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Corporate governance and performance of UK listed small and medium enterprises

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Abstract

Purpose – This paper aims to report the results of an investigation into the effect of corporate governance factors on the performance of listed small and medium-sized enterprises (SMEs), and examines whether this effect differs between the two sizes of business.

Design/methodology/approach – The paper uses unbalanced panel data regression analysis on a sample of 234 SMEs listed on the Alternative Investment Market, for a 10-year period (2004–2013).

Findings – The panel data analysis results show that for all SMEs, corporate governance factors – board size, chief executive officer (CEO) age and tenure and directors' remuneration – are significantly associated with performance of SMEs. The results also suggest that while board size is associated with the performance of both small and medium enterprises, CEO age is significant only for medium firms and directors' remuneration only for small ones, while CEO tenure and proportion of non-executive directors are not significant for either.

Practical implications – Overall, the results imply that corporate governance factors affect the performance of listed SMEs. However, this effect differs significantly between small and medium enterprises. The findings have important implications for policymakers who prescribe corporate governance mechanisms for SMEs.

Originality/value – The paper adds to existing literature on corporate governance of SMEs by establishing a relationship between firm performance and board size, CEO age, CEO tenure, directors' remuneration and proportion of non-executive directors.

Keywords Small to medium-sized enterprises, Corporate governance, Board of directors, Company performance

Paper type Research paper

1. Introduction

A myriad of studies have investigated the relationship between corporate governance factors and performance (Black *et al.*, 2006; Chhaochharia and Grinstein, 2007; Bennett and Robson, 2004), the rationale being to make recommendations. For example, Spanos (2005) argues that corporate governance has significant implications for the growth prospects of an economy, because proper practices diminish risk for investors, attract investment capital and improve corporate performance. Dalton and Dalton (2005) also suggest that research into the association between corporate governance and performance has important implications for policymakers who prescribe corporate governance mechanisms. Johnson *et al.* (2000) report that weak corporate governance worsened the 1997 Asian currency crisis; this underscores the importance of corporate governance to firms' performance.

Despite the importance of corporate governance to firms' performance, only a few studies have investigated the relationship between corporate governance factors and performance in small and medium-sized enterprise (SMEs). For example, Eisenberg *et al.* (1998) found a negative relationship between board size and firm value when they analysed a sample of small Finnish firms. Bennedsen *et al.* (2008) also reported a significant negative association

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between board size/CEO age and performance. The limited number of research studies on the effect of corporate governance factors on the performance of SMEs is surprising, given that SMEs are the mainstay of economic development in most countries around the world (Beaver and Prince, 2004; Lukacs, 2005). According to the Department of Business Innovation and Skills (2013), "SMEs represent 99.9 per cent of private sector businesses and provide employment to an estimated 14.4 million people, which is 59.3 per cent of private sector employment. Their estimated combined annual turnover of £1,600 billion accounts for 48.1 per cent of private sector turnover", making SMEs a source of economic growth and employment in the UK. Consequently, research on whether corporate governance affects the performance of SMEs is important, given that any resulting policy implications have the potential to influence the country's economic growth and, so, the welfare of its citizens.

The objective of this current study is to examine the effect of corporate governance factors (board size, CEO age, CEO tenure, proportion of non-executive directors [NEDs] and directors' remuneration) on the performance of SMEs listed on the UK Alternative Investment Market (AIM), using a sample of 234 SMEs for a 10-year period (2004-2013). These five corporate governance variables were selected because of their importance, particularly to SMEs' performance (Eisenberg *et al.*, 1998; Cowling, 2008; Dasilas and Papasyriopoulos, 2015). We control for enterprise-specific characteristics such as annual sales growth, firm age, size, asset tangibility and leverage. We then split our sample of SMEs into small and medium firms, and investigate whether corporate governance factors affect the performance of each size of firm differently.

The relationship between corporate governance and performance may differ between large firms and SMEs because the ownership structure of the latter may mean they do not benefit from the detailed corporate governance regime usually found in the former (Dasilas and Papasyriopoulos, 2015) to safeguard shareholders' interests from misappropriation by management. According to Uhlaner *et al.* (2007), agency problems in SMEs are minimal, given that their management lies mostly in the hands of the shareholders. Further, existing corporate governance regimes – such as the Sarbanes–Oxley Act 2002 in the USA, the 2003 Guidelines of the Australian Stock Exchange's Corporate Governance Council, the Combined Code on Corporate Governance in the UK and other provisions in the 2004 guidelines of the Organisation for Economic Co-operation and Development – tend to focus on compliance with issues irrelevant to the day-to-day running of SMEs. Given the ownership structure differences between SMEs and large firms, the question then is whether corporate governance factors affect the performance of listed SMEs in the same way as in large firms.

Our study makes important contributions to existing literature and differs from previous research in two main ways. First, as the effect of corporate governance on performance may differ between large firms and SMEs due to differences in corporate governance mechanisms (Cowling, 2008), this study differs from previous ones in that it documents evidence of this. Further, existing studies on SMEs' corporate governance and performance do not distinguish between small and medium enterprises (Bennett and Robson, 2004; Bennedsen *et al.*, 2008). We argue that if the effect of corporate governance factors differs by size of SME, any prescription for corporate governance based on the results of analysis of SMEs as a homogeneous group may be inappropriate. The size difference between small and medium enterprises means that corporate governance efficiency is expected to be higher in the latter.

