



Voluntary corporate governance structure and financial distress: Evidence from Australia



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ABSTRACT

We examine the role of voluntary adoption of corporate governance mechanisms in mitigating the financial distress status of firms. Using a sample of 171 financially distressed and 106 healthy listed Australian firms over the 5-year period prior to the introduction of the ASX Corporate Governance Council Code in 2003, we find support for the argument that the adoption of certain corporate governance mechanisms is beneficial for firms, as reflected in a reduced likelihood of financial distress. In particular, greater levels of blockholder and director ownership and the existence of a separate audit committee are associated with lower financial distress likelihood. We also find causal evidence that the voluntary adoption of particular corporate governance structures leads to lower levels of financial distress, rather than financial distress recognition leading to corporate governance structural reform.

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1. Introduction

In this paper we examine the association between the voluntary adoption of corporate governance mechanisms and the likelihood of financial distress of listed Australian firms from 1999 to 2003. In particular, we examine whether board composition, director and external ownership, CEO duality and the presence of an audit committee are associated with the likelihood of financial distress of listed Australian firms. The rationale for our choice of this particular period is that it precedes the introduction of the Australian Securities Exchange (ASX) Corporate Governance Council's 'Principles of Good Corporate Governance and Best Practice Recommendations' requirement in 2003.

During 1999–2003, companies effectively voluntarily devised their own corporate governance practices and, since there were no recommended governance practices which companies could follow, Australian listed firms varied significantly in their corporate governance practices (Henry, 2008).

Focusing on a time period incorporating no formal corporate governance requirements provides an opportunity to directly assess: (i) whether companies that are closer to, or have a higher probability of financial distress, adopt corporate governance structures that differ compared to those employed by healthier firms; and (ii) whether there is a bi-causal relationship between financial distress and corporate governance. This approach differs from prior studies which examined the link between corporate governance and the probability of financial distress in environments where formal corporate governance codes exist. This latter setting introduces potential noise or bias resulting from firms adopting prescribed corporate governance platforms, including situations of non-mandatory compliance, rather than

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identifying voluntary corporate governance reform responses to firm-specific conditions.

Few prior studies have examined the direct association between various corporate governance attributes and financial distress of firms. Exceptions are [Abdullah \(2006\)](#) for Malaysian firms, [Elloumi and Gueyle \(2001\)](#) for Canadian firms, and [Lee and Yeh \(2004\)](#) for Taiwanese firms. [Elloumi and Gueyle \(2001\)](#) examined the relationship between various corporate governance attributes, such as the presence of outside directors on boards, equity ownership of outside directors and CEO–chair duality, with the likelihood of financial distress of Canadian firms. They found that the presence of outside directors and ownership of outside directors are negatively related to the likelihood of financial distress. However, the presence of CEO and duality fail to show any significant association with financial distress of firms. [Abdullah \(2006\)](#) found that non-executive director ownership and the presence of outside blockholders reduce the probability of financial distress in Malaysian firms. He found no association between board independence, duality and the likelihood of financial distress. For Taiwanese firms, [Lee and Yeh \(2004\)](#) found a higher stock pledge ratio, the largest shareholders exerting more control on supervisors and directors, and greater deviation of control rights from cash flow rights are associated with higher probability of firms experiencing distress the following year.

Our paper extends this literature by examining other governance attributes, including the existence of a board audit committee, which has not previously been considered. Board audit committee activity is expected to be closely aligned with the going concern status of firms. We also attempt, using a simultaneous equations framework, to disentangle the causality issue between corporate governance and financial distress, which has previously been ignored. This is also the first study to provide related evidence in a voluntary corporate governance setting, as we focus on a time period prior to the introduction of a formal corporate governance code in Australia in 2003. Thus, our findings may have important implications for corporate governance policy as set by the ASX Corporate Governance Council by identifying corporate governance attributes that are associated with a reduced level of financial distress likelihood.

Other contributions of our paper include assessing the influence of corporate governance on both binary and continuous variable representations for financial distress, whereas prior literature has only focused on analysing firms defined dichotomously as ‘distressed’ and ‘healthy’. We categorise financial distress based on earnings generation which allows us to examine the influence of corporate governance attributes on operating performance, whereas most previous studies focused on the effects of corporate governance on market-based valuation outcomes. Furthermore, by evaluating corporate governance attributes in an *ex ante* regulatory setting, our results will inform about the likely benefits of the adoption of Best Practice recommendations (or at least a number thereof) now in place.

During the early 2000s, a series of corporate collapses and frauds in Australia, most notably HIH Insurance, One Tel and Harris Scarfe, destroyed substantial amounts of

shareholder wealth¹ and weakened investor trust. As a result of these events, concerns were expressed about the weakness or failure of existing corporate governance practices, which initiated considerable debate on corporate governance practices and led subsequently to the introduction of the ASX Corporate Governance Council Principles of Good Corporate Governance and Best Practice Recommendations reforms.

Prior studies have suggested that agency costs are higher for listed companies in Australia compared to other western countries such as the US and UK ([Fleming et al., 2005](#); [Henry, 2010](#)). The existence of greater agency cost levels further raises concerns about the extent and effectiveness of traditional monitoring and incentive mechanisms. In light of this environment, it is our suggestion that firm corporate governance structure may play an increasingly important role as an effective monitoring mechanism and in reducing agency costs. Prior studies, including [Ang et al. \(2000\)](#), [Fleming et al. \(2005\)](#) and [Singh and Davidson \(2003\)](#), provide evidence that specific corporate governance attributes, including director ownership and board independence, reduce firm-level agency costs. [Henry \(2010\)](#) found that greater overall compliance with a corporate governance code is associated with a lower agency cost platform. There is also a wealth of literature examining the relation between corporate governance and firm performance (see [Brown et al., 2011](#) for a recent literature review, including Australian-related evidence), with mixed evidence regarding the nature of any association between the strength of firm corporate governance and performance outcomes. For Australia, [Henry \(2008\)](#) documented that *ex ante* (or pre-introduction voluntary) compliance with the ASX Corporate Governance Council recommendations positively impacted on the market valuation of a sample of Australian listed companies.

We propose that firms maintaining a lower platform of agency costs are less likely to experience financial distress. If, as the earlier literature suggests, adherence to the recommended corporate governance regime is associated with lower underlying agency costs, stronger firm-level corporate governance should be negatively related to the likelihood of financial distress. We employ both a dichotomous variable indicating financial distress status, and a continuous variable representing financial distress using the [Zmijewski \(1984\)](#) model. The results of our study provide evidence that higher director and blockholder ownership and the existence of an audit committee are significantly negatively related to financial distress likelihood for our sample of Australian firms. Our findings suggest that these governance attributes may act as substitute agency and monitoring mechanisms. Robustness analysis using simultaneous equation system suggests that causality runs from corporate governance attributes impacting on financial distress, rather than vice versa.

The remainder of our paper is structured as follows. [Section 2](#) develops the hypotheses. Data description and sample selection criteria are described in [Section 3](#). The description of variables is provided in [Section 4](#). The empirical

¹ The collapse of insurance giant HIH Insurance in Australia alone has cost shareholders more than \$5.3 billion in losses ([Clarke et al., 2003](#)).

model, findings and endogeneity tests are presented and discussed in Section 5. The final section provides concluding remarks.

