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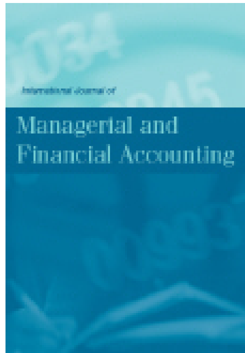

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Does the board of directors influence the likelihood and resolution of financial distress?

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Abstract: The current study investigated the effect of board of directors (i.e., CEO duality, independence, multiple directorships, politically connected directors, and size) on the financial distress measured using Altman's (1968) Z-scores model as a proxy for a firm's financial distress. A panel dataset of 260 firm-year observations from Jordanian industrial corporations listed on the Amman Stock Exchange from 2014 to 2018 was investigated. Using panel mixed-effect regression, the results show that board size and CEO duality have a significant impact in mitigating a firm's financial distress, while board independence, multiple directorships, and politically connected directors with financial distress were not statistically significantly associated with financial distress. These results indicate that a large board size accompanied by CEO duality leads to better oversight, reducing a firm's financial distress. The current study supports stewardship theory arguments that suggest that CEO duality improves the process of decision-making.

Keywords: board of directors; Altman's Z score; financial distress; Jordan.

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1 Introduction

Financial distress is a broad term that refers to circumstances in which companies are occurring financial problems. Financial distress is a business's failure to meet or pay its financial obligations (Andrade and Kaplan, 1998; Whitaker, 1999; Asquith et al., 1994; Wruck, 1990). Baldwin and Mason (1983) noted that the primary indications of distress are typically abuses of a debt covenant coupled with the reduction or omission of dividends. Adeyemi (2011) defined financial distress as circumstances in which a business has 'operational, administrative, and financial difficulties' that make it unable to meet its obligations on maturity dates (p.100). In fact, there is widespread agreement that a corporation is in a financial crisis when it cannot satisfy its financial obligations. The research literature related to corporate failure argues that financially healthy companies have a better structure of corporate governance than financially distressed ones (Daily and Dalton, 1994; Lee and Yeh, 2004; Wang and Deng, 2006; Fich and Slezak, 2008; Lajili and Zéghal, 2010; Shahwan, 2015; Manzaneque et al., 2016). Platt and Platt (2012) noted that corporate governance mechanisms mitigate or control managerial self-interest for a firm to create as much wealth for shareholders as possible. So, good practices of a firm's governance structure play an essential role in continuing corporate activities, supporting business performance, and guarding against a firm's financial distress problems (Ud-Din et al., 2020).

This study's theoretical framework includes agency theory, which is based on a separation of management and ownership and leads to conflicts between shareholders and managers. Shareholders bear 'agency costs' to limit the destructive behaviours of executive managers that would harm shareholders' interests (Jensen and Meckling, 1976). Having an effective board and hiring a high-quality external auditor are essential in protecting the interests of shareholders. The board bears primary responsibility for overseeing the decisions and actions that management takes and protecting a company's resources from exploiting managers, such as increasing managers' bonuses or other invisible rewards (Khalil and Ozkan, 2016; Ombaba and Kosgei, 2017). The director's board is the key component of a company's governance structure, forming a protective barrier between shareholders and management. Based on the agency theory, the boards supervise management behaviours to reduce agency conflicts and align shareholder and management interests, monitor the chief executive officer (CEO), hire management staff, and protect the shareholders' interests (Jensen, 1993; Fama and Jensen, 1983b; Shleifer and Vishny, 1997; Al Daoud, 2020). Jensen (1993) claims that problems related to business internal control structures begin with the characteristics of the board members. From this perspective, effective boards can improve a business's performance and serve a vital function in the process of decision-making (Fama and Jensen, 1983a).

Meanwhile, resource dependence theory assures that the boards' characteristics represent a link between the external environment and the corporation, and that helps secure company resources more easily and obtain vital information that reduces uncertainty (Hillman et al., 2000; Hillman, 2005; Provan, 1980; Pfeffer and Salancik, 1978). Each director may bring linkages and resources via expertise, skills, information, and access to major parties, such as purchasers, social groups, legislators, and suppliers, and help obtain legitimacy. Daily et al. (2003) hypothesised that access to resources improves a firm's performance, functioning, and survival by protecting it from external variables. Therefore, features of the director's board help decide the board's ability to supervise and provide essential information, control managers, give guidance to

management, and ensure compliance with rules and relevant laws involving the company and the external environment.