Second, the study uses data on listed UK SMEs to investigate the relationship between corporate governance factors and performance. This is significant, as the corporate governance mechanisms of SMEs change when they are listed (Uhlaner *et al.*, 2007). While corporate governance is a choice for unlisted SMEs, the AIM listing rules require the implementation of measures such as a board of directors; audit committees, remuneration committee, appointment committees and independent directors. We therefore argue that

the limited evidence on the effect of corporate governance factors on the performance of unlisted SMEs (Bennedson *et al.*, 2008) may not apply to listed SMEs. Although AIM-listed SMEs are not obliged to comply with the UK's Combined Code, they are encouraged to do so (Mallin and Ow-Yong, 2008). Mendoza (2011) contends that any sub-optimal corporate governance regime will threaten the continuity of the firm on the AIM. To the best of our knowledge, there is no published research that has examined the relationship between corporate governance and the performance of UK-listed SMEs.

The rest of the paper is structured as follows. The next section examines the theoretical framework for the relationship between corporate governance and performance. This is followed by a literature review and development of hypotheses. The study data and research methodology are then discussed. The penultimate section discusses the empirical results. The final section presents the summary and conclusion.

2. Theoretical framework

The study adopts a multi-theoretical framework to explain why the corporate governance factors investigated may affect the performance of SMEs. For example, the resource-dependency theory of corporate governance concentrates on the importance of the board of directors in enhancing the performance of firms (Hillman *et al.*, 2000). According to this theory, the board is crucial to firms in providing or securing essential resources (Arnegger *et al.*, 2014; Liu *et al.*, 2014) in two ways:

1. through directors' diverse knowledge and expertise (which help to improve the performance of the firm); and
2. through their extensive links with the outside world (which give the organisation access to external resources, including suppliers, buyers, public-policymakers, social groups and legitimacy).

Therefore, in resource-dependency theory, a larger board should be associated with the firm's performance.

Resource-dependency theory can also explain the relationship between directors' remuneration and performance (Barringer and Milkovich, 1998; Tremblay *et al.*, 2003), because firms must reward directors well to attract the best people onto the board (Tremblay *et al.*, 2003). As directors are seen as useful resources, hiring high calibre of directors will ensure high-quality resources, which will enhance performance (Conyon and Peck, 1998). The ability of a firm to extract both internal and external resources will depend on the calibre of the board of directors. Daily and Johnson (1997) suggest that prestigious directors not only increase companies' legitimacy but also provide links to other prestigious individuals.

In this study, we rely on the life cycle theory to explain the effect of CEO tenure on firm performance consistent with previous research (Giambatista *et al.*, 2005). The basis for expecting CEO tenure to influence performance is the proposition by Hambrick and Fukutomi (1991) that such tenure has five phases: "response to mandate", "experimentation", "selection of an enduring theme", "convergence" and "dysfunction". Hambrick and Fukutomi (1991) suggest that the early stages of a CEO's tenure (including "response to mandate" and "selection of an enduring theme") are characterised by high performance because of a willingness to learn, determination to succeed, openness and high-risk interest. However, according to Hambrick *et al.* (1993), performance begins to fall primarily because the CEO continues to hold onto an obsolete paradigm; there is also a decrease in task interest. They further argue that newly enacted CEOs enjoy maximised performance for the first six years of their tenure, after which performance begins to decrease.

The market learning theory has also been used to explain the effect of CEO age on company performance (Scharfstein and Stein, 1990; Holmström, 1999). This theory argues

that younger CEOs are more risk-averse and less aggressive than their older counterparts (Hirshleifer and Thakor, 1992; Zwiebel, 1995), which may result in their foregoing profitable ventures through being unwilling to commit. In contrast, older CEOs may have a track record, resulting from the scrutiny of both the labour and financial markets (Golden and Zajac, 2001); this allows them to be more able and willing to take on higher risk (Chok and Sun, 2007). Also, older CEOs are more determined to invent something new, resulting in their taking on higher risk (Belghitar and Clark, 2012), which may result in increased performance. Therefore, market learning theory suggests that having an older CEO will result in the maximisation of firm performance.

Finally, the effect of NEDs on performance is explained most strongly by agency theory, according to which their presence reduces costs. Under this theory, NEDs are seen as more independent than executive directors (Dehaene *et al.*, 2001); they also contribute to the superior performance of firms by giving expert advice to management (Fama and Jensen, 1983). Therefore, in agency theory, a higher proportion of NEDs on the board should lead to an increase in performance.

3. Literature review and development of hypotheses

We discuss below why corporate governance factors (board size, CEO age, CEO tenure, proportion of NEDs and directors' remuneration) may affect the performance of AIM-listed SMEs, and why the effect of these factors on performance may differ between small and medium enterprises.