2. Hypotheses development

2.1. Board independence

Agency theorists argue that outside directors provide a means for monitoring management activities through an increased focus on firms' financial performance, resulting in the minimisation of agency costs (Fama and Jensen, 1983). Rutherford and Buchholtz (2007) further claimed that an increase in the proportion of outside directors is positively associated with the level of board vigilance, which helps in reducing the degree of information asymmetry and ultimately increases the board's information quality. Others claim that higher representation of outside directors on boards is a viable way of co-opting the environment and reducing uncertainty surrounding strategy development and execution (Pearce and Zahra, 1992). Bathala and Rao (1995) and Rediker and Seth (1995) reported that outside directors play an important role in effective corporate governance, especially in terms of decision-making and control functions. Concerns about reputation effects and the ability to attract other directorships are also expected to motivate outside directors to maximise the financial health and value of firms under their stewardship. This is despite the fact that Chou et al. (2010) identified that if outside directors only focus on shareholders' interests and not those of debt holders then, controlling for the magnitude of firm leverage, they may actually have an incentive to make less effort if firms have a higher degree of financial distress. Elloumi and Gueyle (2001) found that independent directors play an important role in enhancing a firm's financial conditions, supporting the belief that inside directors lack objectivity and independence from management. Thus, consistent with agency and monitoring arguments, we hypothesise that:

H1. There is a negative association between board independence and financial distress.

2.2. Blockholder ownership

Jensen and Meckling (1976) argued that, because of their large ownership stakes in firms, blockholders have incentives to monitor the actions and decision-making of corporate managers, as a means of maximising the value of their shareholdings (and equivalently minimising the potential for losses resulting from financial distress or failure). It has been claimed that the presence of blockholders in a firm pressurises managers to take specific actions, or for directors calling for dismissal of managers, whenever the company appears to be performing below its capacity (Ely and Song, 2000). Furthermore, Abdullah (2006) and Elloumi and Gueyle (2001) found support for the agency or alignment motives by reporting that the magnitude of blockholder ownership is negatively associated with firm financial distress. Consistent with the presence of blockholders providing a positive monitoring influence and

preventing managers from behaving opportunistically, we propose the following hypothesis:

H2. There is a negative association between the ownership of blockholders and financial distress.

2.3. CEO–chair duality

Agency theorists argue that concentrated leadership (CEO and Board Chair are the same person) in a firm leads to CEO entrenchment and a decline in board independence from corporate management, whereas the roles of CEO and board chair being given to two separate individuals reduces the CEO's overall power and increases the ability of the board to perform its appropriate supervisory role (Fama and Jensen, 1983). Dalton and Kesner (1987) and Mallette and Fowler (1992) claimed that separation of the positions of CEO and board chair leads to a more powerful board of directors, which reflects improved ability to oversee management. Liyu et al. (2007) demonstrated that CEO–chair duality impairs the board's monitoring capacity, which leads to more instances of earnings management occurring in firms. It has also been claimed that the lack of CEO–chair duality in a firm reduces the opportunity for the CEO to exercise behaviors which are self-serving and costly to owners (Daily and Dalton, 1994). Chen et al. (2005) argued that managerial entrenchment in the form of CEO–chair duality makes the CEO more powerful within the firm and less likely to be replaced or challenged by the board of directors.

Since the formal corporate governance code in Australia also recommends the separation of CEO and board chair roles (ASX Corporate Governance Council, 2003) as an appropriate structural measure for firms to implement, we hypothesise that:

H3. There is a positive association between CEO–Chair duality and financial distress.

2.4. Director ownership

Prior research shows that director ownership is an effective internal control mechanism for resolving agency problems (Jensen and Meckling, 1976). Jensen and Ruback (1983) further suggested that directors should hold substantial equity interests in their firms, which gives them an incentive to act in the best interests of shareholders. It is also argued that director ownership increases the directors' understanding of the company's operations (Lenne et al., 2005). Mehran (1995) reported that when director ownership tends to be higher, investors view the company as a high-quality investment target. Additionally, the findings of Hanson and Song (2000) support the supposition that higher levels of director ownership give managers' incentives to sell assets that create negative synergies. Abdullah (2006) and Elloumi and Gueyle (2001), in their investigation of financially distressed firms, showed that director ownership in a firm reinforces incentives for directors to monitor management to prevent financial distress. Based on the substantial empirical support for the agency theory explanation of the incentive effects of director ownership, our hypothesis for testing this issue is:

Table 1
Sample information.

Panel A: Sample firms.				
Financially distressed firms				171
Healthy firms				106
Total firms				277
Panel B: Sample firms by Industry and Groups				
Industries	Financially distressed		Healthy	
	No.	Percentage	No.	Percentage
Energy	25	14.62%	7	6.61%
Materials	76	44.44%	15	14.15%
Industrial	15	8.77%	25	23.59%
Consumer Discretionary	9	5.26%	30	28.30%
Consumer Staples	2	1.17%	16	15.10%
Healthcare	21	12.28%	9	8.49%
Information Technology	15	8.77%	1	0.94%
Telecommunication	7	4.10%	1	0.94%
Utilities	1	0.59%	2	1.88%
Total firms	171	100.00%	106	100.00%

Note: Financial firms are excluded from this sample.

H4. There is a negative association between directors' ownership and financial distress.

2.5. Audit committee

An audit committee in a firm works as an internal corporate governance mechanism and reduces agency costs (Forker, 1992), and plays an important role in helping boards of directors in fulfilling their corporate governance responsibilities (Spira, 2003). Collier (1993) found that the presence of an audit committee helps directors in meeting their statutory and fiduciary responsibilities, such as producing accounting records and completing the annual audit process, and ensuring the quality of the financial reporting and control system. The audit committee also enables non-executive directors to contribute an independent judgment and play a positive role in the firm's business matters (Hicks and Goo, 2008). Furthermore, Calleja (1999) reported that companies with an audit committee tend to perform better than companies without one.

On the basis of the discussion earlier, we argue that the existence of an audit committee in a firm enhances the monitoring environment, which should ultimately reduce the likelihood of a firm becoming financially distressed. The hypothesis is therefore as follows:

H5. There is a negative association between the existence of an audit committee and financial distress.

3. Data

We collect accounting, financial and corporate governance data from the Morningstar (formerly Aspect Huntley) DatAnalysis and the Thomson Financial Company Analysis databases. Our initial sample consists of all Australian Securities Exchange (ASX) listed firms as at June 1998. We define financially distressed firms as those experiencing five consecutive years of negative net income from 1999 to 2003. Our definition results in the identification of 215 financially

distressed firms. We exclude 11 financial firms because of their specifications and operating nature, leaving 204 firms. In order to analyse the association between corporate governance characteristics and financial distress, we need complete financial and governance data for the period 1999–2003. This requirement results in a final sample of 171 financially distressed firms.

Our sample of financially healthy firms is classified as those which have experienced five consecutive years of positive net income from 1999 to 2003. After the initial screening of listed firms' financial statements, we located 123 financially healthy firms. After dropping financial firms (9) and firms whose financial and corporate governance information was not available during any of the years from 1999 to 2003 (8), we end up with 106 financially healthy firms. Taken together, we have 1385 firm-year observations. In Table 1, we classify firms into nine industries according to the Global Industry Classification Standard (GICS) codes. A large proportion (44.44%) of the financially distressed firms is concentrated in the Materials industry. Healthy firms, however, belong predominantly to the Consumer Discretionary (28.30%), Industrial (23.59%), Consumer Staples (15.10%) and Materials (14.15%) sectors.

4. Variable description

To investigate the association between corporate governance attributes and a firm's financial distress probability, the following variables are employed.