This study's key objective is to ascertain the effect of various boards of director mechanisms (including board size, CEO duality, independence, multiple directorships, and politically connected directors) on firms' financial distress in Jordan, an emerging country. The reason for choosing these characteristics is that they are frequently used in the previous literature to represent the board of director instruments. These attributes are also anticipated to influence the board's efficiency in monitoring and supervising the company, affecting a firm's performance. It is supposed to offer substantial evidence to the board of directors on companies' financial distress resolution. While most previous research on this topic has been undertaken in emerging or developed economies, this study looks at this relationship in developing nations. It will help to improve understanding of how boards of directors in these countries can effectively monitor management's opportunistic behaviour to safeguard the interests of all firm's stakeholders. Our findings might alert regulators to areas where corporate governance standards need to be changed. In addition, they can assist businesses in identifying traits or practices that may alleviate their financial difficulties. Finally, the findings will aid in determining whether the directors' board members have an asymmetric impact on the possibility and resolution of a firm's financial distress in developed and developing nations.

This study includes the non-traditional categories of board variables, including directors' political influences and the multiple directorships of board members. Jordan's financial market is emerging, with weak protection rights and an unstable economy, and these reasons lead to directing attention to the role of the boards in improving Jordanian firms' performance through their pursuit of innovative ideas, obtaining and applying knowledge, and integrating their business into competitive international markets.

2 Literature review and research hypotheses

2.1 Board size

A company's board size represents the total number of members of directors on a board in a specific year. Having the correct number of board members is essential because proper board size ensures managerial monitoring quality and control (Lakshan and Wijekoon, 2012). From the viewpoint of resource dependence theory, a board with a large number of members increases a company's ability to form external links that help secure necessary resources more easily (Dalton et al., 1999; Dhamadasa et al., 2014). Additionally, large-sized boards can draw upon a wide pool of knowledge and diverse expertise to help make sound decision-making and limit the power of CEOs (Tornyeve and Wereko, 2012). From the agency theory perspective, Jensen (1993) argued that increasing board size reduces board effectiveness because of problems related to coordination and communication between board members, and these restrict the board's capacity to supervise and follow up on the management's progress. Therefore, a smaller-sized board is preferable to enhance performance.

The outcomes of previous explorations concerning the effects of board size and financial distress are mixed. Fich and Slezak (2008) and Dhouibi (2013) found positive effects between board size and a company's financial distress. They explained that a large board member hinders coordination and communication between their members, which reduces their role in making important decisions and supervising managers in firms. Consistent with this view, John and Ogechukwu (2018) concluded that a small board reduces financial distress due to involvement in strategy formation and makes decisions faster than large boards. Manzaneque et al. (2016) showed a negative association between a large-sized board and a company's financial distress. They said that a large board of directors represents a wide range of interests and views, which emerge a conflict of interests among the board members, meaning that each board member has an interest that may not be compatible with the other members. This leads to the unification of interests, which works to achieve the greatest interests of shareholders. Ud-Din et al. (2020) found that increasing board size reduces the probability of financial distress by decreasing overlapping roles and improving board member efficiency. However, Wang and Deng (2006) and Nasir and Ali (2018) did not discover any connection between the size of the board and financial distress. Accordingly, due to the mixed effects of previous studies, determining the specific number of board members to serve remains enigmatic; the first hypothesis about board size is suggested:

H1 There is a significant relationship between board size and financial distress in Jordanian industrial listed firms.

2.2 Board independence

Board independence is often defined in terms of external members who have no relationship with the firm except that they are members of the firm's board. From the agency theory's perspective, independent members monitor management decisions without bias and direct their expertise to achieve a shareholder's best interests. They prevent top executives from using the firm's resources to achieve their interests, as they act as arbitrators among internal managers, which reduces agency problems (Fama, 1980; Fama and Jensen, 1983b). Conversely, stewardship theory argues that inside directors are better because they are more familiar with the activities and have more knowledge and experience of a firm's business and operations, making the best decisions (Aduda et al., 2013; Tornyeve and Werek, 2012).