3.1 Board size

The costs of a larger board may outweigh the benefits, particularly in SMEs, where agency problems are minimal (Eisenberg *et al.*, 1998) and there is no need for the extensive monitoring achieved by a larger board. Generally, larger boards are less effective in monitoring managers, as they are difficult to co-ordinate (e.g. getting all of them at the table for discussions). Also, it becomes very difficult to process problems due to the large number of people involved (Eisenberg *et al.*, 1998). A negative association between board size and performance was reported by Eisenberg *et al.* (1998), Yermack (1996), Vafeas (1999) and Dahya *et al.* (2008). We also expect there to be a difference in the board size-performance association between SMEs (Cowling, 2008). According to Bennett and Robson (2004), the influence of the board on performance varies between firms of different sizes. Therefore, our first set of hypotheses is that:

H1a. There is a significant negative association between board size and SMEs' performance.

H1b. There is a significant difference in the effect of board size on the performance of small and of medium enterprises.

3.2 CEO age

Avery and Chevalier (1999) argue that relatively young CEOs may be risk-averse because of their lack of confidence in their executive skills and so fear of making mistakes. Also, because younger CEOs may lack experience, they may be more likely to make errors of judgement in decision-making, leading to increased costs and so lower performance. The younger CEO's lack of a track record (Holmström, 1999) may also inhibit performance, through making them reluctant to take on risky but highly profitable ventures. A positive relationship between CEO age and performance was found by Yim (2013). We also expect the association between CEO age and performance to be different for small and for medium enterprises, as the latter have the resources to hire more highly qualified and experienced CEOs. Afrifa (2013) found a difference in the effect of CEO age on performance between small and medium firms. Our second set of hypotheses therefore states that:

H2a. There is a significant positive association between CEO age and SMEs' performance.

H2b. There is a significant difference in the effect of CEO age on the performance of small and of medium enterprises.

3.3 CEO tenure

CEOs who have been at the helm for a longer period are expected to perform better than those who have been in post for a shorter period, because the former have become more familiar with the affairs of the company. Longer tenure also helps the CEO to establish good rapport with stakeholders, and to plan and execute a long-term strategy, which will enhance the performance of the company. A study by [Agrawal and Knoeber \(1996\)](#) found a positive relationship between CEO tenure and company performance. The association between CEO tenure and performance is expected to be different between small and medium enterprises because the available evidence suggests differences in the average CEO tenure by firms' size. For example, [Homroy \(2012\)](#) found that average CEO tenure in larger firms is 9.35 years, compared to 6.60 in small firms. Our third pair of hypotheses therefore states that:

H3a. There is a significant positive association between CEO tenure and SMEs' performance.

H3b. There is a significant difference in the effect of CEO tenure on the performance of small and of medium enterprises.

3.4 Proportion of NEDs

The uncomplicated nature of SMEs business suggests that their performance may be negatively associated with proportion of NEDs on the board ([Yermack, 1996](#)). Some have suggested that NEDs may be ineffective in independently judging company performance, due to inadequate knowledge of the company ([Anderson and Reeb, 2004](#)) and CEOs' dominant role in selecting them ([Lansberg, 1988](#)). For example, [Agrawal and Knoeber \(1996\)](#) suggest that CEOs sometimes hire NEDs for political reasons, which means the latter may be ineffective in monitoring executive directors. A negative association between NEDs and performance was reported by [Yermack \(1996\)](#). A difference in the association between NEDs and performance is expected for small and for medium enterprises because the percentages of NEDs on their boards are likely to be different due to their relative resource bases. For example, research by [Denis and Sarin \(1999\)](#) found that small firms have a lower proportion of NEDs. Hence, our fourth set of hypotheses is that:

H4a. There is a significant negative association between the proportion of NEDs and SMEs' performance.

H4b. There is a significant difference in the effect of the proportion of NEDs on the performance of small and of medium enterprises.

3.5 Directors' remuneration

The effect of directors' remuneration on performance has been documented by previous research ([Main et al., 1996](#); [Brick et al., 2006](#)). High compensation packages may impair the directors' judgement, giving managers the advantage of being able to pursue their own interests at the expense of performance. Also, higher compensation may lead to the practice of "mutual back scratching" by directors who collectively propose better packages for each other at the expense of performance ([Brick et al., 2006](#)). A negative relationship between directors' remuneration and firm performance was documented by [Ozkan \(2007\)](#). Given the limited resources of SMEs ([Storey, 1994](#)), we hypothesise a negative relationship because SMEs are less profitable than large firms, and huge salaries have a negative impact on performance. We expect the association between directors' remuneration and performance to vary between small and medium enterprises, because (assuming both firm sizes pay the same salary) this expense on performance will be felt

more by small enterprises, as their revenue is generally lower. Our fifth set of hypotheses is that:

H5a. There is a significant negative association between directors' remuneration and the performance of SMEs.

H5b. There is a significant difference in the effect of directors' remuneration on the performance of small and of medium firms.

3.6 Control variables

To reduce the probability of omitted-variable bias, we include a number of control variables. According to Bartov *et al.* (2000), failure to control for confounding variables could lead to falsely rejecting a hypothesis when in fact it should be accepted. Specifically, we control for firms' annual sales growth, company age, company size, asset tangibility and financial leverage. These control variables were identified on the basis of prior research.

