

Audit Committee Characteristics and Firm Performance During the Global Financial Crisis

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Abstract - We address the question 'do governance enhancing audit committee (AC) characteristics mitigate the firm performance impact of significant-adverse-economic events such as the Global Financial Crisis (GFC)?' Our analysis reveals that smaller audit committees with more experience and financial expertise are more likely to be associated with positive firm performance in the market. We also find that longer serving chairs of audit committees negatively impacts accounting performance. However, accounting performance is positively impacted where ACs include block holder representation, the chair of the board, whose members have more external directorships and whose chair has more years of managerial experience. We contribute to the growing body of research on the impact of audit committee governance attributes on performance during times of financial distress.

Keywords: Corporate governance; Audit committee; Firm performance; Return on assets

Introduction

This paper investigates which, if any, governance enhancing audit committee (AC) characteristics positively impact firm performance during the Global Financial Crisis (GFC). We argue that during periods of adverse economic shocks, the quality of a firm's financial decision-making and risk management processes mitigates the adverse performance effects of the exogenous shocks. We focus upon AC characteristics and their significant influence over a firm's financial and risk decision-making processes in the post-Enron world. The AC is the single most important board subcommittee owing to its specific role of protecting the interest of shareholders in relation to financial oversight and control (Mallin, 2007). The primary role of the AC is to oversee the firm's financial reporting process, the review of financial reports, internal accounting controls, the audit process and more recently, its risk management practices (Klein, 2002a, p. 378). Similar to trends worldwide (DeZoort et al., 2002), the Australian Corporate Governance Principles and Recommendations (ACGPR; Australian Securities Exchange Corporate Governance Council 2007) mandates the core governance role of the AC for S&P300 companies is to have an independent audit committee consisting of at least three independent directors.

Adopting better corporate governance practices, such as an enhanced AC, improves monitoring of management and

reduces information asymmetry problems. There is a significant literature that links independence, size and other characteristics of the board of directors and audit committees to improved firm performance and value (Klein, 1998). Higher levels of independence and expertise on board and audit committees increase firm value (Chan and Li, 2008). The common wisdom is that the level of independence of AC members is associated with improved monitoring of the financial reporting process (Bronson et al., 2009). In contrast, other research suggests that lack of independence on the AC improves monitoring quality. Where the AC has a high percentage of past associates and ex-employees, also known as greydirectors, it is less likely the auditor will issue a going-concern report (Carcello and Neal, 2000, 2003a,b). Finally, some evidence suggests that smaller rather than larger ACs are associated with higher financial reporting quality (Wright, 1996; Abbott and Parker, 2000; Klein, 2002a; Carcello and Neal, 2003a).

However, much of the prior governance research was conducted under normal market conditions, and this may in part explain some of the inconsistent results in governance-performance research. We argue that if governance has a role in increasing firm performance and value, as suggested by the prior theory and evidence, then this effect should be observed when the firm faces financial exogenous shocks such as the GFC. We expect that the governance impact of ACs during the GFC should manifest in greater monitoring and transparency, improved financial decision-making and improved risk assessment. This in turn impacts positively on performance and value. If governance matters, we expect firms that perform better during the GFC to have different corporate governance characteristics that minimise corporate risk and validate financial disclosures.¹ Given that both the cause and product of the GFC were financial in nature, we expect to see AC's driving the governance response.

Our analysis shows that several AC characteristics are associated with higher firm performance during the GFC. We compare the worst and best performing S&P300 firms and find size of the AC and the experience and knowledge of the chair significantly affect performance. A multivariate analysis of AC attributes indicates that the number of members on the AC and level of expertise of AC members impacts positively on firms market performance. This

implies that having more members with financial expertise resulted in better firm market performance during the GFC when such decision-making expertise was needed. Firm-accounting performance was positively associated with shorter tenure but more experienced AC chairs, AC members with more external directorships and greater percentage of AC members with finance and accounting qualifications. We also find market and accounting performance for firms are positively related to an index of AC characteristics confirming the overall tenor of the results that better AC governance positively impacts performance during financial crises.

The remainder of the paper proceeds as follows. Section 2 reviews prior literature and distills the key theoretical relationships between corporate governance AC characteristics and firm performance and presents the testable hypothesis. Section 3 describes the research design, which includes the sample, variable measures and the empirical methods used in the relationship between corporate governance and firm performance. Section 4 presents the results of the data analyses. Finally, Section 5 offers a discussion of the results and their implications as well as a conclusion to the paper.

Background and Hypothesis

A number of AC characteristics have been researched in normal market settings to understand their relevance, if any, to firm performance during the exogenous shock of the GFC. We examine fifteen AC characteristics, including the size of AC, percentage of independent AC members, education level of AC members and experience of the AC members, to identify if any of these characteristics differentially impact the performance of firms during the GFC.

Role and Impact of Audit Committees

Audit committees are an integral part of the required corporate governance system to overview the financial reporting process for Australia's S&P300 listed firms. The role of the AC is important to stakeholders as better quality disclosed financial reporting improves market performance (Wild, 1996). Over time, the role of the AC has evolved and has progressively been redefined from a voluntary monitoring mechanism employed in high agency cost situations to improve the quality of information flows to shareholders (Pincus et al., 1989). It is now a key component of the oversight function and the focus of increased public and regulatory interest (Abbott and Parker, 2000). The current responsibilities of the AC are overseeing the accounting, audit and financial reporting processes of the company (Sarbanes-Oxley Act 2002, Section 2). The implied expectation is that a suitably qualified and committed independent AC acts as a reliable guardian of public interest (Abbott et al., 2002). In Australia, the ACGPR defines the AC's role to include the oversight of the company's financial reporting integrity and to oversee the independence of the external auditor (Australian Securities Exchange Corporate Governance

Council 2007, p. 26)². For US firms, the AC is required to discuss and review the firm's risk assessment and hedging strategies (New York Stock Exchange 2011). Thus, the AC's primary role has evolved to overseeing the financial reporting and risk management processes. The AC is the core monitoring mechanism for shareholders and other constituents especially in the light of the many accounting scandals, e.g., Enron, World-Com, Paramalat and, in Australia, HIH and One Tel. Prior literature states that ACs also promote and strengthen the existence of an internal audit function (Turnbull, 1999; Turley and Zaman, 2004). Regulators have put additional requirements for the composition and the financial knowledge of the directors sitting on the board and on the AC (Bradbury, 1990). They also place additional conditions on the independence of the board of directors and the composition of the audit, compensation and governance committees (Sarbanes-Oxley Act 2002). Interestingly, Sarbanes-Oxley (SOX) does not set any particular requirements for the board as a whole but does require that the AC to be entirely composed of independent directors and to include at least one financially knowledgeable member. The regulatory trends clearly indicate that effective corporate governance includes an effective AC in addition to the independence of the board of directors.

Empirical evidence supports the regulatory focus on governance to enhance the relevance and reliability of financial information. Graham et al. (2005) find that 78 per cent of the interviewed US managers admitted to sacrificing long-term value to smooth earnings. This suggests that managers are actively involved in earnings management, and this potentially undermines the quality of financial reports. Beasley (1996) finds that the presence of an AC does not affect the likelihood of fraud, but more independent members on the board of directors should decrease the possibility of fraud. Other researchers find a significant inverse relationship between the number of AC members and financial reporting quality; the lower the number of AC members, the higher the quality (Wright, 1996; Abbott and Parker, 2000; Klein, 2002a; Carcello and Neal, 2003a). However, Abbott et al. (2004) confirm that an AC consisting of independent members and who meet at least twice a year decreases the possibility that the firm will be associated with misleading and fraudulent reporting. One of the more recent guidelines for the United States and Australia is the inclusion of experienced members on the AC. Research shows that the addition of financial experts (audit managers) and financial literates (MBA and graduates in commerce and accounting) changes the structure and focus of AC's discussions (McDaniel et al., 2002). This contributes positively to the quality of the financial reporting process and risk management practices and consequently enhances market value (Wild, 1994, 1996). Kirkpatrick (2009) finds that independent members on the ACs contribute to a higher market value. They argue that independent members have a better understanding of risk appetite of firms and that shareholders value solid risk practices and reward firms with enhanced market value. Another stream of research shows that increased reporting quality also increases firm performance, measured as the

variability of the earnings reported before and after the instalment of an AC. Returns variability increased significantly after the AC instalment, which suggests that the AC contributes to a better performing firm by reducing managements' ability to smooth earnings (Wild, 1996).