Literature regarding the effects of board independence and a company's financial distress indicated a negative correlation between having more independent directors and a company's financial distress (Ombaba and Kosgei, 2017; Li et al., 2008). This result is in line with 'monitor and control' arguments, which means independent board members are operative monitors restricting management's power. Similarly, Salloum et al. (2013) found that financial distress positively correlated with board members with fewer outside directors. However, John and Ogechukwn (2018) found that independent directors were related to Nigerian banks' financial distress. They argued that independent directors may have lacked the financial expertise and knowledge related to internal working and the risks involved in banks. In addition, Abdullah (2006) showed a positive relationship

between independent board members and a firm's financial distress in Malaysia because independent directors were often inactive. Last, Lajili and Zéghal (2010) and Ahmad and Adhariani (2017) found that independent board members did not influence a firm's financial distress. In the context of mixed results regarding the connection between board independence and a company's financial distress, the next hypothesis is posited:

H2 There is a significant relationship between board independence and financial distress in Jordanian industrial listed firms.

2.3 CEO duality

CEO duality is when the same person holds the positions of chairman of the board and CEO. Based on the agency theory argument, Lipton and Lorsch (1993) argued that it is challenging for the director's board to perform its critical roles without separating the CEO and chair positions. CEO duality leads to reduced effective oversight and allows a CEO to control decision-making and preference for personal benefit, increasing agency costs that negatively affect the firm's performance. However, according to the stewardship theory, CEO duality enables a CEO to make decisions more quickly and effectively, interact with shifting business conditions, and take simpler, more effective actions (Boyd, 1995).

As for the link between CEO duality and the probability of a company's financial distress, Maere et al. (2014) study conducted in Belgium revealed that firms with boards separate the CEO positions and board chair were less apt to become bankrupt. They argued that separating roles enhanced a company's ability to provide sound advice and counsel. This corresponds to a study by Daily and Dalton (1994) reporting a positive relationship between the duality of the CEO and the probability of bankruptcy, which they said resulted from the centralisation of decision-making and the absence of control over decisions taken by the same person holding two administrative positions. In contrast, Miglani et al. (2015) concluded that the duality role of the CEO reduced the likelihood of a company's financial distress because duality was likely to provide strong leadership and a centralised focus on achieving a firm's objectives and provide strong leadership to a firm. In addition, Simpson and Gleason (1999) showed a lower possibility of a corporation's financial distress when the same person was the chairman and CEO. However, some studies found no association between CEO duality and financial distress (Salloum et al., 2013; Manzaneque et al., 2016; Nasir and Ali, 2018). Consequently, the following hypothesis is posited.

H3 There is a significant relationship between CEO duality and financial distress in Jordanian industrial listed firms.

2.4 Multiple directorships

Multiple directorships are the director's members who hold several outside firms' directorships. The influence of multiple directorships on boards can be discussed based on two hypotheses. The busyness hypothesis claims that directors with outside directorships may reduce management oversight and neglect their duties towards a firm due to distributing their time and efforts to several boards (Ferris et al., 2003). Fich and Shivdasani (2006) noted that many outside directorships reduce a firm's performance because corporate governance becomes reduced. Conversely, the reputation hypothesis

argues that directors affiliated with other boards lead to developing their managerial experience by informing them of the administrative methods and strategies used in other firms (Jiraporn et al., 2009). Likewise, busy directors help a firm build good contracting relationships with other companies, important customers, or suppliers (Ferris et al., 2003). From this perspective, busy directors may obtain important information about other firms and use them to enhance their competitive advantage (Hamdan, 2018).

Few prior studies examined the effect of multiple directors and the firm's financial distress. Maere et al. (2014) showed a positive effect between busy directors and the occurrence of bankruptcy because busy directors give less time to follow up on a firm's matters and provide advice on critical strategic decisions. Likewise, Hamdan (2018) found that busy directors decreased board effectiveness in promoting the performance of Saudi-listed firms. In contrast, Lu et al. (2013) found that busy directors positively affected the performance of Chinese firms because of their ability to obtain appropriate information and resources due to their extensive relationships with other firms and seek to enhance the efficiency of the corporate governance structure. Ombaba and Kosgei (2017) showed a negative but insignificant association between board members with multiple directorships and the likelihood of a company's financial distress. Hence, the hypothesis about multiple directorships is posited:

H4 There is a significant relationship between multiple directors and financial distress in Jordanian industrial listed firms.