4. Data and research methodology

4.1 Sample selection and data

The data used in this study were obtained from the AMADEUS database, a commercial database provided by Bureau Van Dijk Electronic Publishing. This is a comprehensive database containing financial information on over 10 million public and private firms. The sample for the study is drawn from listed SMEs in the UK for the period from 2004 to 2013. Financial firms such as banks and insurance were excluded because they have different accounting requirements. Moreover, firm-years with anomalies in their accounts such as negative values in assets, sales, current assets and fixed assets were removed. Also, firms missing substantial amount of information were excluded. Finally, variables with extreme values were winsorized at the 1 per cent (Durnev and Kim, 2005; Black *et al.*, 2006). The final sample of SMEs, which is based on the requirements established by the European Commission's recommendation 2003/361/CE of 6th May 2003, on the definition of SMEs, therefore consists of an unbalanced panel of 234 firms for which information is available. It represents 2,079 firm-year observations. By allowing for both entry and exit, the use of an unbalanced panel partially mitigates potential selection and survivor bias. Specifically, the following criteria are used for the selection of SMEs[1]:

- turnover of less than €50 million; and
- possession of less than €43 million of total assets.

4.2 Regression model specification

We specify the regression analysis model below to examine the relationship between corporate governance and performance of UK-listed SMEs. In equation (1), all right-hand side variables are lagged by one period to alleviate the concern that Tobin's Q ratio (QRATIO) and corporate governance factors may be simultaneously determined in equilibrium:

$$\begin{aligned} QRATIO_{it} = & \beta_0 + \beta_1 BSIZE_{i,t-1} + \beta_2 CEOAGE_{i,t-1} + \beta_3 CEOTEN_{i,t-1} + \beta_4 NEDS_{i,t-1} \\ & + \beta_5 DREM_{i,t-1} + \beta_6 GROWTH_{i,t-1} + \beta_7 AGE_{i,t-1} + \beta_8 COSIZE_{i,t-1} \\ & + \beta_9 ATAN_{i,t-1} + \beta_{10} LEV_{i,t-1} + \varepsilon_{i,t-1} \end{aligned} \quad (1)$$

We define all the variables in Table I below.

As panel data regression is used, the Hausman test is utilised to decide whether to use the fixed-effects (FE) model or random-effects (RE) model by first determining whether there is a correlation between the unobservable heterogeneity (μ_i) of each firm and the explanatory variables of the model. The Hausman test was performed, which rejected the null hypothesis that the unobserved heterogeneity is uncorrelated with the regressors. This finding means that the RE is significantly different from the FE, and therefore, the FE is the more consistent and efficient method to use.

Table I Variable definitions

<i>Variables</i>	<i>Acronym</i>	<i>Measurement</i>
<i>Dependent variable</i>		
Tobin's Q ratio	QRATIO	Ratio of market value of equity plus the book value of total assets minus the book value of equity divided by the book value of total assets
<i>Corporate governance variables</i>		
Board size	BSIZE	Total number of all directors on the board at the end of the financial year
CEO age	CEOAGE	CEO age at the end of each financial year
CEO tenure	CEOTEN	Number of years the CEO has been in post at the end of each financial year
Proportion of NEDs	NEDs	Number of NEDs divided by total directors on the board at the end of the financial year
Remuneration of directors	DREM	Natural log of the total remuneration of directors for each financial year
<i>Control variables</i>		
Annual sales growth	GROWTH	Percentage change in sales revenue over the previous year
Company age	AGE	Number of years between incorporation and the calendar year-end of each firm
Company size	COSIZE	The natural log of the firm's turnover at the end of the financial year
Financial leverage	LEV	Ratio of total debt divided by capital at the end of the financial year
Asset tangibility	ATAN	Ratio of fixed assets divided by total assets at the end of the financial year

A Chow test was performed to determine whether corporate governance factors had a significantly different impact on the performance of small and of medium enterprises. A Chow test is a statistical and econometric test of whether the coefficients in two linear regressions on different data sets are equal; it is often used to determine whether the impact of the independent variables on the different subgroups of the sample varies.

4.3 Descriptive statistics

Table II presents descriptive statistics for the performance, corporate governance and control variables for the full period (2004–2013) for all SMEs included, and also the mean statistics of the enterprises divided into small and medium sizes (again, as defined by requirements established by the European Commission's recommendation 2003/361/CE of 6th May 2003). The mean performance measured by QRATIO for all the SMEs from 2004 to 2013 is 1.4474. The results also show a difference in the performance between small firms (mean QRATIO = 1.2072) and medium firms (mean QRATIO = 1.6876); this supports the argument that larger firms are more profitable (Yang and Chen, 2009). Table II also shows that the average board size is approximately 5. Research by Chahine (2004) also found that the average board size of SMEs listed on the Nouveau and the Second Marché in France was approximately 5, the same as our finding. Both indicate that the board size of SMEs is different from that of large firms, in which Hermalin and Weisbach (1998) found average board size to be 13 and Denis and Sarin (1999) approximately 10. We found average CEO age to be 51.8785 years, and tenure 4.5669 years. Directors' remuneration is, on average, £0.3321 million, and the average proportion of NEDs is 51.3956 per cent. The fact that the latter is above 50 per cent means that the average SME firm does comply with the UK Combined Code 2010, which requires the board to be dominated by NEDs. The average listed SME in the sample is larger than unlisted SMEs in the UK (García-Teruel and Martínez-Solano, 2010) and larger than listed SMEs in Europe (Lardon and Deloof, 2014), judging from the total assets size.