Independence is often heralded as the single most important board and AC characteristic; however, the evidence is somewhat mixed. Bhagat and Black (2002) find no relationship between the ratio of outsider versus insider board members and firm performance. Klein (1998) suggests that the inclusion of outside directors on the board of directors will increase shareholder returns and corporate performance, but no relation has been found between the overall board independence and firm performance. Chan and Li (2008) find evidence that the presence of independent and expert members on boards and committees increases firm value. This view was also supported by Rosenstein and Wyatt (1990), who find the inclusion of outsiders on the board is associated with abnormal stock returns.

Despite the large quantum of research investigating the relation between firm performance and corporate governance practices, the conclusions remain mixed. For example, Gompers et al. (2003) find firms with stronger shareholder rights (corporate governance structures) are associated with higher firm value, higher profits, higher sales growth, lower capital expenditures and fewer corporate acquisitions. However, an identical study by Core et al. (2006) shows that firms with strong shareholder rights do not outperform those with weak shareholder rights.

These conflicting results are common in the governance literature. However, most of these studies have been undertaken during periods of economic stability when AC controls are potentially less important. For example, Gompers et al.'s (2003) sample was drawn from 1990 to 1999, a period of recovery from the 1987 crash and prior to the Dot-Com collapse of 2000. Core et al.'s (2006) sample was drawn from the 1997 fiscal year prior to the 2000 market correction. Our current study consequently adds to existing literature by considering whether corporate governance characteristics more likely to impact firm performance when firms are under exogenous financial pressure.

Characteristics of Audit Committees

Given the requirement for firms to have an AC, we argue that any differential in performance related to governance is more than likely related to the differences in AC characteristics. The key AC attributes identified in the literature, which we will discuss related to: (i) size and meeting frequency, (ii) independence and (iii) expertise (i.e. experience and education). The first category of AC characteristics focuses on the size and meeting frequency of the AC, which are interrelated attributes. The number of meetings increases as the size of Board and AC increases (Raghunandan and Rama, 2007). This increase in meeting

frequency and number of members is argued to provide more effective monitoring and hence improve firm performance. Controversially, larger audit committees can also lead to inefficient governance, thus yielding more frequent AC meetings (Vafeas, 1999). Sharma et al. (2009) find evidence that the number of AC meetings is negatively associated with multiple directorships, audit committee independence and an independent AC chair. They find a positive association between the higher risk of financial misreporting and AC size, institutional and managerial ownership, financial expertise and independence of the board. We argue that the number of members on the AC and number of meetings can potentially have a positive impact on firm performance.

The second category of AC characteristics relates to independence of the AC. Having an independent AC facilitates more effective monitoring of financial reporting (Beasley, 1996; Carcello and Neal, 2003b) and external audits (Abbott et al., 2002, 2004; Carcello and Neal, 2003a). However, independence has a downside risk. Being completely separate from management could mean that the independent AC members see less industry issues and are more likely to side with the auditor requiring less negotiations and deliberations and thus fewer meetings. This negatively impacts on the level of monitoring (Sharma et al., 2009). The independence literature also examines the positive role of so-called grey-directors who have firm and industry-specific knowledge. Grey-directors are ex-employees or current employees of a firm. Under ACGPR, they are not classified as independent directors if they have worked for the company within the last three years. Klein (1998) finds that these grey-directors can be valuable board members. Her study shows a positive cross-sectional link between the percentage of insiders on finance and investment committees and firm performance.

Ideally, the chair of the AC should be independent and the most experienced person on the committee because of their pivotal role. The function of the chair is to manage the committee's agenda, to be the first point of liaison with the external auditor and to run the AC meetings. However, Sharma et al. (2009) show that some firms appoint an inside director as the AC chair, which leads to less AC independence. Cotter and Silvester (2003) conclude that independent directors on ACs reduce the monitoring by debtholders when leverage is low. The corollary is that executives on the AC lead to increased monitoring by debtholders. In addition, Beasley and Salterio (2001) find a board chair or CEO on the AC reduces the effectiveness of the AC. They conclude that the presence of a CEO on the AC has a negative impact on the independence of the AC and leads to less effective monitoring, although their findings related to determinants of the AC membership and show no empirical link to monitoring effectiveness or performance.

The independence of the AC may be influenced by other governance mechanisms. For example, blockholders also form part of the external governance structure, but their influence is often exerted internally. When blockholders

own more than 5 per cent of the shares of a firm, their presence on the board and committees may lead to governance issues. Klein (2002b) predicted a negative association between AC independence and the presence of alternative monitoring mechanisms, such as blockholders, although her results are inconclusive. Morck et al. (1988) and Jensen (1993) argue that the presence of outside blockholders serving on the board 'usually benchmarked at 5%–10% of total shareholders' equity' (He et al., 2009, p. 10) enhances governance because these directors have both the financial incentives and the independence to effectively evaluate and monitor management and their policies. Blockholders with a significant influence, greater than 20 per cent, have incentives to align interests with those of management, and we expect this impact to be amplified during exogenous shocks. In summary, the AC independence research suggests the percentage of independent directors, grey-directors, AC chair independence, presence of the CEO and representation of blockholders on the AC may all impact on firm performance via the effectiveness of the AC. However, the differential impact these AC independence attributes will have in periods of exogenous financial shock such as the GFC is an empirical issue.

The final category of AC characteristics that influences performance related to financial expertise, which consists of both experience and education. Expertise is specifically recognised by regulators with a minimum of one AC member required to be a financial expert under SOX (Abbott et al., 2004). In Australia, the ACGPR explicitly requires that the AC include members who are all financially literate in that they are able to read and understand financial statements

and at least one member should have relevant experience and education qualifications (i.e. qualified accountant or another finance professional with experience of financial and accounting matters) and that some members should have an understanding of the firm's industry (Australian Securities Exchange Corporate Governance Council 2007). Recent research confirms that accounting expertise within boards that are characterised by strong governance contributes to greater monitoring by the AC and leads to enhanced conservatism (Krishnan and Visvanathan, 2008).

The literature separates managerial experience from governance experience (i.e. serving on other ACs or boards). Having experienced members on the AC contributes to significantly less misreporting and more effective monitoring (Dechow et al., 1996; Raghunandan and Rama, 2007). Greater independent director experience and greater audit knowledge results in more reliable reports (DeZoort, 1998). The empirical evidence indicates that markets react more positively to the appointment of a new AC member who is an expert (Davidson et al., 2004; DeFond et al., 2005). Within the AC, the chair fulfils a key leadership role and hence should be the most qualified person on the AC. Where the AC chair has sufficient auditing background, it is very likely that the AC chair and the CFO will form a good working relationship (Spira,

1999). Although it is recognised that the chair of AC should have experience, DeZoort (1998) finds contrary evidence that 76 per cent of AC chair's do not have any auditing experience. While experience arguably contributes to AC effectiveness, when AC members have multiple directorships they can be overstretched and will not fulfil their fiduciary duties effectively. Consequently, AC effectiveness is negatively impacted the more directorships AC members hold (Core et al., 1999; Vafeas, 2003). We investigate the impact of the AC chair's experience in the position, number of AC members with external directorships, average directorships among AC members and years of experience of the AC chair (as manager or on the board of directors) on AC effectiveness.

