

Original Article

Impact of the Independent Directors' Social Network on Earnings Management Before and During the COVID-19 Period

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Abstract: This study examines the impact of the independent directors' social network on earnings management before and during the COVID-19 pandemic. The COVID-19 pandemic increased uncertainty and pressure in the business environment, which led to intensified earnings management of listed companies worldwide. The research constructs centrality indexes of the independent director social network through the social network analysis method and conducts an empirical study on 1,167 A-share listed companies in China from 2009 to 2020. The relationship between independent directors' network centrality and accrual-based earnings management of companies is examined. Empirical results reveal that independent directors' network centrality is associated with higher accrued earnings management and undesirable corporate practices such as earnings management can be disseminated through directors' social networks. This research innovatively incorporates the research findings into the COVID-19 context, further indicating that independent directors' social network is associated with higher accrued earnings management during the COVID-19 period than before. This research will provide insights for regulators, specifically regulators in China, regarding the independent directors' composition and effectiveness.

Keywords: Accrual-based earnings management; independent director; social network; COVID-19 pandemic.



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1. Introduction

Economic and sociological studies show that social relations affect the economic behavior of individuals, and social ties are the channels through which members exchange resources and information, utilize existing relationships, and form new ones (Ellison & Fudenberg, 1993, 1995). In recent years, scholars have introduced social relations into the corporate environment research framework and found that social networks are significantly related to corporate value creation, investment strategies, and governance environments (Chen & Nie, 2023; Fracassi, 2017; Larcker et al., 2013; Shue, 2013). The position advantage in the social network significantly impacts the earnings management practice. This study expands on this research area by examining how independent directors' social network affects the firms' earnings quality

(Abdul Wahab et al., 2020; Fang et al., 2022; Qiu, 2019). The available evidence indicates an increase in earnings management for crisis management motives during COVID-19. The risk committee with independent director members can obtain vital and extensive information during an economic downturn and better deal with financial crises (Jebran & Chen, 2023). The earnings management manipulations delayed financial reporting during the regulatory change (Šušak, 2020). The COVID-19 pandemic increased uncertainty and pressure in the business environment, which led to intensified earnings management of listed companies in China (Yan et al., 2022). The impact of the independent directors' social network on earnings management before and during the COVID-19 pandemic is uncertain in China. This study provides empirical evidence.

2. Literature Review and Hypothesis Development

2.1. Independent Director Social Network

A social network consists of nodes and connections, and information flows and spreads through connections or links. The positions of individuals in the network are neither equivalent nor random. Individuals at a more centralized location in the network have the advantage of distributing and obtaining information, and their firms have stronger bargaining power (Hanneman & Riddle, 2005). Through social networks, 'trustworthy' information can be transmitted to achieve trust transactions (Burt, 1997, 2004). More existing literature has proven that executive social networks significantly influence the firms' financial decisions, including earnings management choices (Griffina et al., 2017), mergers and acquisitions (El-Khatib et al., 2015), capital investment (Fracassi, 2017), board supervision (Fracassi & Tate, 2012), executive compensation (Engelberg et al., 2013), private debt (Fogel et al., 2018), management forecast (Griffina et al., 2017) and organisational change (Purmono et al., 2018). A company's financial decisions are closely linked to financial reporting disclosures, including earnings manipulation.

2.2. Independent Director Social Network and Accrual-based Earnings Management

Earnings management is a disclosure management behavior in which corporate managers control the external financial reporting process to obtain specific private interests (Schipper, 2009). It is the act of maximizing the self-interest of the operator or the enterprise's market value through the choice of accounting policies to the extent permitted by GAAP (Abata & Migiro, 2016). Earnings management is an activity of taking risks and an accounting practice that enterprise managers use subjective judgment to alter financial reports in transaction structure and financial disclosure, thereby misleading stakeholders' interpretation of enterprise financial performance or affecting the signing of contracts based on the results of financial reports (Healy & Wahlen, 1999). Accrual-based earnings management (AEM) is usually within the scope of flexible application of accounting standards and accounting policies. Managers adjust the company's earnings by choosing accounting methods and accounting estimates and adopting accounting treatments that are beneficial to their interests.

The related empirical evidence finds a more central position or direct information channel of the connected social network of independent directors to the enterprise's increased use of accrual earnings (Abdul Wahab et al., 2020; Godigbe et al., 2018). Board member sharing among companies facilitates the propagation of earnings management through operational decisions and discretionary practices related to income (Ribeiro & Colauto, 2016). Opinion leaders are more powerful and influential in making decisions for better or worse. Financial reporting practice, like any other herding behavior, can be the outcome of imitation of firms to adopt earnings management behaviour to keep competitive parity (Bikhchandani et al., 1998; Hirshleifer & Teoh, 2003; Lieberman & Asaba, 2006). Thus, the following hypothesis is formulated:

Hypothesis 1 (H1): The independent director social network significantly affects higher accrual earnings management.