4.1. Dependent variable

The dependent variable in this analysis is a dichotomous variable coded 1 for financially distressed firms and 0 for healthy firms, based on five consecutive years of net income. The selection of negative net income as a definition for financial distress, however, has limitations. For example, it has been argued that senior management may reduce reported earnings during labour negotiations to

improve their bargaining position (DeAngelo and DeAngelo, 1991). In general, however, companies are more likely to increase rather than decrease earnings, and to create value through earnings management. The fact that a firm reports losses, therefore, is taken as a sign of an important event and, as such, the use of a very strict definition of consecutive negative net income for 5 years is likely to serve as a suitable proxy of financial distress.

4.2. Independent variables

Our first variable of interest is board independence (OUTSIDERS). Following Elloumi and Gueyle (2001), board independence (OUTSIDERS) represents the percentage of the total number of board members that are identified as independent directors.² Blockholder ownership (BLOCKOWN) is defined as the sum of all individual, non-director shareholdings exceeding 5% of company issued equity capital.³ The existence of CEO and board chair duality (DUALITY) is represented by a dummy variable coded as 1 if the CEO is also the chair of the board of directors, otherwise 0. Following Henry (2008), director ownership (DIROWN) is measured as the percentage of total company equity held by all company directors. The existence of a board audit committee (AUDITCOM) is represented by a dummy variable coded as 1 if a separately-constituted operational audit committee is present in a particular firm year, otherwise 0.

We also control for a number of variables that previous studies have shown to be correlated with the financial distress of firms. These include the nature of the audit opinion received by the firm (AUDITOPN). This is represented using a dummy variable coded as 1 if the firm received an unsatisfactory audit opinion⁴ at the end of the applicable financial year period, otherwise 0. The receipt of an unsatisfactory audit opinion from auditors is a negative signal regarding a firm's financial status and we predict that an unsatisfactory audit opinion demonstrates the existence of hidden risk in a firm and has predictive power in determining the financial distress potential of a firm. Empirically, Citron and Taffler (1992) and Hudaib and Cooke (2005) reported that financially distressed firms are more likely to receive a qualified audit report, and Chen and Church (1992) found that going-concern opinions reduce the Chapter 11

(bankruptcy) filing surprise of firms. Following Elloumi and Gueyle (2001), the company's debt position (LEVERAGE) is defined as the ratio of total debt to total assets. The sign for the LEVERAGE variable is expected to be positively related to the probability of financial distress. To control for firm size, the SIZE variable is defined as the natural logarithm of total assets. In line with previous findings, we expect that larger firms are less likely to become financially distressed.⁵ We also control for management efficiency (MGTEFF) using the Sales/Total Assets ratio, with more efficient firms being less likely to experience financial distress. This aspect of firm activity is employed rather than profitability due to sample selection being based on an earnings performance criterion. Prior studies provide evidence that large audit firms are more likely to issue a qualified audit opinion compared to smaller ones (Warren, 1980) and, because they are better funded, are more likely to disclose problems because of their greater risk exposure (Dye, 1993). On the basis of this we expect that, due to fear of financial problems being disclosed, financially distressed firms are less likely to use one of the Big Four audit firms. Therefore, following Carey and Simnett (2006), a Big Four audit firm (BIG 4) variable is employed, which is represented as a dummy variable coded as 1 if the auditing process has been performed by one of the Big Four audit firms, and 0 otherwise. We include year and industry dummies to control for fixed time and industry effects.

5. Empirical model, findings and discussion

The following logit regression model is used to test the association between corporate governance attributes and firm financial distress probability:

$$\begin{aligned} \text{DISTRESS}_{it} = & \alpha_0 + \beta_1 \text{OUTSIDERS}_{it} + \beta_2 \text{BLOCKOWN}_{it} \\ & + \beta_3 \text{DUALITY}_{it} + \beta_4 \text{DIROWN}_{it} + \beta_5 \text{AUDITCOM}_{it} \\ & + \beta_6 \text{AUDITOPN}_{it} + \beta_7 \text{LEVERAGE}_{it} + \beta_8 \text{SIZE}_{it} \\ & + \beta_9 \text{BIG4}_{it} + \beta_{10} \text{MGTEFF}_{it} \\ & + \sum_{m=1}^5 \beta_m Yr_{it} + \sum_{n=1}^9 \beta_n \text{Ind}_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where, for sample firm *i* and year *t*:

$\text{DISTRESS}_{it} = 1$, when the firm is classified as being in financial distress, and 0 otherwise

OUTSIDERS_{it} = the percentage of independent directors on the board

BLOCKOWN_{it} = the sum of the percentage of total shares owned by blockholders

$\text{DUALITY}_{it} = 1$, when the CEO and board chair positions are held by the same person, and 0 otherwise

DIROWN_{it} = the sum of the percentage of total direct shareholdings by all directors as a group

$\text{AUDITCOM}_{it} = 1$, for the existence of an audit committee, and 0 otherwise

² Directors are classified as independent if they are not a substantial shareholder or an officer or affiliate of a substantial shareholder of the company; a principal adviser or consultant to the company; a material supplier or customer of the company or have any related party relationship with the company; a relative or descendent by birth or marriage of company founders; currently, and have not previously been, employed by the company in an executive role. This definition of independent directors is consistent with that used in the 'Principles of Good Corporate Governance and Best Practice Recommendations' by the ASX Corporate Governance Council (2003).

³ In Australia, 5% is the minimum ownership level at which the Listing Rules of the ASX requires ultimate shareholder notification to be disclosed to the market. This paper, therefore, has employed the 5% shareholding threshold for investigating the relationship between blockholders and financial distress status of firms.

⁴ For the purpose of this paper, an unsatisfactory opinion includes a qualified audit opinion of going concern, a disclaimer and an adverse opinion.

⁵ We do not include board size as a separate corporate governance variable primarily due to its high correlation with underlying firm size. As firm size is expected to be the major determinant of board size, we elect to control for firm size in our regression models.

Table 2
Descriptive statistics and univariate test of differences.

Variables	N	Mean	Standard deviation	Median	Minimum	Maximum	Mean difference ^a (t value, unequal variance)
Board independence (OUTSIDERS)							
Distressed	855	47.233	19.091	50.000	0.000	100.000	-12.997*** (-11.071)
Healthy	530	60.231	22.460	60.000	0.000	100.000	
Total	1385	52.261	21.357	50.000	0.000	100.000	
Blockholder ownership (BLOCKOWN)							
Distressed	855	29.000	21.310	25.400	0.000	97.010	-15.483*** (-13.051)
Healthy	530	44.732	22.068	44.145	0.000	97.800	
Total	1385	35.179	21.505	31.135	0.000	97.800	
CEO–Chair duality (DUALITY)							
Distressed	855	0.270	0.442	0.000	0.000	1.000	0.123*** (5.740)
Healthy	530	0.140	0.351	0.000	0.000	1.000	
Total	1385	0.220	0.414	0.000	0.000	1.000	
Director ownership (DIROWN)							
Distressed	855	7.536	11.288	2.510	0.000	73.850	-1.403** (-1.879)
Healthy	530	8.939	14.716	1.260	0.000	74.140	
Total	1385	8.073	12.722	2.030	0.000	74.140	
Audit committee (AUDITCOM)							
Distressed	855	0.450	0.498	0.000	0.000	1.000	-0.492*** (-24.881)
Healthy	530	0.940	0.231	1.000	0.000	1.000	
Total	1385	0.640	0.480	1.000	0.000	1.000	
Audit opinion (AUDITOPN)							
Distressed	855	0.070	0.263	0.000	0.000	1.000	0.054*** (4.949)
Healthy	530	0.020	0.143	0.000	0.000	1.000	
Total	1385	0.051	0.221	0.000	0.000	1.000	
Leverage ratio (LEVERAGE)							
Distressed	855	0.317	1.203	0.014	0.000	9.660	0.094** (2.270)
Healthy	530	0.223	0.136	0.235	0.000	0.724	
Total	1385	0.281	0.950	0.086	0.000	0.000	
Firm size (SIZE)							
Distressed	855	6.802	0.616	6.801	4.000	8.990	-1.696*** (-41.443)
Healthy	530	8.498	0.807	8.482	6.550	10.582	
Total	1385	7.451	1.078	7.200	4.000	10.582	
Big 4 auditor (BIG 4)							
Distressed	855	0.480	0.500	0.000	0.000	1.000	-0.258*** (-10.066)
Healthy	530	0.740	0.440	1.000	0.000	1.000	
Total	1385	0.578	0.494	1.000	0.000	1.000	
Management efficiency (MGTEFF)							
Distressed	855	0.293	1.118	0.019	0.000	19.570	-0.938*** (-15.260)
Healthy	530	1.231	1.108	0.849	0.010	7.824	
Total	1385	0.652	1.204	0.225	0.000	19.570	

^a Independent samples t-test for difference in means.