Table II Descriptive statistics

Variables	Obs.	Mean	SD	Total sample Median	Minimum	Maximum	Small Mean	Medium Mean
<i>Performance measures</i>								
QRATIO	2,079	1.4474	1.3894	0.8729	0.2653	1.9355	1.2072	1.6876
<i>Corporate governance factors</i>								
BSIZE	1,971	5.0386	4.8400	6.0000	3.0000	11.0000	4.8043	5.2729
CEOAGE	2,079	51.8785	38.8997	47.0000	28.0000	77.0000	51.9605	51.7965
CEOTEN	2,079	4.5669	3.9416	3.1659	1.4251	37.8034	3.6822	5.4516
DREM (£M)	2,052	0.3321	0.2645	0.3657	0.0361	0.7201	0.2879	0.3763
NEDs	1,917	51.3956	37.7472	50.0000	0.0000	0.8451	47.8758	54.9154
<i>Control variables</i>								
GROWTH	1,998	8.7754	4.9203	5.4976	-6.9083	18.1133	6.4573	11.0934
COAGE	2,061	14.2454	15.1830	8.2069	5.1206	99.6740	11.6189	16.8718
COSIZE(£M)	2,079	24.6269	25.0512	22.4147	1.5412	41.8390	21.9053	27.3486
ATAN	2,079	37.0151	27.2930	35.0000	25.0000	87.0000	36.4700	37.5600
LEV	2,016	22.4008	40.4094	1.4900	0.0000	61.8800	18.7926	26.0089

Notes: The table provides the sample characteristics of 2,079 firm-years across 234 unique listed UK SMEs over the period 2004-2013; QRATIO is the ratio of market value of equity plus the book value of total assets minus the book value of equity divided by the book value of total assets; BSIZE is total number of all directors on the board; CEOAGE is the age of the CEO; CEOTEN is the number of years the CEO has been in post; NEDS is the percentage of non-executive directors on the board; DREM is the total remuneration of directors; GROWTH is the percentage change in sales revenue over the previous year; AGE is the number of years between incorporation and the calendar year-end of each firm; COSIZE is the firms' total assets; ATAN is the ratio of fixed assets divided by total assets; LEV is the ratio of total debt as a percentage of total assets

5. Empirical analysis

5.1 Correlation analysis

The results of the Pearson correlation coefficients are presented in Table III for all continuous variables included in the study, and indicate a significant and negative correlation between QRATIO and board size at the 1 per cent level. They also indicate a significant and positive correlation between QRATIO and both CEO age and CEO tenure, at the 1 per cent level. The correlations between the independent variables are also significant. The correlation between board size and CEO age is 0.1003, significant at the 1 per cent level. CEO tenure and board size have a correlation coefficient of 0.2883, significant at the 1 per cent level. The correlation between CEO age and tenure is 0.1603, significant at the 1 per cent level. Board size and directors' remuneration have a correlation of 0.2533 at the 1 per cent level of significance. The correlation between CEO tenure and directors' remuneration is 0.1324, significant at the 1 per cent level. The correlations among the control variables also suggest that multicollinearity should not be a problem in multiple regression analysis, as the coefficient values are low. Field (2005) suggests that multicollinearity becomes an issue only when the correlation coefficient exceeds 0.80.

5.2 Regression analysis

We start by analysing the relationship between corporate governance factors and performance for all SMEs for the 10 years from 2004 to 2013. The panel data regression results presented in Table IV show that the adjusted R^2 of the full sample in Column 1 is 44.05 per cent. Board size is negatively associated with QRATIO at the 1 per cent level, suggesting that increasing the number of directors on the board of UK-listed SMEs reduces performance. This finding confirms *H1a* and is consistent with prior studies in larger firms, such as those by Bennedsen *et al.* (2008), O'Connell and Cramer (2010) and studies in SMEs such as Chahine (2004) and Eisenberg *et al.* (1998). The finding is consistent with the notions that SMEs have limited financial resources (Storey, 1994) and no need for a large board size due to their activities being less cumbersome. In this case, any unnecessary addition to the boards of SMEs will simply result in a waste of financial resources, leading to reduced performance.

Table III Pearson correlation coefficients

Variables	QRATIO	BSIZE	CEOAGE	CEOTEN	NEDS	DREM	GROWTH	AGE	COSIZE	ATAN	LEV
QRATIO	1										
BSIZE	-0.2113 0.0000	1									-
CEOAGE	0.1101 0.0000	0.1003 0.0024	1								
CEOTEN	0.0930 0.0000	0.2883 0.0000	0.1603 0.0000	1							
NEDS	-0.1204 0.0061	0.0969 0.0004	-0.0925 0.0019	-0.0064 0.0028	1						
DREM	-0.0501 0.0000	0.2533 0.0000	0.0283 0.0000	0.1324 0.0000	-0.019 0.0000	1					
GROWTH	0.0143 0.0000	0.0604 0.0000	0.0835 0.0009	0.0271 0.0000	0.0027 0.2263	0.0709 0.0000	1				
AGE	0.0821 0.0002	0.1101 0.0016	0.1332 0.0008	0.0041 0.0258	0.0077 0.0002	0.0738 0.0231	0.0344 0.0325	1			
COSIZE	0.0269 0.0000	0.0562 0.0000	-0.0126 0.0000	0.1234 0.0000	-0.2067 0.0000	0.0541 0.0000	-0.0209 0.0000	0.0193 0.0000	1		
ATAN	-0.0536 0.0000	0.0473 0.0000	0.0441 0.0000	-0.1063 0.0000	0.0483 0.0000	0.1211 0.0000	0.0132 0.0000	-0.0074 0.0000	-0.1138 0.0000	1	
LEV	-0.0004 0.8569	0.4704 0.0000	-0.0111 0.0000	0.1643 0.0000	-0.0006 0.7892	0.0129 0.0000	-0.0012 0.5893	0.0025 0.1896	-0.0306 0.0000	-0.008 0.0000	1