2.3. The Effect of COVID-19 Pandemic

The role of independent directors is not only limited to governance practices. They can also play an important role in a crisis period. The performance increase during the crisis is a reduction in the excessive risk-taking behavior of firms in the presence of independent directors on different committees (Yeh et al., 2011). Independent directors linked to financial institutions are more effective in providing advice, information, and access to sorely needed capital (Oktavia, 2020). Such affiliations will likely signal the firm's creditworthiness to external stakeholders, especially during crises. Besides, financially linked

independent directors can provide valuable information, advice, and key resources crucial for re-emergence from bankruptcy (Arora, 2018). However, no significant influence of independent directors on the performance of 26 European countries during the global financial crisis has been observed (Marano et al., 2022). The COVID-19 shock intensifies companies' earnings management in China, especially when enterprises face higher financial constraints (Yan et al., 2022). No research has shown that the independent director social network has a more apparent inhibitory effect on earnings management after the COVID-19 pandemic than before. Presumably, companies are highly motivated to handle more earnings management for accrual-based earnings management after the pandemic because it is easier and more direct. The boards of director networks serve as natural mediums. Information about earnings reporting and skillful management is transmitted among connected firms through a contagion effect. Thus, the following hypothesis is formulated:

Hypothesis 2 (H2): The independent director social network significantly affects higher accrued earnings management than before the COVID-19 pandemic.

3. Materials and Methods

3.1. Data Sources

This research selected the data of China's A-share listed companies on the Shanghai and Shenzhen Stock Exchange from 2009 to 2020 as the research sample. The sample with missing financial and corporate governance data, financial industry companies, and missing company director data were excluded. A total of 1,167 companies and 14,004 firm-year observations were collected. Data are collected and sorted manually to depict the independent director's social network. The original data come from the board features of the China Stock Market and Accounting Research Database.

3.2. Definition of Operational Variables

3.2.1. Social Network

This study applied four standard measures of connectedness (degree, betweenness, closeness and eigenvector centrality) from social network theory to represent the multidimensional construct of independent directors' network. Four standard centrality measures represent a connectedness dimension characterizing directors' relative locations and importance in the network (Godigbe et al., 2018; Larcker et al., 2013; Omer et al., 2012, 2020). Social networks are especially salient in the corporate environment, where sharing knowledge and interpersonal collaboration are key to decision-making (Marzi et al., 2023). This study also used a comprehensive index of the average centrality measured by the four standard centralities using ordinal indicators 0–9 to convert the original data and then take the average value (Chen et al., 2014). A similar conversion, such as using ordinal indicators 1–10 transfers data and takes the sum of maximum, minimum, mean, and median values (Chang et al., 2023). Meanwhile, another comprehensive indicator PCA network is selected for robustness testing, calculated by the original data's first principal component (Godigbe et al., 2018).

3.2.2. Accrual-Based Earnings Management

This study uses discretionary accruals as a proxy for accrual-based earnings management. Nondiscretionary accruals are related to the normal operations of companies, but discretionary accruals are at the discretion of company executives and are often controlled by opportunistic manipulation. The study takes the performance-adjusted Jones model (Dechow et al., 2012; Kothari et al., 2005) to evaluate discretionary accruals, which has mostly been depicted as financial reporting quality or earnings management (Choudhary & Singh, 2020; Elzahar et al., 2022; Song et al., 2023; Thuy et al., 2021).

$$\frac{TA_{it}}{A_{it-1}} = a_1 \times \frac{1}{A_{it-1}} + a_2 \times \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + a_3 \times \frac{PPE_{it}}{A_{it-1}} + a_4 \times ROA_{it} + \varepsilon_{it} \quad (1)$$

$$NDA_{it} = a_1 \times \frac{1}{A_{it-1}} + a_2 \times \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + a_3 \times \frac{PPE_{it}}{A_{it-1}} + a_4 \times ROA_{it} \quad (2)$$

$$DA_{it} = \frac{TAC_{it}}{A_{it-1}} - NDA_{it} \quad (3)$$

TA_{it} represents the total accrued profit of the firm i in year t, TA_{it} = NI_{it} - CFO_{it}, NI_{it} is the net profit, and CFO is the net cash flow in the operation process. ΔREV_{it} represents the difference between the operating income of year t minus the operating income of year t-1, and ΔREC_{it} represents the difference between the net value of accounts receivable in year t and the net value of accounts receivable in year t-1. PPE_{it} is the net value of fixed assets in year t, and A_{it-1} is the total assets of year t-1. The non-residual term represents the corresponding value of non-manipulative accrued profit NDA_{it}, and the residual term represents the operable accrued profit DA_{it} of accrued earnings management. The larger this value is, the higher the degree of accrued earnings management. This study regresses the absolute value of accruals AEM_{it} as the explained variable.