*** and ** are significant at 1%, 5% respectively.

Definitions of included variables are as follows: OUTSIDERS is the percentage proportion of the total number of board members that are identified as independent directors; BLOCKOWN is the sum of the percentage of total shares owned by blockholders to total shares; DUALITY is a dummy variable coded as 1 for the existence of duality in CEO and board chair roles, otherwise 0; DIROWN is the percentage of total company equity shareholding held by all company directors; AUDITCOM is a dummy variable coded as 1 to indicate the existence of an audit committee, otherwise 0; AUDITOPN is a dummy variable coded as 1 to indicate the existence of an unsatisfactory audit opinion, otherwise 0; LEVERAGE is calculated as total debt/total assets; SIZE is the natural logarithm of total assets; BIG 4 is a dummy variable coded as 1 if the auditing is undertaken by a Big Four firm, otherwise 0; and MGTEFF is calculated as sales/total assets.

$AUDITOPN_{it} = 1$, for an unsatisfactory audit opinion, and 0 otherwise

$LEVERAGE_{it}$ = the ratio of total debt/total assets

$SIZE_{it}$ = the natural logarithm of total assets

$BIG4_{it} = 1$, when the auditor is a member of the Big Four audit firm group, and 0 otherwise

$MGTEFF_{it}$ = management efficiency as measured by the ratio of sales/total assets

Yr = year dummy variables for years 1999–2003

Ind = industry dummy variables for energy, materials, industrial, consumer discretionary, consumer staple, health care, information technology, telecommunications and utilities industries.

ϵ = regression residual

Given the panel nature of our sample data, besides a pooled regression we also estimate a random effects panel regression model to control for unobserved heterogeneity when this heterogeneity is constant over time and correlated with the independent variables.

5.1. Descriptive statistics and analysis

Table 2 presents the descriptive statistics of the sample firms and the univariate tests of differences between distressed and healthy firms. Financially distressed firms have

Table 3

Pearson correlation matrix.

VARIABLES	OUTSIDERS	BLOCKOWN	DUALITY	DIROWN	AUDITCOM	AUDITOPN	LEVERAGE	SIZE	BIG 4	MGTEFF
BLOCKOWN	0.074**									
DUALITY	-0.229**	0.019								
DIROWN	-0.236**	0.101**	0.037							
AUDITCOM	0.262**	0.289**	-0.187**	-0.014						
AUDITOPN	-0.079**	0.051	0.112**	0.057*	-0.040					
LEVERAGE	-0.025	0.010	0.064*	-0.003	0.003	0.035				
SIZE	0.361**	0.247**	-0.230**	-0.145**	0.503**	-0.115**	-0.120**			
BIG 4	0.178**	0.018	-0.148**	-0.124**	0.172**	-0.028	0.007	0.325**		
MGTEFF	0.061*	0.153**	-0.051	0.152**	0.245**	-0.012	0.030	0.220**	0.031	

** and * denote significance at the 1% and 5% levels respectively.

Definitions of included variables are as follows: OUTSIDERS is the percentage proportion of the total number of board members that are identified as independent directors; BLOCKOWN is the sum of the percentage of total shares owned by blockholders; DUALITY is a dummy variable coded as 1 for the existence of duality in CEO and board chair roles, otherwise 0; DIROWN is the percentage of total company equity shareholding held by all company directors; AUDITCOM is a dummy variable coded as 1 to indicate the existence of an audit committee, otherwise 0; AUDITOPN is a dummy variable coded as 1 to indicate the existence of an unsatisfactory audit opinion, otherwise 0; LEVERAGE is calculated as total debt/total assets; SIZE is the natural logarithm of total assets; BIG 4 is a dummy variable coded as 1 if the auditing has been done by a Big Four firm, otherwise 0; and MGTEFF is calculated as sales/total assets.

less independent boards than healthy firms (47.23% vs. 60.23%), lower block ownership (29.00% vs. 44.73%), higher likelihood of duality (27% vs. 14%), and lower director ownership (7.53% vs. 8.93%). In regard to the role of a board audit committee as an effective governance attribute, financially distressed firms are less likely to have a separately constituted audit committee than healthy firms (45% vs. 94%), less likely to be audited by a Big Four audit firm (48% vs. 74%), more likely to have an unsatisfactory audit opinion (7% vs. 2%), and have higher leverage ratios (31.7% vs. 22.3%). Financially distressed firms are also smaller, consistent with Titman and Wessels (1988) who suggested that the presence of more resources and diversity leads to larger firms less likely to end up in financial distress compared to small firms. Finally, management of financially distressed firms are less efficient compared to healthy firms (0.29 vs. 1.23), as expected.

Table 3 presents the pairwise Pearson correlations between the independent and control variables. The underlying nature and magnitude of the reported correlations suggests that the independent variables can be jointly included to form a parsimonious regression model.

Table 4 presents the results of the logit regressions which test the relation between various corporate governance attributes and financial distress. For the pooled logit model, the OUTSIDERS variable is not statistically significant, indicating no association between board independence and financial distress of our sample firms. The coefficient for the BLOCKOWN variable (-1.490) is negative and statistically significant at the 5% level. The lack of significant results in relation to the DUALITY variable raises concerns about the efficacy of separating the positions of CEO and board chair on financial distress probability. The minimal predictive power of the DUALITY variable is consistent with previous financial distress studies (Abdullah, 2006; Elloumi and Gueyle, 2001).

Table 4 also shows that the DIROWN variable is significantly negatively related to the likelihood of financial distress at the 1% significance level. This finding is consistent with Abdullah (2006) and Elloumi and Gueyle (2001), who also identified a significant negative association between director

ownership and financial distress probability. Thus, this result suggests that greater director ownership is associated with lower agency problems and financial distress likelihood, after controlling for the presence of other governance and agency deterrent mechanisms. Furthermore, the AUDITCOM variable is negative and statistically significant, consistent with the argument of Forker (1992) that the presence of an audit committee strengthens board monitoring and mitigates agency costs in a firm.

With reference to economic significance⁶, a one unit increase in director ownership (DIROWN) is associated with a 31.88% decrease in the probability of financial distress, while firms with an audit committee have a 4.62% lower probability of financial distress than firms without a separate audit committee in place. These measures suggest that the role of director ownership as an agency and incentive device is particularly important. While a change in board independence has minimal economic impact on financial distress likelihood, a unit increase in blockholder ownership and the adoption of CEO and chair duality are associated with reductions in financial distress probability by 5.65% and 2.21% respectively.