Experience alone may not be sufficient to establish financial expertise. Both experience and education are needed to become a financial expert (Giacomino et al., 2009). Regulators recognise this and require all audit committee members to be able to read and understand the financial reports. However, there is limited research on this topic in part due to low incentives to disclose information on backgrounds and careers of directors prior to the post-Enron governance regulatory boom. One study by Chan and Li (2008) classify two groups, those with and those without finance-trained directors. They find a significant impact for finance-trained directors as members of an independent AC (Chan and Li, 2008). DeZoort (1998) shows that a majority of the directors surveyed had a master's degree, but still a large portion of directors lacked any professional certification or licensing. The ACGPR requires at least one AC member to be financially qualified in that they hold either finance or accounting degree. Hence, we examine the frequency of finance and accounting qualifications for both the AC chair and the members of the AC in general.

Based on our review of the literature, we have identified fifteen AC characteristics that impact on firm performance, albeit with mixed evidence as to the direction of the relationship. Almost all this body of literature examines economically healthy periods. We argue that a firm's ability to manage through the GFC will be related to the quality of its corporate governance characteristics. All firms will suffer performance downturns because of the effects of non-transparent leveraged financial products in combination with poorly supervised and regulated financial markets. These effects should be exacerbated when firms have unhealthy risk management practices and poor monitoring. The AC has a key role in financial decision-making, risk management and reporting integrity, and thus, firms with a higher quality AC should be better positioned to make more effective decisions during the GFC. Our research proposition is that as the GFC impacted financial markets, the quality of the financial decision-making is enhanced and hence performance improved if the AC exhibits more of the good governance characteristics identified in our literature review. Our hypothesis is therefore: Hypothesis: Governance enhancing Audit Committee characteristics will positively impact financial performance during the Global Financial Crisis.

Research Design

Sample and Data

The sample includes all firms listed on the S&P300 during the period of the GFC 2008–2009. This period represents the first full year of the GFC in terms of the fall in the aggregated value of the market (i.e. the all ordinaries index). The stock price and financial data were obtained from the Bloomberg and Aspect Huntley databases,

respectively. The corporate governance data were obtained manually from annual reports. Two subsamples of high- and low-performing firms are identified by selecting the high and low 25 per cent performers from the S&P300, a total of 150 firms. Secondly, we collected the audit committee characteristics and control variable data for the 150 firms. Thirty firms were excluded because of missing data or because they were from the finance, banking and insurance sector.³ Table 1 summarizes the sample selection resulting in 120 firm observations.

Table 1

Summary of Sample Selection

Year	2008
S&P300 firms	300
Selection on firm performance Less	150
Missing data and excluded industries	30
Final sample	120
High performers	60
Low performers	60

*Data missing from Bloomberg, Aspect Huntley databases or Annual Reports and excluding financial, banking and insurance firms.

Firm Performance

Our study focuses on which AC characteristics, if any, drive firm performance in the period of the GFC. Consistent with prior research (Klein, 1998; Bhagat and Black, 2002; Bhagat and Bolton, 2008; Brown and Caylor, 2009), we define performance as the change in stock price over one year from the beginning of the impact of the GFC to the first recovery of the market.

$$PERF = f(\Delta Share Price_{(GFC\ period)}). \quad (1)$$

The dependent variable firm performance, PERF, is coded as one for the high performers (upper quartile) and zero for the low performers (lower quartile). We based our analysis on the change in market capitalisation (adjusted for splits and new issues) but excluding dividends owing to the manipulation of dividends in the sample period and their potential to misrepresent the market's perception of performance.⁴ In our robustness test, we employ an alternative market performance measure and an accounting performance measure: percentage price change (RETURN) and return on assets (ROA).

Our use of a categorised dependent variable PERF as our focal performance measure, based on changes in share returns over the test period, goes some way to addressing the endogeneity problems often cited in governance research (Welch, 2003; Ozkan and Ozkan, 2004; De Andres et al., 2005; Dwivedi and Jain, 2005; Black et al., 2006; Miller et al., 2007; Bhagat and Bolton, 2008; Schultz et al., 2010; Brown et al., 2011). Endogeneity leads to biased and inconsistent estimators, and this reduces the confidence we may have in drawing conclusions from the research (Chenhall and Moers, 2007). While it is present in much empirical research (Brown et al., 2011), we believe the

nature of the propositions being tested and the research design provide reasonable control for endogeneity and other econometric issues.

Specifically, there have been concerns about the relationship between characteristics of the board, and by inference its subcommittees, firm performance and the endogeneity that may be implicit in this relationship (Bhagat and Black, 1999; Bhagat and Bolton, 2008; Schultz et al., 2010). The specific issue is whether firm's performance drives the board structure or the board drives performance or whether some other variable drives both (the CEO is an obvious candidate). There is some convincing arguments that the nature of boards that govern corporations today are significantly different from boards in the 1960s (Bhagat and Black, 1999) and that these changes are driven by adverse shocks to the market such as the 1987 stock-market crash (Cadbury, 1999), the savings and loan crisis of the early 1990s (Miller, 1998), the internet bubble of 2000 (Thornton and Marche, 2003) and finally the GFC, which is the subject of our study. Our proposition is that the AC matters to a far greater extent when there is an unexpected exogenous shock; that is, the AC comes into prominence when expectations are not met in a rapidly altered external environment. By choosing an exogenous and largely unexpected event, we assess the AC characteristic–performance relationship before the performance can affect the composition of the board. That is, the research design controls for the implicit endogenous effect.

We further address the endogeneity problem at two levels. First, our dependent variable is based on the rate of return from June 2008 to June 2009, which is the year the negative impact of the GFC was greatest. This first difference approach is advocated by some researches as

one method of minimising the endogeneity issue (Chenhall and Moers, 2007; Larcker and Rusticus, 2007; Bhagat and Bolton, 2008; Schultz et al., 2010; Brown et al., 2011). By calculating the rate of return, we eliminate the endogenous variables that may have influenced board structure before the GFC. Second, our sample is divided into two categories; firms that performed relatively well during the GFC and firms that performed relatively poorly. High-performing firms may in fact have negative returns

but are fairing much better relative to other firms in the initial sample. By coding the dependent variable as binary categories based on a first difference of an underlying continuous variable, our final test measure is therefore two steps removed from the base data. We argue that any endogeneity impact on the estimates is arguably much greater in the raw value measures relative to our test measure.

Table 2

Dependent, Independent and Control Variables

Variable	Definition
PERF	1 = high-quartile performer, 0 = low-quartile performer
RETURN	Percentage change in share price 2008–2009
ROA	Return on Assets = Earnings Before Interest and Tax/Total Assets for 2009
NUMMEM	The number of members on AC
NUMMEET	The number of meetings of AC reported in sample year
INDEP	The percentage of independent members on AC
GREY	The percentage of grey members on AC
CHAIR	1 = Board chair on AC, 0 = otherwise
BLOCK	1 = Block holder on AC, 0 = otherwise
CEO	1 = CEO on AC, 0 = otherwise
CHAIRIND	1 = Chair independent; 0 = otherwise
CHAIREDU	1 = Chair of AC holds a finance or accounting degree, 0 = otherwise
CHAIREXP	1 = Chair of AC is experienced, 0 = otherwise
EXTERDIR	The percentage of AC members with external directorships
MEMBEDU	The percentage of AC members with a finance or accounting degree
INDEXP	The percentage of AC independent members with managerial experience
DIRSHIP	The average number of directorships for AC members
YREXP	AC chair number of years experience working as senior manager or for boards/committees
TOTASS	The log of the book value of Total Assets 2008
LEV	Leverage = debt to assets for 2008
BETA	Firm systematic risk
INDUSTRY	n - 1 Industry Sector Code (GICS) dummy variables

Audit Committee Characteristics

We employ fifteen measures of AC characteristics drawn from the large body of prior work.⁵ The definition for each independent variable along with the dependent and control variables is summarised in Table 2. To compute a composite governance index, each of the non-binary variables is transformed to a binary form by assigning one where the variable is greater than or equal to the median for all companies and zero otherwise. The exception to this procedure is for the variable greydirectors (GREY). For GREY, we expect there to be a negative relationship with the dependent variable. We code GREY as one if less than or equal to the median or zero otherwise for the purpose of computing the composite index. We test whether each variable impacts our main and two alternate performance measures: binary low and high categorical variable (PERF), percentage price change (RETURN) and return on assets (ROA). We conduct two sensitivity tests: the first with a composite index of AC governance variables and the second with a reduced set of variables based on dimensions obtained from principal component analysis.