2.5 Political connections

Politically connected directors currently hold seats in the parliament or the ministries, municipal, political parties, or government positions (Menozzi et al., 2014). The resource dependence theory indicates the importance of the background of director members and their experiences in many areas like politics to improve board effectiveness to serve the firm to create relations with important sources, decrease uncertainty and gain access, information, and legitimacy (Hillman, 2005). Elhabib et al. (2015) postulated that the presence of political members on a board might allow a firm access to sources of low-cost financing and obtain internal information about government projects and strategic plans related to the industry to which the firm belongs. Likewise, Faccio (2002) argued that political directors help firms obtain tax benefits and enter the markets more easily and powerfully. Also, corporations with a political connection are more likely to be bailed out by their governments when facing financial turmoil than non-politically connected firms (Faccio et al., 2006). On the other hand, a director with a political background may reduce the board's efficiency due to their insufficient experience and knowledge in the business environment (Shin et al., 2017). Moreover, firms with politically connected directors can afford to release lesser-quality accounting information because of a decreased necessity to react to market pressure to enhance information quality (Chaney et al., 2011).

Maaloul et al. (2018) showed a positive association between the director's members with political influences and the performance of Tunisian firms because these directors enable a firm to obtain government support and external resources easily, and investors are choosing to invest in politically connected corporations which lead to gain a competitive advantage that enhances its value. However, Jaffar and Abdul-Shukor (2016) found an inverse effect between the existence of political director members and

Malaysian firm performance because these directors harm a firm's public image, which reduces its value. At the same time, the study of Hidayat and Utama (2016) showed that directors with political connections did not influence the financial performance of Indonesian firms. Therefore, the political connection hypothesis is proposed.

H5 There is a significant relationship between political directors and financial distress in Jordanian industrial listed firms.

3 Methodology

3.1 Sample and data collection

The sample comprised a panel dataset of all industrial companies listed and regulated by listing requirements of the (ASE) from 2014 to 2018. The final study sample comprised 52 industrial firms listed on the (ASE). This study excluded companies that did not provide the requested information for the study's variables; therefore, the final sample was 260 firm-year observations from 2014 to 2018. This study used secondary data, and the data for financial ratios were obtained from the ASE and the companies' websites. All of the governance variables used in this study were gathered from the annual reports of the sampled firms over the period (2014–2018).

3.2 Variable measurements

3.2.1 Independent variables

To evaluate the company's financial distress (dependent variable), the current study employed Altman's (1968) Z-scores model. Altman classified firms into the following three groups: 'strong' if the Z rate was > 2.99, which indicates that a company is not facing financial distress, 'moderate' if the Z rate was between 1.811 and 2.99, which indicates that a company was not facing financial distress currently but may face financial problems in future, and 'weak' if Z rate was < 1.81; here, a firm is facing financial distress. Altman (1968) created the Altman Z-score model, also defined as the multiple discriminant analysis (MDA) model, to predict corporate financial distress. According to Altman (1968), the Z-score model is a linear combination of five common financial ratios. The Z-Score model from 1968 was chosen as a method for financial distress prediction since it is simple to use and has a high accuracy level in predicting financial distress in industrial firms (Pernamasari et al., 2019, Al-Manaseer and Al-Oshaibat, 2018). Furthermore, the Altman model was employed in this study because no information has been issued by the competent authorities indicating which companies are financially distressed in Jordan, and the data that the Altman model requires is available and measurable. Furthermore, most previous studies used the Altman model (Udin et al., 2017; Zureigat et al., 2014; Makhlouf and Al-Sufy, 2018). The Z-score in this study is determined by five of Altman's ratios, as shown in the equation below.

$$\begin{aligned}\text{Z-score} = [&0.012 \times X_1 (\text{working capital / total assets}) + 0.014 \\ &\times X_2 (\text{retained earnings / total assets}) + 0.033 \\ &\times X_3 \ \text{earnings before interest and taxes / total assets} + 0.006 \\ &\times X_4 (\text{market value of shares / total liabilities}) + 0.999 \\ &\times X_5 (\text{sales / total assets})]\end{aligned}$$

and coded as a categorical variable that takes the value of 0 for a firmwith Z-score value < 1.811, 1 when the Z-score value falls between 1.811 and 2.99, and 2 for a firm with Z-score value > 2.99.