With respect to the control variables, LEVERAGE is positively associated with the likelihood of financial distress of sample firms. Consistent with the findings of Chen and Church (1992) and Flagg et al. (1993), the AUDITOPN variable is also significant, suggesting that firms receiving an unsatisfactory audit opinion are more likely to experience

⁶ The marginal effects are obtained using the post-estimation margins command available in Stata. We estimate both average marginal effects (averages of marginal effects evaluated at each observation – which are reported in the text) and marginal effects estimated at mean values for other model independent variables due to the potential for marginal effects at means to be misleading if dummy variables are included in the estimated model. The marginal probability effects for the corporate governance variables based on variables being held at mean values are as follows: Director ownership (9.33%), Audit committee existence (1.35%), Blockholder ownership (1.65%), CEO–Chair duality (0.062%) and board independence (0.00%). These marginal probability changes are for a unit change in continuous variables and a discrete value change from 1 to 0 for dummy variables.

Table 4

Logit regression testing the relation between corporate governance and financial distress for 277 Australian firms from 1999 to 2003.

Explanatory variables	Predicted sign	Pooled coefficient (p-value)	Panel (random effects) coefficient (p-value)
Constant		21.187*** (0.001)	205.627*** (0.000)
Board independence (OUTSIDERS)	–	–0.003 (0.802)	–0.040 (0.263)
Blockholders (BLOCKOWN)	–	–1.490** (0.012)	–9.649** (0.029)
CEO–Chair duality (DUALITY)	+	–0.558 (0.405)	–3.296 (0.122)
Director ownership (DIROWN)	–	–8.407*** (0.003)	–26.802*** (0.000)
Audit committee (AUDITCOM)	–	–1.217** (0.014)	–4.882** (0.038)
Audit opinion (AUDITOPN)	+	2.960** (0.019)	5.459** (0.028)
Leverage (LEVERAGE)	+	2.827* (0.068)	2.892** (0.027)
Firm size (SIZE)	–	–4.311*** (0.000)	–24.173*** (0.000)
Big 4 auditor (BIG 4)	–	–0.577 (0.285)	–2.100 (0.281)
Management efficiency (MGTEFF)	–	–0.526*** (0.000)	–2.711*** (0.000)
Model summary: Wald statistic		327.890*** (0.000)	204.710*** (0.000)
Nagelkerke R ²		0.805	

Notes: ***, ** and * denote significance at 1%, 5% and 10% levels respectively. The sample is composed of 171 financially distressed and 106 healthy firms. The dependent variable is financial distress status (DISTRESS), represented by a dichotomous variable coded as 1 for financially distressed firms and 0 for healthy firms. The study covers the time period 1999–2003 with a sample of 1385 firm year observations.

Definitions of included variables are as follows: OUTSIDERS is the percentage proportion of the total number of board members that are identified as independent directors; BLOCKOWN is the sum of the percentage of total shares owned by blockholders; DUALITY is a dummy variable coded 1 for the existence of duality in CEO and board chair roles, otherwise 0; DIROWN is the percentage of total company equity shareholding held by all company directors; AUDITCOM is a dummy variable coded as 1 for the existence of an audit committee, otherwise 0; AUDITOPN is a dummy variable coded as 1 for the existence of an unsatisfactory audit opinion, otherwise 0; LEVERAGE is calculated as total debt/total assets; SIZE is the natural logarithm of total assets; BIG4 is a dummy variable coded as 1 if the auditing is undertaken by a Big Four firm, otherwise 0; and MGTEFF is calculated as sales/total assets. The reported p-values are based on standard errors clustered at the firm level (bootstrap standard errors). Year and Industry dummy variables are included in the regression models.

financial distress, as expected. The coefficient on the SIZE variable is negative and statistically significant ($p \leq 0.01$), which confirms that smaller firms are more likely to experience financial distress. Using a Big Four audit firm, however, has no relation with the likelihood of financial distress. Finally, the MGTEFF variable is negative and statistically significant ($p < 0.01$), which suggests that more efficient management is associated with lower likelihood of experiencing financial distress.

The second column of Table 4 shows that controlling for unobserved firm heterogeneity, the results remain largely intact. The ownership variables and the existence of a

separate audit committee are again negatively and significantly related with the DISTRESS indicator variable. In terms of control variables, the AUDITOPN, LEVERAGE, SIZE and MGTEFF variables are all significantly related with the likelihood of firms meeting the financial distress classification.

5.2. Zmijewski Financial Score (ZFS)

As an alternative to the categorical dependent variable (DISTRESS) which is based solely on a negative or positive earnings criterion, we re-test the hypotheses using a continuous variable specification for financial distress based on the model developed by Zmijewski (1984). The Zmijewski Financial Score (ZFS) is one of the most widely used financial distress prediction models (Carcello and Neal, 2003; Hay et al., 2007). ZFS is constructed based on an index incorporating multiple financial ratios representing firm profitability, leverage and liquidity:

$$ZFS = -4.336 - 4.513(X_1) + 5.679(X_2) - 0.004(X_3) \quad (2)$$

where

X_1 = Net Income/Total Assets (profitability measure)

X_2 = Total Debt/Total Assets (leverage measure)

X_3 = Current Assets/Current Liabilities (liquidity measure)

A higher ZFS indicates greater likelihood of financial distress. We compute the ZFS for each firm-year observation. Using the same specification as in (1), we estimate the model using OLS due to the continuous nature of the dependent variable. We reestimate the model using fixed effects panel regressions, to control for unobserved firm heterogeneity across sample firms. The results of these analyses are provided in Table 5.

Overall, our findings are consistent with those reported in Table 4. Higher director and blockholder ownership levels are associated with lower financial distress levels, as is having a separate board audit committee in operation. In terms of economic influence on the financial distress levels, a one standard deviation increase in the level of director and blockholder ownership reduces the ZFS by 0.54 and 0.58 respectively, representing approximately one-tenth of one standard deviation of ZFS. We find no evidence that CEO duality is significantly associated with financial distress. With respect to the control variables, an unsatisfactory audit opinion and higher leverage levels are positively associated with ZFS, whereas larger firms have a lower ZFS, as expected.

Controlling for unobserved heterogeneity using fixed effect panel regressions, our results remain largely intact. However, the AUDITCOM variable no longer has any explanatory power for financial distress.

5.3. Causality and endogeneity assessment

The analysis earlier identifies the association between a number of corporate governance and ownership variables and financial distress status of firms. However, the causal nature of these relations is not clear; it is possible not only that corporate governance attributes may impact

Table 5

Regression testing the relation between corporate governance and financial distress (measured by ZFS) for 277 Australian firms from 1999 to 2003.