Control Variables

The control variables used in this study are firm size, risk (beta and financial leverage) and the industry influence on firm performance and audit committee characteristics. Kinney and McDaniel (1989) find that larger firms have better internal controls, better information systems, more resources for hiring fully qualified personnel and therefore the potential for increased reporting quality. Quality financial reporting in turn leads to an improvement of firm performance (Wild, 1996). We control for size effects with the variable TOTASS, measured as the logarithm of the book value of total assets (Klein, 2002b; Carcello and Neal, 2003a; Bronson et al., 2009; Sharma et al., 2009). Any performance measure based on share returns needs to be adjusted for the systematic risk of the firm. We use the beta from the Aspect Huntley database as at 30 June 2008 and in some cases, the industry beta to control for systematic risk. When the return on the market is negative, such as during the GFC, higher beta firms will have lower performance under the capital asset pricing model. Beta and performance are expected to be negatively related for our

sample period. The GFC is more likely to impact firms with high leverage, so we also include a control for leverage, LEV, which is the total liabilities divided by total assets. The GFC affected the market as a whole, but some sectors were impacted more than others.⁶ We control for industry fixed effects with $n - 1$ dummy variables, INDUSTRY, based on the two-digit GICS code.⁷ 3.5. Logit model and analysis We estimate the cross-sectional logit model, equation (2), to test the hypothesised relationship between AC characteristics and the dichotomous firm performance variable PERF.

$$\begin{aligned} PERF_i = & \gamma_0 + \gamma_1 NUMMEM_i + \gamma_2 NUMMEET_i + \\ & \gamma_3 INDEP_i + \gamma_4 GREY_i + \gamma_5 CHAIR_i + \gamma_6 BLOCK_i + \\ & \gamma_7 CHAIREDU_i + \gamma_8 CHAIREXP_i + \gamma_9 EXTERDIR_i + \\ & \gamma_{10} MEMBEDU_i + \gamma_{11} INDEXP_i + \gamma_{12} DIRSHIP_i + \\ & \gamma_{13} YREXP_i + \gamma_{14} TOTASS_i + \gamma_{15} LEV_i + \gamma_{16} BETA_i + \\ & \text{Industry Fixed Effect} + \varepsilon_i \end{aligned} \quad (2)$$

We also conduct additional sensitivity and robustness tests. Omitted variables potentially bias coefficients, and an irrelevant variable can result in poor model fit, which we test using likelihood tests. Another potential problem is multicollinearity between the AC characteristics. This potentially inflates standard errors, and although coefficients are unbiased, this could impact hypothesis testing. To address this issue, we conduct two additional analyses. Firstly, we construct a composite index of AC governance characteristics by summing the binary transformed values of the AC characteristic measures for each company. We re-estimate the dichotomous firm performance analysis using the composite index as the independent variable. Secondly, we ran an exploratory factor analysis to reduce the AC characteristics to three

uncorrelated principal components. We run the logit analysis on the reduced independent variable set as additional robustness analysis. Finally, we also test whether the individual AC characteristics, composite governance index and principle components explain market returns, RETURN, and accounting performance, ROA, by running OLS regressions on RETURN and ROA.

Results

A summary of the performance and industry characteristics of the sample is reported in Table 3. There are 60 low-performing and 60 high-performing firms. The average overall RETURN of the low performers was 16.74 per cent, where the high performers had a positive average return of 16.9 per cent. The average return for the combined sample (high and low combined) is 25.3 per cent, which means the sample firms lost more than quarter of their value during the GFC. In terms of accounting performance, the low performers had an ROA of -3.4 per cent, while the high performers had an average ROA of 11.9 per cent. The overall average ROA is 4.3 per cent. The results in Table 3 suggest there are also industry sector effects. The materials sector is one of the major contributors of the low-performing subsample, while firms in the high-performing subsample are mostly from the industrial, consumer discretionary, consumer staple, health care and information technology sectors. The energy and utilities sectors are fairly evenly divided between the two subsamples. Because different industries are likely to have different betas, the industry sector composition suggests that it will be a significant control variable in our analysis.

Table 3

Performance and Industry Breakdown

	Low Performers	High Performers	Total Sample
RETURN ^a	-67.4%	16.9%	-25.3%
ROA ^b	-3.4%	11.9%	4.3%
GICS Sector			
10 Energy	6	7	13
15 Materials	31	8	39
20 Industrials	16	10	26
25 Consumer discretionary	1	10	11
30 Consumer staples	2	7	9
35 Health care	0	11	11
45 Information technology	1	4	5
50 Telecom services	1	1	2
55 Utilities	2	2	4
N	60	60	120

^aRETURN is change in share price 2008–2009. ^bROA is Earnings Before Interest and Tax/Total Assets for 2009.

The correlations for the independent variables are reported in Table 4. All but seven bivariate Pearson correlations are less than 0.4. The size measure, TOTASS, is positively correlated at 0.453 and 0.403 to the number of members on the AC and the leverage, respectively. The chair of the AC holding finance and accounting qualification is positively correlated with whether the chair of the AC is experienced and the percentage of AC

members with finance and accounting degree at 0.427 and 0.526, respectively. The percentage of independent members on the AC is negatively correlated with the percentage of grey AC members at 0.620. The two highest correlations are between average number of directorships and number of AC members with external directorships (0.657), which is to be expected given the definitions of these two variables. Finally, the highest correlation is

0.760 between AC chair experience and the percentage of independent AC members that have managerial experience. Overall, the correlation matrix suggests minimal potential for multicollinearity issues in the data. We will return to this issue later in the paper when we discuss robustness and sensitivity analysis.

Table 5 presents the mean and standard deviation of the AC characteristics and control variables for the full sample and the low- and high-performing subsamples. Two variables, CEO and CHAIRIND, have low or zero variance. Only one firm, a high performer, had the CEO on the AC, suggesting increased AC independence across the rest of the sample. In addition, the AC chair for all firms was independent. As these two variables are not distinguishing characteristics between firms, they are excluded from

further analysis. Comparing the AC characteristics, we find that both performance groups have similar mean levels for most of the variables. Nevertheless, differences are apparent. The low-performing group has slightly more meetings, a higher level of grey-directors, lower education and experience for the AC chair, lower external directorships and lower average member education and experience across the audit committee. The mean number of members on the AC is 3.33. The grey directors (8.0 per cent) are higher for the low-performing firms than the high performing firms, on average where the percentage of grey-directors is 7.0 percent. The low-performing group of firms have on average more meetings than high-performing firms, with an average of 4.30 meetings compared with 4.22 meetings.