Table 1. Definition of Operational Variables

Symbol(s)	Variable(s)	Measurement(s)
AEM	Accrual-Based Earnings Management	The absolute value of the residual is calculated according to the adjusted Jones model (Kothari et al., 2005)
Degree	Degree Centrality	Measures the number of first-degree connections of a director in the director network by year
Between	Betweenness Centrality	Measures the extent to which an independent director connects other directors in the network
Close	Closeness Centrality	Measures the speed at which a director can exchange information with other directors through the boardroom network
Eigen	Eigenvector Centrality	Measures the number of first-degree connections of a director in the director network, weighted according to how well-connected those connections
Ave	Average Centrality	A comprehensive index of the centrality of independent directors' social network, average score, integrated calculation of degree centrality, closeness centrality, betweenness centrality and eigenvector centrality
PCA	PCA Centrality	A comprehensive index of the centrality of independent directors' social network, PCA measure, integrated measurement of the first principal component of degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality
Size	Firm Size	Log of total assets.
Lev	Leverage	The ratio of total liabilities to total assets
Fage	Firm Age	Operating fiscal year since the company listed
ROA	ROA	Return on total assets
Grow	Growth	Growth rate of total assets
Freq	Frequency of Board Meetings	Number of independent directors' annual participation in board meetings
Ins	Institutional Investor Holdings	Total proportion of holdings by institutional investors
Bdsize	Board Size	Number of directors serving on the company's board.
Inde	Independent Directors Proportion	Independent directors account for the proportion of all directors serving on the company's board
Ind/Year	Industry/Year	The dummy variable of industry refers to China Securities Regulatory Commission industry classification standards in 2012

Variable(s)	(1) AEM	(2) AEM	(3) AEM	(4) AEM	(5) AEM	(6) AEM
	(7.431)	(7.446)	(7.424)	(7.420)	(7.443)	(7.445)
ROA	-0.0039	-0.0039	-0.0038	-0.0038	-0.0038	-0.0038
	(-1.258)	(-1.251)	(-1.235)	(-1.238)	(-1.242)	(-1.243)
Grow	0.0069***	0.0069***	0.0069***	0.0069***	0.0069***	0.0069***
	(8.331)	(8.343)	(8.355)	(8.350)	(8.348)	(8.348)
Freq	0.0007***	0.0008***	0.0008***	0.0008***	0.0008***	0.0008***
	(5.539)	(5.660)	(5.631)	(5.626)	(5.614)	(5.613)
Ins	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***
	(-2.657)	(-2.670)	(-2.697)	(-2.705)	(-2.687)	(-2.685)
Bdsize	-0.0009**	-0.0006	-0.0007*	-0.0007**	-0.0007**	-0.0007**
	(-2.303)	(-1.633)	(-1.931)	(-1.969)	(-2.051)	(-2.058)
Inde	0.0083	0.0146	0.0125	0.0119	0.0115	0.0114
	(0.743)	(1.353)	(1.155)	(1.106)	(1.064)	(1.058)
Constant	0.1827***	0.1790***	0.1802***	0.1807***	0.1809***	0.1832***
	(15.359)	(15.217)	(15.305)	(15.337)	(15.350)	(15.407)
Industry Fixed	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.086	0.086	0.086	0.086	0.086	0.086
F	30.01	30.00	30.01	30.06	30.09	30.09
Observations	12,972	12,972	12,972	12,972	12,972	12,972

Note: Panel: The Accrual-Based Earnings Management. The table presents t-statistics in parentheses, ***, ** and *, denote significance at the 0.01, 0.05 and 0.1 levels, respectively. The results of regressing AEM on independent director network centrality by the OLS method. Four standard social network centrality proxies to AEM in Columns 1–4 and the average centrality in Column 5. The robustness test of the first principal component by the PCA method is in Column 6.