Explanatory variables	Predicted sign	Pooled coefficient (p-value)	Panel (fixed effects) coefficient (p-value)
Constant		13.516*** (0.000)	38.866*** (0.000)
Board independence (OUTSIDERS)	–	0.012* (0.067)	0.017 (0.210)
Block holder ownership (BLOCKOWN)	–	–1.585** (0.022)	–2.817** (0.014)
CEO–Chair duality (DUALITY)	+	–0.037 (0.904)	–0.683 (0.337)
Director ownership (DIROWN)	–	–4.290*** (0.000)	–3.296* (0.086)
Audit committee (AUDITCOM)	–	–0.875** (0.010)	–0.777 (0.239)
Audit opinion (AUDITOPN)	+	4.254*** (0.002)	2.932** (0.030)
Leverage (LEVERAGE)	+	7.604*** (0.000)	7.335*** (0.000)
Firm size (SIZE)	–	–2.289*** (0.000)	–5.694*** (0.000)
Big 4 auditor (BIG 4)	–	0.353 (0.146)	0.276 (0.367)
Management efficiency (MGTEFF)	–	0.150** (0.037)	0.010 (0.935)
Model summary:			
Adjusted R ²		0.454 48.800***	0.312 30.330***
F-statistic		(0.000)	(0.000)

Notes: ***, ** and * denote significance at 1%, 5% and 10% levels respectively. The sample is composed of 171 financially distressed and 106 healthy firms, and includes 1385 firm-year observations. The dependent variable is the Zmijewski Financial Score (ZFS). Definitions of included variables are as follows: OUTSIDERS is the percentage proportion of the total number of board members that are identified as independent directors; BLOCKOWN is the sum of the percentage of total shares owned by blockholders; DUALITY is a dummy variable coded as 1 to indicate the existence of duality in CEO and board chair roles, otherwise 0; DIROWN is the percentage of total company equity shareholding held by all company directors; AUDITCOM is a dummy variable coded as 1 to indicate the existence of an audit committee, otherwise 0; AUDITOPN is a dummy variable coded as 1 to indicate the existence of an unsatisfactory audit opinion, otherwise 0; LEVERAGE is calculated as total debt/total assets; SIZE is the natural logarithm of total assets; BIG4 is a dummy variable coded as 1 if the auditing is undertaken by a Big Four firm, otherwise 0; and MGTEFF is calculated as sales/total assets. The reported p-values are based on standard errors clustered at the firm level (bootstrap standard errors). Year and industry dummy variables are included in the regression models.

on financial distress status, but also that financial distress may trigger corporate governance and ownership changes. To achieve our second objective of identifying the underlying causal relationship, we undertake some additional analysis. We develop a system of simultaneous equations which treats the financial distress status and the governance and ownership structure of firms as being endogenous. The corporate governance and ownership variables endogenised in the system are: board composition (OUTSIDERS), CEO–Chair duality (DUALITY), audit committee existence (AUDITCOM), blockholder ownership (BLOCKOWN), and director ownership (DIROWN). For robustness, we estimate separate equation systems for the DISTRESS indicator and ZFS. The first system of simultaneous equations is specified as follows:

$$\begin{aligned} \text{DISTRESS}_{it} = & \alpha_0 + \beta_1 \text{OUTSIDERS}_{it} + \beta_2 \text{DUALITY}_{it} \\ & + \beta_3 \text{AUDITCOM}_{it} + \beta_4 \text{BLOCKOWN}_{it} \\ & + \beta_5 \text{DIROWN}_{it} + \beta_6 \text{AUDITOPN}_{it} \\ & + \beta_7 \text{LEVERAGE}_{it} + \beta_8 \text{SIZE}_{it} + \beta_9 \text{BIG4}_{it} \\ & + \beta_{10} \text{MGTEFF}_{it} + \beta_{11} \text{TANGASSETS}_{it} + \varepsilon_{1,it} \end{aligned} \quad (3)$$

$$\begin{aligned} \text{OUTSIDERS}_{it} = & \alpha_0 + \beta_1 \text{DISTRESS}_{it} + \beta_2 \text{DUALITY}_{it} \\ & + \beta_3 \text{AUDITCOM}_{it} + \beta_4 \text{BLOCKOWN}_{it} \\ & + \beta_5 \text{DIROWN}_{it} + \beta_6 \text{LEVERAGE}_{it} + \beta_7 \text{SIZE}_{it} \\ & + \beta_8 \text{MGTEFF}_{it} + \beta_9 \text{OUTSIDERS}_{it-1} + \varepsilon_{2,it} \end{aligned} \quad (4)$$

$$\begin{aligned} \text{DUALITY}_{it} = & \alpha_0 + \beta_1 \text{DISTRESS}_{it} + \beta_2 \text{OUTSIDERS}_{it} \\ & + \beta_3 \text{AUDITCOM}_{it} + \beta_4 \text{BLOCKOWN}_{it} \\ & + \beta_5 \text{DIROWN}_{it} + \beta_6 \text{SIZE}_{it} + \beta_7 \text{MGTEFF}_{it} \\ & + \beta_8 \text{DUALITY}_{it-1} + \varepsilon_{3,it} \end{aligned} \quad (5)$$

$$\begin{aligned} \text{AUDITCOM}_{it} = & \alpha_0 + \beta_1 \text{DISTRESS}_{it} + \beta_2 \text{OUTSIDERS}_{it} \\ & + \beta_3 \text{DUALITY}_{it} + \beta_4 \text{AUDITOPN}_{it} + \beta_5 \text{SIZE}_{it} \\ & + \beta_6 \text{BIG4}_{it} + \beta_7 \text{AUDITCOM}_{it-1} + \varepsilon_{4,it} \end{aligned} \quad (6)$$

$$\begin{aligned} \text{BLOCKOWN}_{it} = & \alpha_0 + \beta_1 \text{DISTRESS}_{it} + \beta_2 \text{DIROWN}_{it} \\ & + \beta_3 \text{LEVERAGE}_{it} + \beta_4 \text{SIZE}_{it} + \beta_5 \text{MGTEFF}_{it} \\ & + \beta_6 \text{BLOCKOWN}_{it-1} + \varepsilon_{5,it} \end{aligned} \quad (7)$$

$$\begin{aligned} \text{DIROWN}_{it} = & \alpha_0 + \beta_1 \text{DISTRESS}_{it} + \beta_2 \text{OUTSIDERS}_{it} \\ & + \beta_3 \text{DUALITY}_{it} + \beta_4 \text{AUDITCOM}_{it} \\ & + \beta_5 \text{BLOCKOWN}_{it} + \beta_6 \text{LEVERAGE}_{it} + \beta_7 \text{SIZE}_{it} \\ & + \beta_8 \text{MGTEFF}_{it} + \beta_9 \text{DIROWN}_{it-1} + \varepsilon_{6,it} \end{aligned} \quad (8)$$

In terms of instruments included within the system, we employ the ratio of tangible assets/total assets (TANGASSETS) as an instrument for financial distress (DISTRESS). There are a number of arguments for the suitability of this variable as an instrument for financial distress. Firstly, [Platt and Platt \(1990\)](#) identified a significant positive relationship between net fixed assets/total assets ratio and the likelihood of firm failure. Similarly, [Theodossiou et al. \(1996\)](#) suggested that financially distressed firms are likely to sell tangible (productive) assets as a means of raising capital to improve their liquidity position and reducing the likelihood of bankruptcy. This is consistent with financially distressed firms having lower tangible assets/total assets ratios compared to healthy firms. Furthermore, several studies from the intellectual capital literature support a positive (negative) relationship between the magnitude of intangible (tangible) assets and firm performance ([Bontis et al., 2000](#); [Carmeli and Tishler, 2004](#); [Riahi-Belkaoui, 2003](#)). Asset tangibility is also an important determinant of capital structure and credit availability ([Faulkender and Petersen, 2006](#)), with tangible assets used as collateral security to provide access to loan capital, with financial health or distress dependent on the productivity of the capital deployed. Clearly, there is a link between the degree of asset tangibility and financial distress. It is not obvious, however, that the proportion of tangible assets employed should influence the nature of either the governance or ownership structure of firms. It is difficult to see how governance attributes should be dependent on firm asset structure, apart possibly from firms appointing independent directors with business expertise associated with a particular asset type. Similarly, certain investors (and par-

ticularly institutional shareholders) are likely to use industry status as an important investment screen. Industry activity is likely to dictate asset usage and intensity; however, this will differ in magnitude at the firm level. As such, the degree of asset tangibility is expected to be associated with financial distress, but not directly with firm-level governance or ownership structure.

