	
		(0.943)	
Bond*INSTshare			−0.544***
			(0.031)
Constant	51.658	−141.678**	18.219
	(34.220)	(66.602)	(35.600)
IND	Y	Y	Y
Year	Y	Y	Y
Observations	14,224	14,224	14,224
R^2	0.040	0.021	0.035
Adjusted R^2	0.037	0.019	0.032
Residual Std. Error	1,082.966 (df = 14185)	1,093.291 (df = 14185)	1,085.642 (df = 14185)
F Statistic	15.439*** (df = 38; 14185)	8.131*** (df = 38; 14185)	13.525*** (df = 38; 14185)

Note：***, ** and * denote the statistical significance at the 1%, 5% and 10%, standard errors are shown in parentheses.

4.6. Summary of findings and discussion

4.6.1. Summary of findings

Table 12 shows the summary of the findings.

Table 12. Summary of findings.

Hypotheses	Validation
H1. Better profitability performance increases the earnings quality.	Supported
H2. More independent board members increase the earnings quality	Rejected
H3. Higher share concentration increases the earnings quality.	Partially Supported
H4. A higher level of institutional holding shares increases the earnings quality	Supported
H5a. Higher outstanding bond debt increases the agency costs and lowers the earnings quality	Supported
H5b. Higher outstanding bond debt outstands increase the contract covenants requirement, lowering agency costs and increases earnings quality.	Rejected

5. Conclusions

We explore how ownership structure could affect a firm's earnings quality, implying that companies would face less agency problems. The results show that profitability could significantly increase earnings quality. Furthermore, monitoring from institutional shareholders could reduce the agency's cost and increase earnings quality. Therefore, higher profitability and involvement of institution investors in the monitoring process would reduce the agency problem. Internal monitoring is effective since the institutional shareholders, as the internal party, always possess the on-time information about the firm's management and operation details. They have sophisticated knowledge and often hold a large number of shares. The management level could receive large pressure when the institutional shareholders are less satisfied with the higher agency costs, and the threat of leaving from the institutional investors could significantly negatively influence the firm's share price. More importantly, such leave could signal to the market that the firm's internal control is weak.

In contrast to past research, the lack of variation in the number of independent board members decreases rather than increases the earnings quality. This is evidenced by most firms' only having independent board members to try to meet the regulation requirements than accurate, independent monitoring. The independent board members should be the independent party who have access to the internal management information to monitor the firm's operation efficiently in order to reduce consequently the agency problem faced by firms. The best practice for having independent board members involved is to utilize the different expertise of the independent board members and give them authority to access the information they need. The higher corporate governance could create value rather than destroy value. Such corporate governance could be reflected by better earning quality and more solid earnings growth.

When the firm increases leverage and borrows the bond, the larger asset effect increases the agency costs and lowers the earnings quality, but the interaction between the outstanding bond debt and the profitability, independent board members and the institutional shareholders all significantly reduce the agency cost caused by buying the outstanding bond debt. Even though external monitoring

does not efficiently cancel the increased agency cost effect from larger assets, leading to increased management power, the interaction between external debt and the internal monitoring control is efficient. External debts have covenants, which provide a good measure for monitoring used by internal parties like institutional shareholders and independent board members. The bank and the bond market usually require the firms to follow the covenants and limit some management behaviors, which increase agency costs. Breaking the bond covenants may cause immediate default in the bond market, which could destroy the firm's value in financial markets. Not following the bank loan covenants may trigger an immediate return clause, which puts considerable pressure on the firm's cash flow. Such external requirements efficiently increase the monitoring from the institutional holders and the independent board members.

Expanding from the current study, the future focus could be on how the ownership structure affects the financial institution the firm has a relationship with, how the ownership structure could affect the clients willing to pay within the shorter term and how the ownership structure could affect the firm's supplier's payment option. Such understanding will provide a better financial cost estimation picture and further help the manager's decision-making.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

Conflict of interest

All authors declare no conflicts of interest in this paper.

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