Table 4

Correlation matrix for independent variables

	NUMMEM	NUMMEET	INDEP	GREY	CHAIR	BLOCK	CHAIREDU	CHAIREXP	EXTERDIR	MEMBEDU	INDEXP	DIRSHIP	YREXP	TOTASS	LEV
NUMMEET	0.282 (0.00)														
INDEP	0.074 (0.42)	0.027 (0.77)													
GREY	-0.156 (0.09)	-0.109 (0.23)	- (0.620 (0.00)												
CHAIR	0.078 (0.39)	-0.050 (0.59)	- (0.63)	0.038 (0.68)											
BLOCK	0.003 (0.98)	0.072 (0.43)	- (0.00)	- (0.294 (0.00)	-0.076 (0.69)										
CHAIREDU	0.171 (0.06)	0.035 (0.70)	0.144 (0.12)	- (0.01)	-0.126 (0.17)	0.070 (0.44)									
CHAIREXP	0.027 (0.77)	0.021 (0.82)	0.106 (0.25)	0.091 (0.32)	0.000 (1.00)	-0.011 (0.91)	0.427 (0.00)								
EXTERDIR	0.192 (0.04)	0.086 (0.35)	0.119 (0.20)	0.069 (0.45)	-0.118 (0.20)	-0.266 (0.00)	0.061 (0.51)								
MEMBEDU	-0.014 (0.88)	0.045 (0.62)	0.155 (0.09)	- (0.04)	-0.080 (0.39)	-0.018 (0.84)	0.526 (0.00)	0.329 (0.00)	0.072 (0.43)						
INDEXP	0.021 (0.82)	0.084 (0.36)	0.122 (0.19)	0.081 (0.38)	-0.014 (0.88)	0.031 (0.74)	0.332 (0.00)	0.760 (0.00)	-0.070 (0.45)	0.357 (0.00)					
DIRSHIP	0.251 (0.01)	0.079 (0.39)	0.111 (0.23)	0.050 (0.58)	-0.104 (0.26)	-0.063 (0.49)	-0.026 (0.77)	-0.156 (0.09)	0.657 (0.00)	-0.079 (0.39)	-0.201 (0.03)				
YREXP	-0.059 (0.52)	0.102 (0.27)	0.129 (0.16)	0.000 (1.00)	-0.023 (0.81)	-0.073 (0.43)	0.138 (0.13)	0.120 (0.19)	-0.032 (0.72)	-0.034 (0.71)	0.077 (0.40)	-0.114 (0.22)			
TOTASS	0.453 (0.00)	0.347 (0.00)	0.130 (0.16)	0.110 (0.23)	-0.142 (0.12)	-0.048 (0.60)	0.179 (0.05)	0.103 (0.26)	0.387 (0.00)	0.069 (0.46)	0.103 (0.26)	0.324 (0.00)	-0.049 (0.60)		
LEV	0.092 (0.32)	0.296 (0.00)	0.189 (0.04)	- (0.55)	-0.126 (0.17)	-0.009 (0.93)	0.100 (0.28)	0.002 (0.98)	0.108 (0.24)	0.095 (0.30)	0.043 (0.64)	0.130 (0.16)	-0.061 (0.51)	0.403 (0.00)	
BETA	-0.002 (0.98)	0.069 (0.45)	0.024 (0.79)	0.061 (0.51)	-0.045 (0.62)	-0.100 (0.28)	-0.114 (0.21)	-0.264 (0.00)	-0.070 (0.45)	-0.154 (0.09)	-0.242 (0.01)	-0.031 (0.74)	0.107 (0.24)	0.039 (0.67)	0.218 (0.02)

See Table 2, for variable definitions. Pearson bivariate correlations with P-values in parentheses. CEO and CHAIRIND characteristics are excluded because of low (only 1 case of CEO on the AC) or no variance, respectively – see Table 5.

Table 5

Descriptive Statistics

Variable	Low performers ^a				High performers ^b				Total sample				Difference ^c	
	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	T	Sig.
NUMMEM	3.33	0.80	2.00	6.00	3.32	0.70	2.00	6.00	3.33	0.75	2.00	6.00	0.12	0.903
NUMMEET	4.30	1.83	1.00	10.00	4.22	1.85	0.00	10.00	4.26	1.84	0.00	10.00	0.25	0.805
INDEP	0.90	0.18	0.33	1.00	0.90	0.16	0.50	1.00	0.90	0.17	0.33	1.00	-0.14	0.888
GREY	0.08	0.17	0.00	0.67	0.06	0.12	0.00	0.33	0.07	0.15	0.00	0.67	0.72	0.472
CHAIR	0.55	0.50	0.00	1.00	0.45	0.50	0.00	1.00	0.50	0.50	0.00	1.00	1.09	0.277
BLOCK	0.05	0.22	0.00	1.00	0.05	0.22	0.00	1.00	0.05	0.22	0.00	1.00	0.00	1.000
CEO	0.00	0.00	0.00	0.00	0.02	0.13	0.00	1.00	0.01	0.09	0.00	1.00	-1.00	0.319
CHAIRIND	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	NA	NA
CHAIREDU	0.60	0.49	0.00	1.00	0.78	0.42	0.00	1.00	0.69	0.46	0.00	1.00	-2.20	0.030
CHAIREXP	0.73	0.45	0.00	1.00	0.97	0.18	0.00	1.00	0.85	0.36	0.00	1.00	-3.76	0.000
EXTERDIR	0.81	0.24	0.00	1.00	0.84	0.26	0.00	1.00	0.83	0.25	0.00	1.00	-0.71	0.481
MEMBEDU	0.44	0.27	0.00	1.00	0.55	0.30	0.00	1.00	0.50	0.29	0.00	1.00	-1.98	0.050
INDEXP	0.72	0.36	0.00	1.00	0.94	0.21	0.00	1.00	0.83	0.31	0.00	1.00	-4.14	0.000
DIRSHIP	2.25	1.39	0.00	7.00	2.15	1.11	0.00	6.25	2.20	1.25	0.00	7.00	0.43	0.670
YREXP	22.30	9.14	4.00	39.00	20.63	8.54	4.00	41.00	21.47	8.85	4.00	41.00	1.03	0.304
GOVINDEP	8.80	2.08	4.00	13.00	9.85	1.96	5.00	13.00	9.32	2.08	4.00	13.00	-2.85	0.005
TOTASS	20.60	1.54	16.77	25.59	20.88	1.60	18.01	24.03	20.74	1.57	16.77	25.59	-0.97	0.332
LEV	0.51	0.22	0.02	1.32	0.48	0.22	0.04	1.09	0.50	0.22	0.02	1.32	0.62	0.536
BETA	1.33	0.40	0.74	2.00	1.00	0.31	0.50	2.00	1.16	0.39	0.50	2.00	5.02	0.000

^aSample size of low-performing firms: 60. ^bSample size of high-performing firms: 60. ^cT-test of mean difference between low- and high-performing firms, one tail significance.

It is also more likely to find a chair of the board of directors on the AC and more average number directorship in low-performing firms relative to high-performing firms. The board chair was a member of the AC for approximately 55 per cent for the low performers and 45 per cent for the high performers. As stated earlier, the presence of a CEO on the AC is zero for the low-performing firms and 2 per cent for high-performing firms. The percentage of AC members with external directorships differs between the high performers with 84 per cent compared with the 81 per cent for low performers. Fifty-five per cent of the high performers have a financially qualified AC compared with 44 per cent of low performers. The level of experience on the AC for high performers is 94 per cent compared with 72 per cent for low performers. Finally, the average number of directorships among the AC members is 2.15 for high performers and 2.25 for low performers. Overall, this suggests that high-performing firms have better qualified and more experienced AC members than low-performing firms. In relation to the characteristics of the AC chair, we find 78 per cent of the high performers have an AC chair with financial qualifications, compared with 60 per cent of low performers. Likewise, high performers have a higher level of experience of AC chair, with 97 per cent compared with 73 per cent for the low performers. Controversially, the low performers have AC chairs with more years of experience (average 22.3 years) than the AC chairs of high performers (20.6 years). This is unexpected, as the level of experience and education is greater for the high-performing firms. A possible explanation could be that AC chairs who have longer tenure are less independent because of the relationships they develop with the CEO and the auditor. Finally, high performers are larger with a TOTASS size control of 20.9 versus 20.6 low performers. Overall, many of the AC characteristic differences between high- and low-performing firms are not significant. Only the chair's education and experience and member education and experience variables are significantly lower

for the low performers relative to the high performers at the 5 per cent level. The cumulative governance effect of the subsample differences is reflecting in the composite governance index, which is significantly lower for the low performers at the 1 per cent level. The descriptive statistics indicate that firms are complying with the ACGPR (Australian Securities Exchange Corporate Governance Council 2007, p. 11). That is, our sample ACs consist of at least three members, have a majority of independent members, an independent chair who is not the chair of the board, and consist of only non-executive members with at least one financial expert.