4.3. Independent Director Social Network and AEM Before and During the COVID-19 Pandemic

Tables 5 and 6 identify that the network centrality of independent directors is significantly associated with higher accrued earnings management during the COVID-19 pandemic than before. Table 5 shows that the coefficient for AEM was positive and almost significant before COVID-19 emerged. However, Table 6 indicates that the coefficient for AEM is significantly positive (Columns 2, 3 and 6, $p < 0.1$; Columns 4 and 5, $p < 0.05$). The economic significance demonstrates that a one standard deviation increase of centrality in an independent director social network will accrue higher earnings management by approximately 0.252% (0.0011×2.29 of the average network centrality) during COVID-19. The average ratio of accrued manipulations of the four-standard centrality in the sample is 0.11%. Therefore, accrued earnings management is positively associated with the independent directors' network centrality during COVID-19. It is consistent with the hypothesis that companies would like to do more accrual-based earnings management during the period, and the motivation to do so increases because it is easier and more direct. This empirical evidence of accrued earnings management in COVID-19 is new.

Table 5. Independent Director of Social Network and AEM before the COVID-19 pandemic

Variable(s)	(1) AEM	(2) AEM	(3) AEM	(4) AEM	(5) AEM	(6) AEM
Degree	0.0004 (1.406)					
Between		0.0003 (1.236)				
Close			0.0002 (1.173)			
Eigen				0.0003		

Variable(s)	(1) AEM	(2) AEM	(3) AEM	(4) AEM	(5) AEM	(6) AEM
				(1.553)		
Ave					0.0004 (1.503)	
PCA						0.0005 (1.502)
Size	-0.0153*** (-11.323)	-0.0153*** (-11.325)	-0.0153*** (-11.315)	-0.0153*** (-11.338)	-0.0154*** (-11.343)	-0.0154*** (-11.343)
Lev	0.0057*** (5.683)	0.0057*** (5.680)	0.0057*** (5.690)	0.0057*** (5.689)	0.0057*** (5.678)	0.0057*** (5.678)
Fage	0.0011*** (7.091)	0.0011*** (7.101)	0.0011*** (7.091)	0.0011*** (7.096)	0.0011*** (7.105)	0.0011*** (7.105)
ROA	0.0055* (1.682)	0.0055* (1.692)	0.0055* (1.698)	0.0056* (1.703)	0.0055* (1.696)	0.0055* (1.695)
Grow	0.0071*** (8.369)	0.0071*** (8.379)	0.0071*** (8.386)	0.0071*** (8.388)	0.0071*** (8.383)	0.0071*** (8.383)
Freq	0.0007*** (4.634)	0.0007*** (4.733)	0.0007*** (4.711)	0.0007*** (4.702)	0.0007*** (4.696)	0.0007*** (4.695)
Ins	-0.0002** (-2.433)	-0.0002** (-2.443)	-0.0002** (-2.460)	-0.0002** (-2.471)	-0.0002** (-2.456)	-0.0002** (-2.454)
Bdsize	-0.0008* (-1.908)	-0.0006 (-1.458)	-0.0006 (-1.625)	-0.0006* (-1.682)	-0.0007* (-1.717)	-0.0007* (-1.722)
Inde	0.0087 (0.709)	0.0134 (1.125)	0.0121 (1.018)	0.0116 (0.976)	0.0114 (0.952)	0.0113 (0.948)
Constant	0.1671*** (12.676)	0.1643*** (12.596)	0.1650*** (12.638)	0.1655*** (12.668)	0.1656*** (12.671)	0.1672*** (12.690)
Industry Fixed	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.086	0.086	0.086	0.086	0.086	0.086
F	23.21	23.18	23.18	23.24	23.23	23.23
Observations	10,818	10,818	10,818	10,818	10,818	10,818

Note: Panel A: Before the COVID-19 Period. The table presents t-statistics in parentheses, ***, ** and *, denote significance at the 0.01, 0.05 and 0.1 levels, respectively. The results of regressing AEM on independent director network centrality by the OLS method. Four standard social network centrality proxies to AEM in Columns 1–4 and the average centrality in Column 5. The robustness test of the first principal component by the PCA method is in Column 6.

Table 6. Independent Director Social Network and AEM during COVID-19.