Identifying suitable instruments for corporate governance attributes is far more challenging (Larcker et al., 2007). Given that the literature does not provide a good lead in identifying suitable instruments for our individual corporate governance attributes, and the lack of natural experiments to provide a source of exogenous variation due to our focus on a voluntary corporate governance enforcement environment, we resort to using lagged values of our corporate governance variables as instruments in our simultaneous equations framework. We argue that lagged corporate governance variables are likely to be suitable instruments due to the voluntary nature of the adoption of corporate governance attributes, with the firm-level corporate governance attributes expected to exhibit greater inter-temporal variation and less stickiness over time relative to the period when firms are subject to the governance code. As a result, the reduced stickiness under our voluntary adoption setting should reduce the likelihood that the regression error terms are correlated with the lagged corporate governance variables.

The 3SLS regression results are provided in Table 6. Panel A in Table 6 reports the first-stage estimation results. For brevity, we only report the coefficients of the instrumental variables. The results show that all of the instrumental variables are highly significant in the first-stage regression equations. As a further indicator of instrument validity, the reported F-statistics for the first-stage models are all highly significant, with the model F-statistics greatly exceeding the critical values suggested by Stock and Yogo (2005) suggesting strong instruments. We also report the Hansen–Sargan test statistics for over-identification is statistically insignificant, indicating that the instrument set is valid. Further, the Hausman exogeneity test statistics is statistically insignificant, supporting the null hypothesis of exogeneity. Based on these diagnostics, we are confident that the instruments employed in the equation system are suitable.

The results for the DISTRESS model (Equation 3) are reported in the second column of Table 6, and are similar to the findings reported in Table 4. Increased levels of director and blockholder ownership, greater board independence and the existence of a board audit committee decrease the probability of financial distress. Further, the CEO–chair duality leads to decrease in probability of distress. Larger firms and firms with higher management efficiency are significantly less likely to be classified as financially distressed, and financial distress status is also, surprisingly, negatively correlated with leverage levels. As expected, firms that receive a qualified audit opinion are also significantly more likely to be classified as financially distressed. The findings for the other equations suggest that financial distress status does not lead to changes in the individual corporate governance attributes or changes in director and blockholder ownership levels.

Table 7 reports the results for the simultaneous equation system incorporating the ZFS variable as our proxy for financial distress. The first-stage regression model results (instrumental variable significance, very high model F-statistics) and the insignificant Hansen–Sargan and Hausman test statistics support the validity of the instrument set employed, with the TANGASSETS variable being significantly negatively correlated with ZFS. The 3SLS results in Panel B in Table 7 are generally consistent with the results in Table 6. Greater levels of director and blockholder ownership, and the existence of an audit committee lead to a reduction in the level of financial distress. However, higher board independence and the existence of CEO–chair duality do not lead to lower levels of financial distress. Other differences with Table 6 include the nature of audit opinions received having no direct influence on financial distress level, and management efficiency which leads to higher levels of ZFS. Importantly, we find little evidence that the degree of financial distress has an influence on firm corporate governance and ownership structure. Overall, the simultaneous equation system results suggest that causality runs from corporate governance to financial distress, with no strong evidence provided that sample firms adopt certain corporate governance structures in response to changes in financial distress status.

6. Summary and conclusion

We examine the association between various corporate governance attributes and the financial distress status of Australian listed firms for the period 1999–2003. The focus is placed on voluntary adoption of governance structures and decision-making by sample firms prior to the introduction of formal corporate governance requirements by the Australian Securities Exchange in 2003. Our results show that both greater levels of director and blockholder ownership and the existence of a board audit committee reduce the likelihood of financial distress. These findings persist under various definitions of financial distress status. Using a simultaneous equations system to evaluate the issue of causality, our analysis indicates that causality runs from corporate governance to financial distress status, suggesting that voluntary adoption of certain corporate governance structures reduces financial distress.

Our findings have implications for the evaluation of financially distressed firms and for the ongoing corporate governance reform process in Australia. Firstly, our findings will assist investors incorporating relevant corporate governance attributes as part of their information set when evaluating the underlying risk and investment attractiveness of firms. Secondly, our results are important for policymakers (ASX Corporate Governance Council), when formulating best practice governance structures.

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Table 6

3SLS regression to test bicausality between corporate governance and financial distress for 277 Australian firms from 1999 to 2003.

	Distress (DISTRESS)	Board independence (OUTSIDERS)	Blockholder ownership (BLOCKOWN)	CEO–Chair duality (DUALITY)	Director ownership (DIROWN)	Audit committee (AUDITCOM)
Panel A: First-stage regression results						
Tangible assets (TANGASSETS)	-0.189*** (-4.700)					
Lagged board independence (OUTSIDERS)		0.835*** (45.380)				
Lagged blockholder ownership (BLOCKOWN)			0.850*** (48.290)			
Lagged CEO–Chair duality (DUALITY)				0.701*** (33.050)		
Lagged director ownership (DIROWN)					0.812*** (51.510)	
Lagged audit committee (AUDITCOM)						0.846*** (56.040)
Model F-statistics	210.850*** (0.000)	263.570*** (0.000)	267.310*** (0.000)	123.960*** (0.000)	280.540*** (0.000)	471.720*** (0.000)
Adjusted R ²	0.676	0.723	0.726	0.550	0.735	0.824
Panel B: 3SLS regression results						
Constant	3.114*** (0.000)	24.169 (0.333)	0.210 (0.239)	0.346 (0.508)	0.068 (0.520)	0.036 (0.823)
Board independence (OUTSIDERS)	-0.001** (0.037)			-0.001** (0.050)	0.000 (0.859)	0.000 (0.835)
Blockholder ownership (BLOCKOWN)	-0.230*** (0.000)	-3.117 (0.240)		0.077 (0.215)	0.019 (0.188)	
CEO–Chair duality (DUALITY)	-0.065** (0.028)	-0.698 (0.597)			0.013* (0.062)	-0.004 (0.864)
Director ownership (DIROWN)	-0.604*** (0.000)	-11.799* (0.053)	-0.017 (0.739)	-0.033 (0.807)		
Audit committee (AUDITCOM)	-0.120*** (0.000)	-0.260 (0.852)		-0.007 (0.827)		
Audit opinion (AUDITOPN)	0.084** (0.018)					-0.003 (0.917)
Leverage (LEVERAGE)	-0.001** (0.024)	-0.028* (0.078)	0.001 (0.752)		-0.001 (0.398)	
Firm size (SIZE)	-0.288*** (0.000)	-1.063 (0.657)	-0.016 (0.384)	-0.034 (0.501)	-0.007 (0.469)	0.016 (0.350)
Big 4 auditor (BIG4)	-0.011 (0.511)					-0.004 (0.764)
Management efficiency (MGTEFF)	-0.033*** (0.000)	-0.693** (0.028)	0.002 (0.571)	0.009 (0.222)	0.001 (0.789)	
Tangible assets (TANGASSETS)	-0.189*** (0.000)					
Distress (DISTRESS)		-7.998 (0.294)	-0.066 (0.218)	0.003 (0.984)	-0.018 (0.568)	-0.064 (0.199)
Lagged board independence (OUTSIDERS)		0.828** (0.000)				
Lagged blockholder ownership (BLOCKOWN)			0.844*** (0.000)			
Lagged CEO–Chair duality (DUALITY)				0.699*** (0.000)		
Lagged director ownership (DIROWN)					0.805*** (0.000)	
Lagged audit committee (AUDITCOM)						0.844*** (0.000)
Wald statistic	2284.55*** (0.000)	2870.070*** (0.000)	2893.68*** (0.000)	1387.63*** (0.000)	3076.100*** (0.000)	5147.590*** (0.000)
Adjusted R ²	0.671	0.719	0.722	0.555	0.733	0.822
Hansen–Sargan over-identification test:	17.265 (0.437)					
Hausman exogeneity test:	11.31 (0.418)					