Hypothesis Testing

We estimate a logit regression to test which AC characteristics are associated with firm performance. Table 6, Model 1 reports the results for this analysis. The log likelihood test for the model is significant at the 1 per cent level and indicates that the model as a whole (i.e. all the slopes coefficients as a group) is significantly different to zero. Thus, the overall model is valid, and the variables are associated with firm performance. We also report the chi-squared statistics for the likelihood test for each individual parameter. At the 5 per cent level, high performance is negatively related to number of AC members (NUMMEM). Larger ACs are associated with lower performance. The percentage of AC independent members with managerial experience (INDEXP) and the experience of the AC chair (CHAIREXP) are positively related to high performance at the 5 and 10 per cent levels, respectively. Of the control variables, size has a positive impact on performance, while beta affects performance negatively. The dummy control variable for the materials sector is also significantly negative, while the industrial sector is significantly positive at the 1 per cent level. The interpretation of the logit estimated coefficients is different to an ordinary least squares regression. The coefficients are the probability log odds ratio of the

likelihood that the independent variable is related to the dependent variable, in this case firm performance. Holding all other variables constant, our model predicts the log odds for firm performance changes 1.365 for every one unit change in the number of AC members. The negative coefficient decreases the probability of a high-performing firm. That is, the lower the number of AC members, the more likely it is for a firm to perform better. Similarly holding all other variables constant, our model predicts the log odds for firm performance would change 3.141 for every one unit change in the percentage of AC members with managerial experience. The positive coefficient increases the probability of a high-performing firm. The

implication is that firms with high percentage of AC members with managerial experience benefit from the added experience provide when they are members of the AC. That is, those AC members with experience help performance during the GFC. The positive coefficient for CHAIREXP suggests performance increase 3.017 if the chair of the AC is experienced. It would appear that if the chair of the AC is experienced, their ability to provide effective monitoring increases. As expected, systematic risk beta is negatively related to performance with the low performers being riskier. Low performers are smaller, and they are also more likely to be in the materials sector.

Table 6

Audit Committee Characteristics and Firm Performance

Variable ^a	Predicted sign	Model 1	Model 2	Model 3
NUMMEM	+	-1.364 (5.401)**		
NUMMEET	+	0.312 (1.508)		
INDEP	+	1.211 (0.152)		
GREY ^b	-	-0.927 (0.088)		
CHAIR	-	0.364 (0.266)		
BLOCK	+	-0.411 (0.060)		
CHAIREDU	+	0.350 (0.148)		
CHAIREXP	+	3.021 (3.260)*		
EXTERDIR	-	0.733 (0.148)		
MEMBEDU	+	-1.679 (1.283)		
INDEXP	+	3.147 (4.025)**		
DIRSHIP	-	-0.299 (0.457)		
YREXP	+	-0.020 (0.226)		
GOVINDEXT	+		0.417 (8.028)***	
EXPERTISE	+			0.975 (9.841)***
COMMITMENT	-			-0.424 (1.623)
INDEPENDENCE	+			0.149 (0.248)
TOTASS	+	0.672 (5.524)**	0.165 (0.692)	0.480 (4.189)**
LEV	-	-2.543 (1.983)	-2.206 (2.402)	-2.258 (2.253)
BETA	-	-4.897 (20.017)***	3.541 (19.512)***	-3.815 (19.345)***
INDUSTRY ^c		Yes	Yes	Yes
PseudoR ^d		0.729	0.614	0.648
Chi-square		94.94***	74.07***	79.82***
Per cent Correctly Predicted		87.5	83.3	84.2

(Chi square) likelihood ratio test of individual parameters. ***, ** and * Significant at the 0.01, 0.05 and 0.10 levels.

Mode 1: $PERF_i = \gamma_0 + \gamma_1 NUMMEM_i + \gamma_2 NUMMEET_i + \gamma_3 INDEP_i + \gamma_4 GREY_i + \gamma_5 CHAIR_i + \gamma_6 BLOCK_i + \gamma_7 CHAIREDU_i + \gamma_8 CHAIREXP_i + \gamma_9 EXTERDIR_i + \gamma_{10} MEMBEDU_i + \gamma_{11} INDEXP_i + \gamma_{12} DIRSHIP_i + \gamma_{13} YREXP_i + \gamma_{14} TOTASS_i + \gamma_{15} LEV_i + \gamma_{16} BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$

Mode 2: $PERF_i = \gamma_0 + \gamma_1 GOVINDEXT_i + \gamma_2 TOTASS_i + \gamma_3 LEV_i + \gamma_4 BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$

Mode 3: $PERF_i = \gamma_0 + \gamma_1 EXPERTISE_i + \gamma_2 COMMITMENT_i + \gamma_3 INDEPENDENCE_i + \gamma_4 TOTASS_i + \gamma_5 LEV_i + \gamma_6 BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$

PERF is 1 for high-quartile performer and 0 for low-quartile performer. GOVINDEXT is a composite index of AC governance formed by converting the governance variables listed in Table 2 to binary variables (relative to a

median cut-off) and then summing them. EXPERTISE factor represents the Chair and AC members' levels of experience and financial and accounting education (see Table 7). COMMITMENT factor represents the external

responsibilities (directorships) of the AC members and number of AC members. INDEPENDENCE factor includes the proportion of independent AC members, the grey-directors and blockholders. See Table 2 for the definitions of the remaining independent and control variables. ^aCEO and CHAIRIND characteristics are excluded because of low/no variance – see Table 5. ^bTo compute GOVINDE, GREY is reverse coded 1 = less than median and 0 = median or greater GREY members. ^cIndustry fixed effect for Materials and Industrial Sectors are, respectively, significantly negative and positive at the 1 per cent level. ^dNagelkerke R². significantly different to zero. Thus, the overall model is valid, and the variables are associated with firm performance. We also report the chi-squared statistics for the likelihood test for each individual parameter. At the 5 per cent level, high performance is negatively related to number of AC members (NUMMEM). Larger ACs are associated with lower performance. The percentage of AC independent members with managerial experience (INDEXP) and the experience of the AC chair (CHAIREXP) are positively related to high performance at the 5 and 10 per cent levels, respectively. Of the control variables, size has a positive impact on performance, while beta affects performance negatively. The dummy control variable for the materials sector is also significantly negative, while the industrial sector is significantly positive at the 1 per cent level. The interpretation of the logit estimated coefficients is different to an ordinary least squares regression. The coefficients are the probability log odds ratio of the likelihood that the independent variable is related to the dependent variable, in this case firm performance. Holding all other variables constant, our model predicts the log odds for firm performance changes 1.365 for every one unit change in the number of AC members. The negative coefficient decreases the probability of a high-performing firm. That is, the lower the number of AC members, the more likely it is for a firm to perform better. Similarly holding all other variables constant, our model predicts the log odds for firm performance would change 3.141 for every one unit change in the percentage of AC members with managerial experience. The positive coefficient increases the probability of a high-performing firm. The implication is that firms with high percentage of AC members with managerial experience benefit from the added experience provide when they are members of the AC. That is, those AC members with experience help performance during the GFC. The positive coefficient for CHAIREXP suggests performance increase 3.017 if the chair of the AC is experienced. It would appear that if the chair of the AC is experienced, their ability to provide effective monitoring increases. As expected, systematic risk beta is negatively

related to performance with the low performers being riskier. Low performers are smaller, and they are also more likely to be in the materials sector.

Sensitivity Analysis

We conduct additional testing to control for potential multicollinearity and dimensionality in the independent variables. Note that while the bivariate correlations (see Table 4) did not evidence any strong relationships between the variables, we considered it prudent to consider this potential limitation.⁸ We produce a composite index of AC governance by summing the individual binary variables for each company and then regress this composite governance index and the control variables on performance. The results in Table 6, Model 2 indicate that GOVINDE is positively related to high performance at the 1 per cent significance level. The result suggests that an overall high level of AC governance increases firm performance. The results also indicate that an increase in risk is negatively related to high performance, which is in line with the impact of BETA in Model 1.

Our second approach to reduce the dimensionality in the AC characteristics is a principal components factor analysis to condense the variables together into one or more parsimonious factors. The downside of reducing the number of variables is the loss of variance, as the factors create their own factor scores and one score cannot represent the underlying data of other variables to the fullest. To perform a factor analysis, a minimum correlation among some of the variables is required, so the three low variance variables are excluded from this analysis. Based on a scree plot of the eigen-values, we identify three factors as reported in Table 7. The three factors extracted capture the expertise, commitment and independence dimensions in the AC characteristic variables and explain a total of 47 per cent of the variance in the data set. Expertise is a positive function of the managerial and audit experience and financial and accounting education of the chair and AC members. Commitment captures the external responsibilities (directorships) of the AC members and the number of AC members. Independence includes the proportion of independent AC members, the grey-directors and the level of blockholdings.