Variable(s)	(1) AEM	(2) AEM	(3) AEM	(4) AEM	(5) AEM	(6) AEM
Degree	0.0007 (1.095)					
Between		0.0010* (1.834)				
Close			0.0007* (1.705)			
Eigen				0.0010** (2.101)		
Ave					0.0011** (1.983)	
PCA						0.0015* (1.955)

Variable(s)	(1) AEM	(2) AEM	(3) AEM	(4) AEM	(5) AEM	(6) AEM
Size	-0.0200*** (-6.479)	-0.0201*** (-6.495)	-0.0200*** (-6.484)	-0.0203*** (-6.557)	-0.0202*** (-6.529)	-0.0202*** (-6.526)
Lev	0.0229*** (3.065)	0.0227*** (3.042)	0.0225*** (3.016)	0.0231*** (3.098)	0.0226*** (3.037)	0.0226*** (3.037)
Fage	0.0007** (2.144)	0.0007** (2.137)	0.0007** (2.071)	0.0006** (2.052)	0.0007** (2.107)	0.0007** (2.111)
ROA	-0.1081*** (-10.068)	-0.1085*** (-10.115)	-0.1080*** (-10.070)	-0.1083*** (-10.096)	-0.1081*** (-10.082)	-0.1081*** (-10.082)
Grow	0.0119*** (2.588)	0.0120*** (2.617)	0.0120*** (2.622)	0.0118*** (2.578)	0.0120*** (2.621)	0.0120*** (2.621)
Freq	0.0008*** (2.717)	0.0008*** (2.749)	0.0008*** (2.762)	0.0008*** (2.799)	0.0008*** (2.763)	0.0008*** (2.760)
Ins	-0.0004** (-2.053)	-0.0004** (-2.060)	-0.0004** (-2.076)	-0.0004** (-2.045)	-0.0004** (-2.053)	-0.0004** (-2.053)
Bdsize	-0.0013 (-1.379)	-0.0008 (-0.925)	-0.0011 (-1.260)	-0.0012 (-1.373)	-0.0012 (-1.411)	-0.0012 (-1.410)
Inde	-0.0004 (-0.017)	0.0116 (0.477)	0.0045 (0.185)	0.0015 (0.060)	0.0019 (0.079)	0.0020 (0.081)
Constant	0.2104*** (7.042)	0.2024*** (6.889)	0.2068*** (7.037)	0.2099*** (7.125)	0.2089*** (7.096)	0.2136*** (7.186)
Industry Fixed	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.159	0.160	0.159	0.160	0.160	0.160
F	18.00	18.14	18.11	18.21	18.18	18.17
Observations	2,154	2,154	2,154	2,154	2,154	2,154

Note: Panel B: During the COVID-19 Period. The table presents t-statistics in parentheses, ***, ** and *, denote significance at the 0.01, 0.05 and 0.1 levels, respectively. The results of regressing AEM on independent director network centrality by the OLS method. Four standard social network centrality proxies to AEM in Columns 1–4 and the average centrality in Column 5. The robustness test of the first principal component by the PCA method is in Column 6.

5. Discussion

This study investigates whether the independent director social network is associated with accrual earnings management and the differences in correlations before and during COVID-19. The empirical results show a significant positive association between the network centrality of independent directors and the companies' accrual earnings management. This result signifies the important role of social networks in facilitating information exchange that directors' social networks as an information dissemination channel for earnings management (Abdul Wahab et al., 2020; Fang et al., 2022; Godigbe et al., 2018). We also find that independent director network centrality is associated with higher accrual earnings management after COVID-19. In addition, from the perspective of the epidemic background, the correlations are different before and after COVID-19. Directors' social network is more relevant to accrual earnings management after COVID-19 because the behavior of AEM rises significantly with higher levels of distress firms engaging in higher levels of AEM (Agrawal & Chatterjee, 2015; Bisogno & De Luca, 2015; Charitou et al., 2007a, 2007b), especially since Covid-19. This article extends the academic literature on financial reporting quality by showing that the social network of independent directors is an indispensable factor in corporate earnings management (Abdul Wahab et al., 2020; Fang et al., 2022; Godigbe et al., 2018). This study provides strong evidence of the important role of social networks in facilitating information exchange, such as 'bad' information before and during the distress period. Moreover, this article verified that independent directors in China do not play an effective role (Wu & Dong, 2021) in terms of accrual-based earnings management.

6. Conclusion

This study concludes that an independent director social network is associated with higher accrual earnings management. This research innovatively incorporates the research findings into the background of the COVID-19 climate. The empirical evidence reveals that independent director social networks are associated with higher accrual earnings management during the COVID-19 period than before. One limitation of this study is its sampled companies. The research and evidence derived from the article are based on a sample of A-share listed companies in China. The findings may vary depending on different director social networks in different countries, and scholars should be cautious about the implications and conclusions of the research on the same academic issue in different countries. Therefore, future research could replicate this study in other countries.

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