3.2.2 Dependent and control variables

This study uses five features of the board of directors as independent variables (CEO duality, independence, multiple directorships, politically connected directors, and size). Board size comprised the total number of members serving on a firm's board (Wang and Deng, 2006; Maere et al., 2014; Al Daoud et al, 2014; Desoky et al., 2020). Board independence was measured by dividing the total of independent members by the total board size, where independent board members are those with no affiliation to the company (Ombaba and Kosgei, 2017; Nasir and Ali, 2018). CEO duality was a dummy variable with a value of one when the same person acted as both the chairman and the CEO; otherwise, the value was zero (Manzaneque et al., 2016; Al Daoud et al, 2015). Multiple directorships was the percentage of board members who concurrently served on the boards of three or more businesses (Ferris et al., 2003; Odat et al., 2021). Political connections were computed by dividing the number of board members of the corporation who currently or previously held a political position in the Jordanian government by the total board members (Hidayat and Utama, 2016; Maaloul et al., 2018; Al Daoud and Kharabsheh, 2022). Leverage, return on assets, firm size and market-to-book ratio were used as control variables in addition to the above independent variables. Firm size was created by computing the natural logarithm of a company's total assets (Hossain et al., 2018). Leverage was computed by dividing the total debts by a firm's total assets (Gauvin and Power, 2019). Return on assets was computed by dividing the net income by a firm's total assets (Sharifi et al., 2021).

3.3 Model specification

A linear mixed model regression was used to investigate the association between board characteristics and a company's financial distress. The model included a random intercept to capture variation between firms and assumed the variance-covariance structure within firms was an autoregressive of the first order. In addition, the model was estimated with clustered robust standard errors at the firm level.

$$\begin{aligned}Altman\text{'s } Z\text{-}score_{it} = &B_0 + B_1 \ Board\ Size_{it} + B_2 \ Board\ Independence_{it} \\ &+ B_3 CEODUAL_{it} + B_4 Multiple\ director_{it} \\ &+ B_5 \ Political\ connections_{it} \\ &+ B_6 Size_{it} + B_7 Leverage_{it} + B_8 Return\ on\ assets_{it} + \mu_i + \varepsilon_{it}\end{aligned}$$

4 Results

4.1 Descriptive statistics

Table 1 summarises the descriptive statistics (i.e., standard deviation, mean, maximum and minimum) of the study variables. Panel A's results in Table 1 show that the mean Altman Z-score was 4.797, with a maximum value of 94.668 and a minimum of –3.947. This outcome was more than the safe level and different from Manaseer and Al-Oshaibat's (2018) findings, which found an average Altman's Z-score of 2.96. Furthermore, the results from panel B show that 105 (40.7%) of the total sample fell within the safety zone (healthy firms). The analysis also shows that 38 (14.73%) of the study sample were currently financially non-distressed firms, but these firms were likely to face future financial difficulties. However, 115 (44.57%) financially distressed firms fell within the danger zone. These companies suffer from a severe lack of liquidity that could make them unable to fulfil their demands, which could lead them to the phase of insolvency.

Table 1 Descriptive statistics of measured variables for 52 firms (fiscal years 2014–2018)

Variable	*Mean*	*Std. dev.*	*Min*	*Median*	*Max*
Panel A: Continuous variables					
Altman's Z-score	4.797	10.588	-3.947	2.148	94.668
Board size	7.760	2.122	4	7.000	13
Board independence	0.432	0.253	0	0.414	1
Multiple directors	0.314	0.186	0	0.308	0.778
Political connections	0.180	0.127	0	0.167	0.571
Firm size (log)	7.348	0.596	5.505	7.246	9.083
Leverage	0.366	0.247	0.004	0.334	1.542
Return on assets	0.015	0.423	-1.952	0.006	6.257
Market to book ratio (log)	0.730	1.411	-2.816	0.533	5.048

Panel B: Categorical variables			
	Frequency of 0's	*Frequency of 1's*	*Frequency of 2's*
Altman's Z-score	115 (44.57%)	38 (14.73%)	105 (40.70%)
CEO duality	123 (47.67%)	135 (52.33%)	

Note: This table presents summary statistics of the sample, which consists of 260 observations (52 firms) between 2014 and 2018.