Additional analysis reported in Table 6, Model 3, employing the factor scores that represent three distinct AC dimensions: EXPERTISE, COMMITMENT

Table 7

Audit committee rotated principal component matrix^{a,b}

	Principal component		
	EXPERTISE	COMMITMENT	INDEPENDENCE
NUMMEM	0.094	0.568	0.019
NUMMEET	0.148	0.372	-0.060
INDEP	0.126	0.033	0.902
GREY	-0.204	-0.091	-0.722
CHAIR	-0.104	-0.224	0.028
BLOCK	0.152	-0.033	-0.495
CHAIREDU	0.713	0.203	0.103
CHAIREXP	0.822	-0.027	0.005
EXTERDIR	-0.107	0.782	0.194
MEMBEDU	0.651	0.114	0.129
INDEXP	0.816	-0.065	-0.019
DIRSHIP	-0.265	0.805	0.104
YREXP	0.147	-0.172	0.210

See Table 2 for variable definitions. ^aExtraction method: Principal component analysis – variance explained 47 per cent.

^bRotation method: Varimax with Kaiser normalisation.

and INDEPENDENCE. The results show that EXPERTISE, which represents the experience and education of AC members, is positively related to high performance at the 1 per cent significance level. This finding could be linked to the relationship between CHAIREXP and INDEXP and high performance in Table 6, Model 1, which suggest that experience is a crucial part of the monitoring mechanism in the AC during periods of financial distress such as the GFC. Furthermore, Table 6, Model 3 shows that TOTASS has a positive impact on performance, while the impact of BETA is negative on performance. These results are similar to those reported in Table 6, Model 1, which shows that size and firm systematic risk have significant influence on performance. We also perform a prediction evaluation test to assess each of the logit models' goodness of fit. The percentage-correct-prediction statistic assumes an event is expected to occur, when the estimated probability is greater than or equal to 0.5 (the cut-off value). Table 6 presents the results for the prediction evaluation test and shows that the estimated models predict more than 80 per cent of the low- and high-performing firms correctly.

Robustness Tests

To further test the robustness of the results, we perform comparative regressions where market returns (RETURN)

and accounting performance (ROA)⁹ are modelled as a function of the AC characteristics, governance index and governance factors. The results for the market and accounting performance analyses are reported in Tables 8 and 9, respectively. The results for Model 4 in Table 8 show that none of the individual AC characteristics are significant when regressed on market performance. Only the risk measures for beta and leverage and negatively related to performance at the 1 and 10 per cent significance levels, respectively. The results reported in Table 8, Model 5 show that GOVINDEXT is positively related to RETURN. That is, the more of the governance enhancing AC characteristics that a firm exhibits (i.e. a higher index of combined AC characteristics) the better the firm performs. Additionally, similar to Model 4, leverage and beta are negatively related to market returns in this reduced model. Finally, the three factors were regressed on RETURN. The results presented in Table 8, Model 6 show that only the EXPERTISE factor is significantly related to RETURN. Market returns increase with EXPERTISE. As expected in an economic downturn, leverage and beta are significantly related to lower market performance. These results confirm the prior logit evidence that aggregate AC characteristics and in particular expertise impact firm performance during the GFC.

Table 8

Audit Committee Characteristics Regression On Market Return

Variable ^a	Predicted sign	Model 4	Model 5	Model 6
NUMMEM	+	-0.063 (-1.125)		
NUMMEET	+	-0.013 (-0.600)		
INDEP	+	-0.031 (-0.102)		
GREY ^b	-	-0.209 (-0.632)		
CHAIR	-	0.040 (0.543)		
BLOCK	+	0.211 (1.140)		
CHAIREDU	+	0.040 (0.390)		
CHAIREXP	+	0.002 (-0.014)		
EXTERDIR	-	0.208 (0.986)		
MEMBEDU	+	-0.007 (-0.042)		
INDEXP	+	0.161 (0.893)		
DIRSHIP	-	-0.029 (-0.735)		
YREXP	+	-0.001 (-0.001)		
GOVINDEIX	+		0.042 (2.324)**	
EXPERTISE	+			0.058 (1.606)*
COMMITMENT	-			-0.022 (-0.540)
INDEPENDENCE	+			0.006 (0.170)
TOTASS	+	0.020 (0.637)	-0.010 (-0.395)	0.013 (0.429)
LEV	-	-0.265 (-1.315)*	-0.288 (-1.588)*	-0.264 (-1.428)
BETA	-	0.411 (-3.677)***	-0.456 (-4.480)***	-0.447 (-4.262)***
INDUSTRY ^c		Yes	Yes	Yes
Adjusted R ²		36.4	41.9	39.7
F-test model fit		3.84***	8.16***	6.59***

T-stat for individual parameters. ***, ** and * Significant at the 0.01, 0.05 and 0.10 levels (one-sided test).

Model: 4:

$$RETURN_i = \gamma_0 + \gamma_1 NUMMEM_i + \gamma_2 NUMMEET_i + \gamma_3 INDEP_i + \gamma_4 GREY_i + \gamma_5 CHAIR_i + \gamma_6 BLOCK_i + \gamma_7 CHAIREDU_i + \gamma_8 CHAIREXP_i + \gamma_9 EXTERDIR_i + \gamma_{10} MEMBEDU_i + \gamma_{11} INDEXP_i + \gamma_{12} DIRSHIP_i + \gamma_{13} YREXP_i + \gamma_{14} TOTASS_i + \gamma_{15} LEV_i + \gamma_{16} BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$$

$$Mode\ 5: RETURN_i = \gamma_0 + \gamma_1 GOVINDEIX_i + \gamma_2 TOTASS_i + \gamma_3 LEV_i + \gamma_4 BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$$

$$Mode\ 6: RETURN_i = \gamma_0 + \gamma_1 EXPERTISE_i + \gamma_2 COMMITMENT_i + \gamma_3 INDEPENDENCE_i + \gamma_4 TOTASS_i + \gamma_5 LEV_i + \gamma_6 BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$$

RETURN is the percentage change in share price between 2008 and 2009. GOVINDEIX is a composite index of AC governance formed by converting the governance variables listed in Table 2 to binary variables (relative to a median cut-off) and then summing them. EXPERTISE factor represents the Chair and AC members' levels of experience and financial and accounting education (see Table 7). COMMITMENT factor represents the external responsibilities (directorships) of the AC members and number of AC members. INDEPENDENCE factor includes

the proportion of independent AC members, the grey-directors and blockholders. See Table 2 for independent and control variable definitions. ^aCEO and CHAIRIND characteristics are excluded because of low/no variance – see Table 5. ^bTo compute GOVINDEIX, GREY is reverse coded 1 = less than median and 0 = median or greater GREY members. ^cIndustry fixed effect for Materials and Industrial Sectors are, respectively, significantly negative and positive at the 1 per cent level.

Table 9

Audit Committee Characteristics Regression on Return on Assets (ROA)

Variable ^a	Predicted sign	Model 7	Model 8	Model 9
NUMMEM	+	0.016 (0.428)		
NUMMEET	+	-0.005 (-0.333)		
INDEP	+	0.150 (0.740)		
GREY ^b	-	0.079 (0.364)		
CHAIR	-	0.064 (1.303)*		
BLOCK	+	0.171 (1.409)		
CHAIREDU	+	-0.008 (-0.123)		
CHAIREXP	+	-0.178 (-1.643)*		
EXTERDIR	-	0.348 (2.516)***		
MEMBEDU	+	0.159 (1.493)**		
INDEXP	+	-0.026 (-0.222)		
DIRSHIP	-	-0.026 (-1.017)		
YREXP	+	0.008 (2.820)***		
GOVINDE	+		0.021 (1.671)**	
EXPERTISE	+			-0.012 (-0.476)
COMMITMENT	-			0.034 (1.153)
INDEPENDENCE	+			0.030 (1.244)
TOTASS	+	-0.006 (-0.286)	-0.006 (-0.729)	-0.010 (-0.505)
LEV	-	0.132 (0.993)	0.073 (0.560)	0.084 (0.646)
BETA	-	-0.208 (-2.838)***	-0.183 (-2.522)***	-0.192 (-2.592)**
INDUSTRY ^c		Yes	Yes	Yes
Adjusted R ²		24.9	18.9	17.7
F-test model fit		2.64***	3.30***	2.83***

T-stat for individual parameters. ***, ** and * Significant at the 0.01, 0.05 and 0.10 levels (one-sided test).