Notes: The table provides Pearson correlation coefficients for the 2,079 firm-years across 234 unique listed UK SMEs over the period 2004-2013; QRATIO is the ratio of market value of equity plus the book value of total assets minus the book value of equity divided by the book value of total assets; BSIZE is total number of all directors on the board; CEOAGE is the age of the CEO; CEOTEN is the number of years the CEO has been in post; NEDS is the percentage of non-executive directors on the board; DREM is the total remuneration of directors; GROWTH is the percentage change in sales revenue over the previous year; AGE is the number of years between incorporation and the calendar year-end of each firm; COSIZE is the natural log of firms' total assets; ATAN is the ratio of fixed assets divided by total assets; LEV is the ratio of total debt as a percentage of total assets

Table IV Corporate governance and firm performance (QRATIO)

Variables	Full sample	Medium	Small	Chow test
Adjusted R^2	0.4405	0.3862	0.3441	
Hausman test	0000	0000	0000	
<i>Corporate governance factors</i>				
BSIZE _{t-1} (log)	-0.0116*** (-4.11)	-0.0144*** (-3.74)	-0.1164*** (-4.02)	17.12***
CEOAGE _{t-1} (log)	0.0179** (2.77)	0.0465** (3.02)	0.0145 (0.78)	17.17***
NEDS _{t-1} (%)	-0.0105 (-0.58)	-0.0130 (-0.87)	0.0443 (0.81)	23.05***
CEOTEN _{t-1} (log)	0.0345*** (4.48)	0.0215 (4.09)	0.0504 (3.24)	25.01***
DREM _{t-1} (log)	-0.0924*** (-3.39)	-0.0470 (-0.70)	-0.150*** (-4.84)	18.59***
<i>Control variables</i>				
GROWTH _{t-1} (%)	0.173*** (4.77)	0.184*** (4.20)	0.624*** (4.96)	-
AGE _{t-1} (log)	0.0407*** (4.11)	0.0350*** (4.31)	0.0489** (3.43)	-
COSIZE _{t-1} (log)	0.131*** (4.35)	0.0246*** (4.61)	0.887** (3.14)	-
ATAN _{t-1} (%)	-1.788*** (-4.72)	-1.060*** (-4.01)	-3.395** (-3.20)	-
LEV _{t-1} (%)	-0.326 (-0.49)	-1.412 (-0.12)	3.497 (1.84)	-
_CONS	9.543*** (11.26)	8.001*** (19.25)	17.03*** (7.22)	-
N	1883	1092	791	

Notes: ***Significant at the 0.01 level; **significant at the 0.05 level; the table presents firm fixed-effects regression with QRATIO as the dependent variable; QRATIO is the ratio of market value of equity plus the book value of total assets minus the book value of equity divided by the book value of total assets; BSIZE is total number of all directors on the board; CEOAGE is the age of the CEO; CEOTEN is the number of years the CEO has been in post; NEDS is the percentage of non-executive directors on the board; DREM is the total remuneration of directors; GROWTH is the percentage change in sales revenue over the previous year; AGE is the number of years between incorporation and the calendar year-end of each firm; COSIZE is the natural log of firms' total assets; ATAN is the ratio of fixed assets divided by total assets; LEV is the ratio of total debt as a percentage of total assets; the sample consists of 2,079 firm-years across 234 unique listed UK SMEs over the period 2004-2013; *t*-values are in parentheses below coefficients

The results also show that CEO age is positively associated with QRATIO at the 5 per cent level, and therefore we accept *H2a*. The statistically positive coefficient indicates that older CEOs improve the performance of AIM-listed SMEs (Holmström, 1999); this finding is consistent with that of Yim (2013). We also find that CEO tenure is positively and significantly associated with performance at the 1 per cent level, which confirms *H3a*. This result shows that the longer a CEO's tenure, the greater the performance of an AIM-listed SME – as a longer-tenured CEO accumulates company-specific knowledge (Shen, 2003).

The results also show the association between directors' remuneration and QRATIO to be negative and statistically significant at the 1 per cent level, and therefore consistent with *H5a*. This result shows that maximising the compensation package of directors leads to reduced performance of UK SMEs. Finally, the results show a negative but insignificant association between NEDs and QRATIO; this means we cannot accept our *H4a* and that the proportion of NEDs has no influence on performance of AIM-listed SMEs.