According to the descriptive result in panel B, the average for CEO duality was 52.3%. This result is lower than Al Daoud et al. (2018), who found an average CEO duality percentage in Jordanian industrial corporations of 64%. The results from panel A indicate that the average board size value was about 7.76, with a minimum value of 4 and a maximum of 13, respectively. The average board independence value, computed by the percentage of independent board directors, was approximately 43.2%, with a minimum value of 0 and a maximum value of 1. Regarding board political connections, 18% of the study sample had political connections, with a minimum of 0% and a maximum of 57.1%. The average busyness of directors in this study was 31.4%, with a minimum value

of 2 and a maximum value of 77.8. Regarding the control variable of this study, the descriptive statistical analysis in Table 1 revealed that the mean value for log size, leverage, ROA, and market-to-book ratio were about 7.384, 0.366, 0.015, and 0.730, respectively.

4.2 Main results and discussion

4.2.1 Correlation analysis

Table 2 shows Pearson correlation coefficients between the variables of the study. Pearson correlation coefficients are used in the current study to check the multicollinearity between a study's variables. According to this study's Pearson connection matrix, the highest correlation (–0.421) existed between Altman's Z-score and leverage. It seems that higher leverage was significantly associated with higher financial distress possibilities. However, as the table shows, all the correlations between the study's variables were less than 0.70. Thus, no multicollinearity problem was present in the data, and multicollinearity is a threat to the regression results in this study (Gujarati and Porter, 2009).

4.2.2 Regression analysis

This study hypothesised that CEO duality was associated with a lower likelihood of a company's financial distress. As shown in Table 3, the regression results exhibit a significant and positive association between CEO duality and Altman's Z-score as a measure of financial distress (coefficient = 0.586 and $p < 0.05$). Companies that combine the chair and CEO roles are less apt to experience financial distress because the company's ability to provide sound advice and counsel is enhanced by combining the roles of the CEO and board chair. These findings support the stewardship theory and show that the dual CEO role is valuable and advantageous for business performance and can give strong leadership while facilitating business strategy creation and cooperation (Hassan et al., 2023). In other words, CEO duality increases the effectiveness of the board of directors and their responsibilities to monitor and control management, leading to reducing the probability of financial distress. This result aligns with those of previous studies. For example, Hassan et al. (2023) revealed that companies with boards that combine the duties of the CEO and board chairman provide considerably higher cumulative abnormal returns than other companies. In terms of financial distress, Brédart (2013) discovered that defaulted companies have CEOs who had more tenure and owned less of the company. Furthermore, the stewardship theory supports the positive results, claiming that CEO duality facilitates the CEO's ability to take relatively simple and easy action while allowing for slightly more accurate decision-making (Boyd, 1995). Moreover, these findings contradict the argument of agency theory, which proposes that the CEO and chair positions should be separated. Two persons should fill the two positions to avoid conflicting interests and maintain management supervision because the board is primarily accountable for controlling management. At the same time, the CEO is in charge of carrying out a company's strategy.

Table 2 Pearson correlation between the measured variables of 52 firms (2014–2018)

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1	Altman's Z-score	1								
2	Board size	0.158*	1							
3	CEO duality	0.095	0.082	1						
4	Board independence	–0.159*	–0.015	–0.126*	1					
5	Multiple directors	0.130*	0.004	–0.174**	0.087	1				
6	Political connections	0.062	0.090	–0.111	0.156*	0.220**	1			
7	Size	0.040	0.203**	0.095	–0.324**	0.014	0.125*	1		
8	Leverage	–0.421**	–0.174**	0.059	0.042	0.036	–0.019	0.036	1	
9	Return on assets	0.055	0.058	0.084	–0.068	0.048	–0.137*	0.174**	–0.114	
10	Market-to-book ratio	0.663*	0.164*	–0.045	–0.071	0.048	0.037	–0.109	0.078	–0.698*

Notes: **Correlation is significant at the 0.01 level; *correlation is significant at the 0.05; n = 260. Table 1 explains all variable measurements.

Table 3 Regression results of Altman's z-score on corporate governance variables for 52 firms (fiscal years 2014–2018)

Dependent variable:	*Altman's Z-score (continuous)*		
	Mixed-effects		
	Coef.	*SE*	*z*
Board size	0.277	0.092	3.02**
CEO duality	0.586	0.293	2.00*
Board independence	–1.055	0.557	–1.89
Multiple directors	–1.261	0.680	–1.86
Political connections	0.838	1.091	0.77
Size	0.031	0.353	0.09
Leverage	4.033	1.621	2.49*
Return on assets	0.158	0.981	0.16
Book-to-market ratio	2.596	0.279	9.3**
Constant	–0.399	2.204	–0.18
Random intercept	0.000	0.000	0.014
rho	0.535	0.159	3.377**
Year dummies	Included		
Wald chi-square	429.31**		
No. of firms	52		
No. of observations	260		

Notes: Altman's Z-score is measured as a continuous variable under mixed-effects, random effects, and fixed-effects models and a categorical variable in logistic regressions (the mixed effects and random effects). Rho refers to the first-order autocorrelation coefficient. Standard errors are robust and clustered at the company level for the mixed effects. **Coefficient is significant at the 0.01 level; *coefficient is significant at the 0.05; n = 260. Table 1 explains all variable measurements.