Mode 7: $ROA_i = \gamma_0 + \gamma_1 NUMMEM_i + \gamma_2 NUMMEET_i + \gamma_3 INDEP_i + \gamma_4 GREY_i + \gamma_5 CHAIR_i + \gamma_6 BLOCK_i + \gamma_7 CHAIREDU_i + \gamma_8 CHAIREXP_i + \gamma_9 EXTERDIR_i + \gamma_{10} MEMBEDU_i + \gamma_{11} INDEXP_i + \gamma_{12} DIRSHIP_i + \gamma_{13} YREXP_i + \gamma_{14} TOTASS_i + \gamma_{15} LEV_i + \gamma_{16} BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$

Mode 8: $ROA_i = \gamma_0 + \gamma_1 GOVINDE_i + \gamma_2 TOTASS_i + \gamma_3 LEV_i + \gamma_4 BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$

Mode 9: $ROA_i = \gamma_0 + \gamma_1 EXPERTISE_i + \gamma_2 COMMITMENT_i + \gamma_3 INDEPENDENCE_i + \gamma_4 TOTASS_i + \gamma_5 LEV_i + \gamma_6 BETA_i + Industry\ Fixed\ Effect + \varepsilon_i$

ROA is the Earnings Before Interest and Tax/Total Assets for 2009. *GOVINDE* is a composite index of AC governance formed by converting the governance variables listed in Table 2 to binary variables (relative to a median cut-off) and then summing them. *EXPERTISE* factor represents the Chair and AC members' levels of experience and financial and accounting education (see Table 7). *COMMITMENT* factor represents the external responsibilities (directorships) of the AC members and number of AC members. *INDEPENDENCE* factor includes the proportion of independent AC members, the grey-directors and blockholders. See Table 2 for remaining independent and control variable definitions. ^aCEO and *CHAIRIND* characteristics are excluded because of low/no variance – see Table 5. ^bTo compute *GOVINDE*, *GREY* is reverse coded 1 = less than median and 0 = median or greater *GREY* members. ^cIndustry fixed effect for Materials and Industrial Sectors are, respectively, significantly negative and positive at the 1 per cent level.

Finally, we explore the association between accounting

performance, ROA, and the AC characteristics, governance index and governance factors. The results reported in Table 9, Model 7 show that ROA is positively associated with the board chair sitting on the AC, blockholders on the AC, more external directorships held by AC members and greater years of managerial experience for the AC chair. However, the tenure of the AC chair, *CHAIREXP*, is negatively related to accounting performance. The results for Model 8 suggest that the overall governance index is positively related to accounting performance. In contrast to the binary and returns models earlier, none of the individual governance factors are significantly related to accounting performance in Model 9. Consistent with the logit and returns models, beta is negatively related to ROA in a downward market. Taking the logit and regression models together, it would seem that the AC governance levels in aggregate and beta are the consistent drivers of performance during the GFC. Aspects of education, independence, tenure and experience can positively and negatively impact performance.

Discussion and Conclusion

This research examines whether governance makes a difference to firm performance during an adverse exogenous shock such as the 2008 GFC. Owing to the financial nature of the GFC, the specific governance attributes of interest are the characteristics of the AC. We examine a range of AC characteristics or attributes that have been studied under normal market conditions and examine their relevance during the GFC. We considered fifteen AC characteristics that broadly cover size and meetings, independence and expertise (experience and education) of the AC to identify any relationship with low and high firm performance during the GFC.

Most of the corporate governance-performance literature to date is restricted to periods of economic stability. Lemmon and Lins (2003) study the impact of the Asian Financial Crisis, but their study considered ownership structure rather than the monitoring effects of the AC. Our study is the only research we are aware of that examines AC characteristics during a truly global crisis. Corporate governance systems and processes are typically introduced to align the interests of professional managers with the interests of shareholders (Jensen and Meckling, 1976). We argue that any performance impact of corporate governance is magnified in times of financial distress. In particular, we argue that it is the AC governance attributes that matter most (Sarbanes-Oxley Act 2002; Australian Securities Exchange Corporate Governance Council 2007; Bronson et al., 2009; Robinson and Owens-Jackson, 2009). Fifteen attributes of ACs were distilled from the corporate governance literature. These AC characteristics have been shown to influence firm performance directly or indirectly. The core argument is that the AC contributes to the quality of financial reporting, risk evaluation and monitoring and thus, enhances firm performance. Prior empirical evidence supports this contention and finds a direct relationship between the quality of financial reports and market returns (Wild, 1994, 1996). We build on this work and test the hypothesis that AC characteristics explain the differential firm performance during the GFC. Consistent with prior research, we estimate a logit model to identify the AC characteristics that discriminate between low and high firm performance after the exogenous shock of the GFC (Beasley, 1996; Klein, 2002b; Carcello and Neal, 2003a; Abbott et al., 2004). The model was estimated using a sample of S&P300 firms listed on the ASX in 2008. We identify low and high performers based on the extreme quartiles of the market returns. A dummy variable for firm performance was created where the high performers (top 25 per cent of the sample) were assigned a value of one, and a zero for those in the lower performance quartile. Four control variables moderated the analysis: firm size (measured as the log of the book value of total assets), beta systematic risk, financial leverage and industry sector (fixed effect dummy variables). Sensitivity analysis is also included in this study as a construct validity check. An exploratory factor

Analysis was undertaken to determine whether the Measures could be clustered and provide new insights on the previous results. Further analysis included the new factors in the same model against firm market and accounting performance. The results indicate that a limited number of AC characteristics are associated with firm performance. The number of AC members negatively impacts firm market performance. However, having a longer tenured chair on the AC and members with more managerial experience positively impacts market performance. We also find evidence that expertise, the combination of education and experience, is positively related to market performance. Accounting performance was positively related to blockholders on the AC, level of AC member's external directorships and experience but negatively related to the AC chair's tenure. A composite index of AC characteristics, GOVINDEX, produced similar results consistent with AC governance in aggregate impacting market and accounting performance positively. Beta and leverage, as expected, impacted negatively on market and accounting performance.

Unexpectedly, the experience of the AC chair negatively impacts accounting performance. An explanation is that the AC chairs who have longer tenure are less independent. Specifically, the longer the tenure of the AC chair, the more likely the chair will behave like an inside director (Sharma et al., 2009). This raises the question as to whether the chair's tenure should be restricted in the same way as that of the lead auditor.

Finally, the analysis in this study makes several contributions to the literature. Prior studies have examined the influence of board committees on firm performance under normal economic conditions. To the best of our knowledge, no prior study has, theoretically or empirically, examined the interaction of AC characteristics and firm performance in periods of extreme economic distress. During the GFC, higher quality ACs mitigate the exogenous impacts of the GFC and results in higher firm performance. Thus, we show that governance makes a difference in a period when quality decision-making is more critical. We also provide some evidence to support the regulatory thrust requiring ACs and certain AC characteristics such as independence, financial expertise and minimal size (Sarbanes-Oxley Act 2002; Australian Securities Exchange Corporate Governance Council 2007).

The results support the view in the literature that knowledge and experience on the AC drives better financial reporting and in turn, all else equal, increases firm performance. Future research can build on this work by investigating data from other markets and different periods of economic recession and financial distress to better understand which corporate governance attributes matter and when they matter most. In conclusion, if governance should make a difference, then that difference should be in period of adverse performance. Our research supports that view.

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