Among the control variables, annual sales growth is positive and significantly related to QRATIO at the 1 per cent level. Company age is shown to be significant and positively related to QRATIO at the 1 per cent level. Company size is positively associated with QRATIO at the 1 per cent level. Asset tangibility is significant and negatively related to QRATIO at the 1 per cent level. However, there is no association between leverage and QRATIO.

In the second analysis, the firms under consideration are classified according to whether they are small or medium. The adjusted R^2 of the small firms in Column 2 is 34.41 per cent, while that of the medium firms in Column 3 is 38.62 per cent. The coefficient of board size for the small firms is -0.1164 and significant at the 1 per cent level. Under the medium firms, it is -0.0144 and significant at the 1 per cent level. This shows that a reduction in board size will improve performance more in small than in medium firms – perhaps because small firms are more constrained in financial resources, meaning a reduction in board size has a greater impact. The Chow test in Column 4 of Table IV indicates a significant difference in the effect of board size on the performance of small and of medium firms. Thus, *H1b* is supported.

The coefficient of CEO age is positive for both small and medium firms; however, the association is significant for the latter but not the former. The significant coefficient level for medium firms suggests that the accumulated experience and knowledge of an older CEO impact positively on the performance of such firms. The Chow test in Column 4 of Table IV indicates that significant differences exist between the effects of CEO age on the performance of the two sizes of firm. Thus, *H2b* is supported. The coefficients for CEO tenure in small and medium firms are 0.0504 and 0.0215, respectively, but the relationship is insignificant for both. The Chow test result in Column 4 of Table IV indicates that the impact of CEO tenure on the performance of small and of medium firms is significantly different.

The coefficient for the proportion of NEDs is positive for small firms and negative for medium firms; however, the relationship is insignificant for both. The Chow test results in Column 4 of Table IV indicate that a significant difference exists between small and medium firms in terms of the effect of the proportion of NEDs on performance. Thus, *H4b* is supported. Finally, the coefficient on directors' remuneration is negative and significant at the 1 per cent level for small firms but negative and insignificant for medium ones, meaning that a reduction in directors' remuneration will improve the performance of small firms but has no significant impact on that of medium firms. The Chow test in Column 4 of Table IV indicates that significant differences exist between the effects of directors' remuneration on the performance of the two categories of firms. Thus, *H5b* is supported. Consequently, the overall conclusion from the Chow test results is that there are significant differences in the impact of corporate governance factors on the performance of small and of medium firms.

6. Robustness tests

Both the firms and variables used in this study could be affected by the financial crisis that started as a sub-prime crisis in 2007 but unfolded into the Great Recession in 2009. Also, the corporate governance influence on performance may differ based on whether a firm is making a profit or loss. First, the sample is divided into pre-recession (2005-2007)[2], during the recession (2008-2010) and after recession (2011-2013). Second, the sample is divided into two based on whether a firm makes a profit or loss in any particular year, as measured by return on assets (ROA). ROA is defined as profit before interest and tax divided by total assets. The results obtained are not significantly different from the results of running the regression for the whole sample.

The objective of this final analysis is to determine whether there is a significant association between corporate governance and UK SMEs performance for unprofitable or profitable observations and pre-recession, during recession or after recession periods. The first three columns of Table V contain the results from the estimates of Model 1 for pre-recession observations (2005-2007), during recession observations (2008-2010) and after recession observations (2011-2013). The adjusted R^2 under the pre-recession is 30.68 per cent, during recession period is 29.04 per cent and for the post-recession period is 31.38 per cent. The coefficients of BSIZE and DREM are negative and significant in Columns 1 to 3. The coefficients of CEOAGE and CEOTEN are positive and significant in Columns 1 to 3. Once again, the coefficient of NEDs is not significant in Columns 1 to 3.

The last two columns of Table V contain the results of running Model 1 for both unprofitable and profitable observations. The R^2 of observations with loss is 36.19 per cent, while the R^2 of observations with profit is 38.35 per cent. The results show that the coefficients of BSIZE and DREM are negative and significant in Columns 4 and 5. The coefficients of CEOAGE and CEOTEN are positive and significant in Columns 4 and 5. Once again, the coefficient of NEDs is not significant in Columns 4 and 5. These results indicate the robustness of the results obtained above and confirm the relationship between corporate governance and UK-listed SMEs' performance.