Regarding the relation between board size and a company's financial distress, the effects were consistent with expectations; they were significant with Altman's Z-score (coefficient = 0.277 and $p < 0.05$). The significant relationship indicates that board size plays an active role in reducing the likelihood of a company's financial distress. A large board allows for better communication of information and expertise, decreasing the possibility of a company's financial distress. The reason for the significant relationship between board size and financial distress is that Jordanian enterprises are largely owned by families who are heavily active in family firm management. As a result of family members dominating the boards, the boards' size becomes advantageous in decision-making. The findings are like those of Ud-Din et al. (2020), who showed that increasing board size reduces the probability of financial distress by decreasing overlapping roles and improving board member efficiency. Furthermore, these findings align with resource dependence theory, which contends that board members provide various benefits, such as access to resources and information, to help the firm achieve its goals (Ud-Din et al., 2020). The positive and significant relationship between board size and financial distress supports the agency theory argument, indicating that a bigger board increases firm performance via better observation by a large group of people who bring a diverse range

of knowledge and expertise in various fields, providing greater monitoring ability and enhancing the firm's capability to create external connections (Kalsie and Shrivastav, 2016).

In contrast to expectations, the results showed that board independence did not significantly influence the likelihood of a company suffering financial distress (coefficient = –1.055 and p > 0.05). One argument is that board independence may be ineffective and not actively reduce a company's financial distress. Thus, the reason for the significant association between board independence and a company's financial distress in Jordanian firms is that boards may not really be independent, potentially resulting in a board's control function being compromised. This study supports the results of Lajili and Zéghal (2010) and Ahmad and Adhariani (2017), documenting no significant association between an independent director member and a company's financial distress. Conversely, this study's results are contrary to Ombaba and Kosgei (2017) and Li et al. (2008), which indicated that the presence of more independent board members harmed a company's financial distress.

Table 3 reveals the analysis result between board members with multiple directorships and a company's financial distress. In contrast to expectations, the study's findings show that the association between multiple directorships and Altman's Z-score was insignificant (coefficient = –1.261 and p > 0.05); thus, multiple directorships did not affect whether a firm was in financial distress. This result aligns with Ombaba and Kosgei (2017), who found no correlation between multiple directorships and the possibility of financial distress. A potential explanation for the insignificant result might be that the percentage of directors holding several outside directorships in firms is not big compared to other nations, according to the study's descriptive results above. Likewise, the findings related to the board's political connections did not support the third hypothesis because political connections did not significantly affect the possibility of a corporation suffering financial distress. The outcomes indicate that a political relation on the board does not have a role in identifying whether a company is financially distressed. The research results differ from those of Maere et al. (2014), who stated that busy directors positively affect the occurrence of bankruptcy because multiple directors have less time to follow up on a firm's issues and provide strategic advice. A probable explanation for the insignificant association between the board's political connection and company's financial distress is the significant dominance of directors who do not have political connections.

Concerning the control variables employed, Table 3 shows that the book-to-market ratio significantly affects a company's financial distress from the regression analysis. This shows that corporations with a sizeable book-to-market value will be less likely to face the probability of financial difficulties. The findings align with Nugroho's (2020) findings, which show that the book-to-market ratio has a significant and positive influence on stock returns and ROA as a proxy for profitability. Regarding the connections between a firm's size, ROA, and firm's financial distress, the results of the present study in Table 3 show that financial distress was not significantly related to firm size as calculated by total assets and ROA (coefficient = 0.031 and p > 0.09), (coefficient = 0.158 and p > 0.16), respectively.