***, **, and * denote significance at 1%, 5% and 10% levels respectively.

The sample is composed of 171 financially-distressed and 106 healthy firms, and includes 1107 observations. The dependent variable is financial distress status (DISTRESS), represented by a dichotomous variable coded as 1 for financially distressed firms and '0' for healthy firms. Coefficient estimates are obtained by estimating the system of six equations simultaneously by 3SLS. The tangible assets (TANGASSETS) variable is calculated as property, plant and equipment/total assets, and is employed as an instrument for financial distress. Definitions of included variables are as follows: OUTSIDERS is the percentage proportion of the total number of board members that are identified as independent directors; BLOCKOWN is the sum of the percentage of total shares owned by blockholders; DUALITY is a dummy variable coded 1 for the existence of duality in CEO and board chair roles, otherwise 0; DIROWN is the percentage of total company equity shareholding held by all company directors; AUDITCOM is a dummy variable coded as 1 for the existence of an audit committee, otherwise 0; AUDITOPN is a dummy variable coded as 1 for the existence of an unsatisfactory audit opinion, otherwise 0; LEVERAGE is calculated as total debt/total assets; SIZE is the natural logarithm of total assets; BIG4 is a dummy variable coded as 1 if the auditing is undertaken by a Big Four firm, otherwise 0; and MGTEFF is calculated as sales/total assets. Lagged levels of the suspect endogenous corporate governance and ownership variables are included as other instruments in the equation system. The first-stage regression model estimated in Panel A includes all exogenous control variables (including industry and year dummy variables) and other instrumental variables. However, for the sake of brevity only the relevant instrumental variables and regression diagnostics are reported. T-statistics are reported in Panel A, while p-values are reported in Panel B. Industry and year dummy variables are included in the individual 3SLS system equations in Panel B. The reported statistics are based on robust standard errors.

Table 7

3SLS regression to test bicausality between corporate governance and financial distress (measured by ZFS) for 277 Australian firms from 1999 to 2003.

	Zmijewski score (ZFS)	Board independence (OUTSIDERS)	Blockholder ownership (BLOCKOWN)	CEO–Chair duality (DUALITY)	Director ownership (DIROWN)	Audit committee (AUDITCOM)
Panel A: First-stage regression results						
Tangible assets (TANGASSETS)	–6.582** (2.450)					
Lagged board independence (OUTSIDERS)		0.832*** (44.230)				
Lagged blockholder ownership (BLOCKOWN)			0.848*** (47.210)			
Lagged CEO–Chair duality (DUALITY)				0.694*** (32.380)		
Lagged director ownership (DIROWN)					0.802*** (49.410)	
Lagged audit committee (AUDITCOM)						0.824*** (52.160)
Model F-statistics	511.330*** (0.000)	126.460*** (0.000)	128.100*** (0.000)	60.110*** (0.000)	136.900*** (0.000)	230.840*** (0.000)
Adjusted R ²	0.914	0.723	0.726	0.551	0.739	0.827
Panel B: 3SLS regression results						
Constant	401.497*** (0.000)	5.915 (0.343)	0.020 (0.699)	0.357*** (0.000)	0.083** (0.021)	–0.155*** (0.002)
Board independence (OUTSIDERS)	0.436 (0.388)			–0.001** (0.040)	0.000 (0.795)	0.000 (0.839)
Blockholder ownership (BLOCKOWN)	–117.612*** (0.007)	0.077* (0.089)		0.077* (0.089)	0.021 (0.119)	
CEO–Chair duality (DUALITY)	–1.286 (0.963)	–1.005 (0.489)			0.004 (0.669)	–0.002 (0.917)
Director ownership (DIROWN)	–255.284*** (0.001)	–12.297** (0.015)	0.006 (0.895)	–0.043 (0.603)		
Audit committee (AUDITCOM)	–22.719*** (0.004)	0.613 (0.554)		–0.008 (0.746)		
Audit opinion (AUDITOPN)	–31.195 (0.361)					–0.007 (0.797)
Leverage (LEVERAGE)		0.588 (0.239)	0.003 (0.491)		0.005 (0.122)	
Firm size (SIZE)	–62.394*** (0.000)	0.357 (0.674)	0.002 (0.744)	–0.035*** (0.000)	–0.012** (0.014)	0.035*** (0.000)
Big 4 auditor (BIG4)	13.137 (0.433)					–0.005 (0.726)
Management efficiency (MGTEFF)	34.527*** (0.000)	1.385 (0.328)	0.012 (0.340)	0.009* (0.055)	0.016* (0.056)	
Tangible assets (TANGASSETS)	–92.057** (0.013)					
Zmijewski score (ZFS)		–0.062 (0.200)	–0.001 (0.521)	0.000 (1.000)	–0.001* (0.077)	–0.001 (0.669)
Lagged board independence (OUTSIDERS)		0.836*** (0.000)				
Lagged blockholder ownership (BLOCKOWN)			0.855*** (0.000)			
Lagged CEO–Chair duality (DUALITY)				0.701*** (0.000)		
Lagged director ownership (DIROWN)					0.777*** (0.000)	
Lagged audit committee (AUDITCOM)						0.856*** (0.000)
Wald statistic	113.290*** (0.000)	2707.220*** (0.000)	2905.58*** (0.000)	1388.72*** (0.000)	2374.640*** (0.000)	5221.700*** (0.000)
Adjusted R ²	0.086	0.692	0.721	0.555	0.630	0.825
Hansen–Sargan over-identification test: 14.274 (0.6368)						
Hausman exogeneity test: 4.97 (0.932)						

***, ** and * denote significance at 1%, 5% and 10% levels respectively.

The sample is composed of 171 financially-distressed and 106 healthy firms, and includes 1107 observations. The dependent variable is the Zmijewski Financial Score (ZFS). Coefficient estimates are obtained by estimating the system of six equations simultaneously by 3SLS. The tangible assets (TANGASSETS) variable is calculated as property, plant and equipment/total assets, and is employed as an instrument for financial distress. Definitions of included variables are as follows: OUTSIDERS is the percentage proportion of the total number of board members that are identified as independent directors; BLOCKOWN is the sum of the percentage of total shares owned by blockholders; DUALITY is a dummy variable coded 1 for the existence of duality in CEO and board chair roles, otherwise 0; DIROWN is the percentage of total company equity shareholding held by all company directors; AUDITCOM is a dummy variable coded as 1 for the existence of an audit committee, otherwise 0; AUDITOPN is a dummy variable coded as 1 for the existence of an unsatisfactory audit opinion, otherwise 0; LEVERAGE is calculated as total debt/total assets; SIZE is the natural logarithm of total assets; BIG4 is a dummy variable coded as 1 if the auditing is undertaken by a Big Four firm, otherwise 0; and MGTEFF is calculated as sales/total assets. The first-stage regression model estimated in Panel A includes all exogenous control variables (including industry and year dummy variables) and other instrumental variables. However, for the sake of brevity only the relevant instrumental variables and regression diagnostics are reported. T-statistics are reported in Panel A, while p-values are reported in Panel B. Industry and year dummy variables are included in the individual 3SLS system equations in Panel B. The reported statistics are based on robust standard errors.

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