Table V Economic condition, corporate governance and firm performance

Variables	Pre-recession	During recession	After recession	Positive ROA	Negative ROA
Adjusted R^2	0.3068	0.2904	0.3138	0.3619	0.3835
<i>Corporate governance factors</i>					
BSIZE _{t-1} (log)	-0.0214*** (-4.00)	-0.0175*** (-4.29)	-0.0139*** (-4.43)	-0.0502*** (-4.01)	-0.0128*** (-4.36)
CEOAGE _{t-1} (log)	0.0902*** (4.65)	0.0536** (3.46)	0.0334* (2.09)	0.0139** (3.49)	0.0577*** (4.35)
NEDS _{t-1} (%)	-0.022 (-0.56)	-0.0692 (-0.77)	-0.0347 (-0.89)	-0.0225 (-0.38)	-0.0428 (-0.03)
CEOTEN _{t-1} (log)	0.0318*** (4.73)	0.0458*** (4.96)	0.0263*** (4.69)	0.0417*** (6.22)	0.0122*** (4.17)
DREM _{t-1} (log)	-0.0103** (-3.21)	-0.046** (-3.47)	-0.065*** (-4.56)	-0.0475** (-3.44)	-0.0127*** (-4.68)
<i>Control variables</i>					
GROWTH _{t-1} (%)	0.0593*** (4.13)	0.0434*** (4.15)	1.5998*** (4.14)	0.256*** (4.27)	0.2808*** (4.93)
AGE _{t-1} (log)	0.0152*** (4.80)	0.0735** (3.34)	0.0304*** (4.28)	0.0794** (3.23)	0.0158** (3.65)
COSIZE _{t-1} (log)	0.0962*** (4.47)	0.448*** (5.29)	1.625** (2.98)	0.335*** (4.83)	0.299*** (5.03)
ATAN _{t-1} (%)	-0.5741*** (-4.73)	-0.8603*** (-4.69)	-0.2724*** (-4.14)	-1.2022*** (-4.51)	-0.7543** (-3.06)
LEV _{t-1} (%)	-1.3112 (-0.95)	-0.1874 (-0.22)	-1.3847 (-0.38)	-0.2393 (-0.47)	-0.7551 (-0.78)
_CONS	11.40*** (6.36)	14.50*** (6.81)	11.406*** (6.31)	15.23*** (9.96)	14.50*** (8.09)
N	753	564	566	1374	509

Notes: ***Significant at the 0.01 level; **significant at the 0.05 level; *significant at the 0.10 level; the table presents firm fixed-effects regression with QRATIO as the dependent variable; QRATIO is the ratio of market value of equity plus the book value of total assets minus the book value of equity divided by the book value of total assets; BSIZE is total number of all directors on the board. CEOAGE is the age of the CEO; CEOTEN is the number of years the CEO has been in post; NEDS is the percentage of non-executive directors on the board; DREM is the total remuneration of directors; GROWTH is the percentage change in sales revenue over the previous year; AGE is the number of years between incorporation and the calendar year-end of each firm; COSIZE is the natural log of firms' total assets; ATAN is the ratio of fixed assets divided by total assets; LEV is the ratio of total debt as a percentage of total assets; the sample consists of 2,079 firm-years across 234 unique listed UK SMEs over the period 2004-2013; *t*-values are in parentheses below coefficients

7. Summary and conclusion

The objective of the study is to investigate the effect of corporate governance factors on the performance of UK-listed SMEs. The study is based on a panel data regression analysis of 234 SMEs over a 10-year period (2004-2013). The results suggest that corporate governance factors (board size, CEO age and tenure and directors' remuneration) have a significant impact on the performance of UK-listed SMEs. These findings are consistent with previous research in respect of board size (Yermack, 1996; Vafeas, 1999), CEO age (Yim, 2013), CEO tenure (Agrawal and Knoeber, 1996) and directors' remuneration (Ozkan, 2007).

This study also provides evidence of the different effects of corporate governance on the performance of small versus medium firms. The results show that board size has a significant negative impact on the performance of both sizes of firm. However, CEO age has a significant impact on the performance only of medium firms, and directors' remuneration is significant only for small firms. Both CEO tenure and proportion of NEDs have no significant impact on the performance of either small or medium firms. Despite these similarities and differences, the Chow test results indicate that the five corporate governance factors differ between small and medium firms.

The study makes important contributions to extant literature and has implications for SMEs and policymakers. The study adds to the limited empirical evidence that exists (Bennedsen *et al.*, 2008; Eisenberg *et al.*, 1998) on the effect of corporate governance on the performance of SMEs. More importantly, it documents the effect of corporate governance factors on the performance of UK-listed SMEs. The study also provides new evidence that these factors have different impacts on the performance of small and of medium firms. This is significant in suggesting that any corporate governance prescription for SMEs as a homogeneous group may be unsuitable for either small or medium firms.

In terms of policy implications, our finding of a negative relationship between board size and the performance of both small and medium firms leads us to recommend that, given the limited resources of SMEs (Pansiri and Temtime, 2008), they need to focus their attention on reducing board size to an optimal level. A positive relationship between CEO age and the performance of medium firms suggests that such firms should encourage their CEOs to remain in post for a long time. Finally, as there is a negative relationship between directors' remuneration and the performance of small firms, we recommend that small firms curtail their payments to directors to improve performance.

We are aware of potential endogeneity problems, which can significantly affect empirical findings. Generally, endogeneity problems arise in three different ways:

1. correlation with the error term (Wooldridge, 2002, p. 50);
2. omitted variable bias; and
3. simultaneity (Larcker and Rusticus, 2010, p. 186).

One way to reduce endogeneity problem of omitted variable bias is to adapt a system of two-stage least-square (2SLS) using appropriate instrument; however, this approach introduces the problem of identifying the correct instruments (Dam and Scholtens, 2012). In this paper, we have tried to reduce potential endogeneity problem of simultaneity, which is found to be the most common endogeneity problem in corporate governance research, by lagging our independent variables and investigate the association between changes in the independent variables and the dependent variable (Mina *et al.*, 2013).

Notes

1. The average exchange rate per each year from 2014-2013 was used to convert the total assets and turnover values from British Pounds Sterling to Euro.
2. The 2004 data are excluded because all variables are lagged by one year.

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