Table 4 Regression results of coverage ratio for 52 firms (fiscal years 2014–2018)

Independent variable	*Dependent variable*
	Coverage ratio
Board size	2.15** (0.387)
CEO duality	1.98* (0. 265)
Board independence	–1.07 (–1.231)
Multiple directors	2.49** (0.176)
Political connections	–1.04 (1.438)
Size	0.26 (1.231)
Return on assets	0.18 (2.893)
Leverage	–1.24 (0.153)
Book-to-market ratio	0.98 (1.676)
Year dummies	Included
Prob > F	0.000
R-squared	26.42
No. of firms	52
No. of observations	260

Note: **Coefficient is significant at the 0.01 level; *coefficient is significant at the 0.05.

To double-check the present study results and ensure the robustness of the study models, the coverage ratio (net income/interest expenses) was employed as a proxy of financially distressed firms following Asquith et al. (1994) and Salloum et al. (2012). Table 4 reported the analysis results using coverage ratio and confirms our previous findings, where a positive and significant association existed between CEO duality and coverage ratio. The results indicate that a corporation's ability to offer wise guidance and counsel is improved by merging the duties of the CEO and board chairman; hence, businesses that combine the chair and CEO roles are less apt to encounter financial distress. The study's results supported the argument that a dual CEO might result in a more integrated leadership structure, which would speed up decision-making and be advantageous for businesses operating in highly competitive situations (Donaldson and Davis, 1991). The results also confirmed that firms with large boards of directors might have broader discussions on top management policies, ensuring more effectiveness in management behaviour monitoring and more effective decision-making processes than smaller board sizes, which leads to reduced firms' financial distress. The results show that smaller boards are less effective at monitoring top management, which could result in financial distress. The study also revealed that multiple directorships were negatively related to a firm's financial distress using the coverage ratio as a proxy of financially distressed

firms. According to the findings, participating on several boards of directors involves gaining more expertise and a higher motivation to perform better; therefore, multiple directorships negatively affect the firm's financial distress. Therefore, the present study's findings supported Ferris et al. (2003), who showed that directors holding many outside directorships assist a company in developing positive contracting connections with other firms, key clients, or vendors.

5 Conclusions, limitations, and recommendations

This research investigated the effect of five board directors' attributes on the firm's financial distress of the industrial companies listed on the ASE from 2014 to 2018. These attributes were board size, CEO duality, independence, multiple directorships, and politically connected directors. This study employed Altman's Z-Scores Model (1968) to assess a firm's financial distress. Using panel data for a sample of 52 industrial ASE-listed companies, the regression analysis found no significant relationship between board independence, multiple directorships, and politically connected director members and a firm's financial distress. The analysis also suggested a negative relationship between CEO duality and a company's financial distress. Based on the results, one conclusion is that when a firm's CEO also holds the chair of the board position, a company becomes less likely to face financial difficulties, reducing financial distress. Thus, CEO duality improves the efficiency of the board and their obligations to monitor and regulate the management, lowering the risk of a financial crisis.

The study also shows that board size influences a firm's financial distress significantly and negatively, which reveals that a large board member is related to a lower probability of a company's financial distress. The results indicate that larger boards increase board effectiveness and appear to be more cohesive and more likely to contribute to the firm's strategic decision-making, consequently leading to improved firm performance and, as a result, reducing a firm's financial distress. Furthermore, the book-to-market ratio significantly influences a firm's financial distress, and firms with a sizeable book-to-market value are less likely to face financial difficulties. The result of the study suggests that firms with a sizeable book-to-market ratio will tend to provide high stock returns and are more likely to decrease the likelihood of a corporation's financial distress as a result of achieving high performance.

This study is consistent with the viewpoint of resource dependence theory which posits that the effective structures of the board of director within companies allows for a better exchange of skills and expertise and improves a company's capacity to create external relationships that make it easier to get critical resources, which can decrease the likelihood of financial distress for a firm. Supporting the stewardship theory, this study's results indicate that CEO duality leads to greater effectiveness and efficiency in its oversight role and management's activities and behaviour are likely to be highly controlled. The study's findings may be helpful to company executives and others who want to increase the efficiency of their boards and the credibility of financial reporting to investors. The findings also provide important insights into the factors that may influence the financial distress in Jordanian companies, lead to a better understanding of current financial distress literature, and work as a guide for regulators, policymakers, scholars, and academicians in developing new strategies to improve firm performance in developing countries. This study recommends further research with a larger number of

data and more board of director attributes, which would improve the analysis and generate more reliable findings. Studies might also see what results can be obtained in other Jordanian company sectors.

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