

Determinants of audit committee structure and audit fees

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1. Introduction

Corporate governance is defined as “the range of control mechanisms that protect and enhance the interests of shareholders of business enterprises” (Fama and Jensen, 1983). In recent years, several important initiatives have been taken in the European Union (EU), the United States (US) and at the international level aiming at the establishment of sound corporate governance practices. Spurred by a wave of corporate scandals mainly owed to self-dealing, fraud and poor quality management decision-making, corporate governance has attracted international attention as a means to address the “separation of ownership and control” (or “agency”) problem in public companies, thus promoting corporate efficiency (Williamson, 1963; Jensen and Meckling, 1976; Fama and Jensen, 1983). Essentially, by establishing internal mechanisms inciting corporate management to promote company’s interests and facilitating effective monitoring, corporate governance systems enhance investors’ protection and confidence.

An audit committee (AC) is considered as a subset of the corporate board of directors and has the responsibility of enhancing the internal control procedures, external reporting and risk management of companies (Klein, 2002). Audit committees have received considerable attention following recent corporate scandals, and are expected to have a key role in ensuring high standards in financial reporting that enhance confidence in financial markets. There are several reports issuing guidelines and recommendations on the composition of the audit committee and its formal responsibilities (e.g., Cadbury Committee, 1992; FRC, 2003; UK FRC Combined Code, 2008). According to the new EU Directive on Statutory Audit (2006), audit committees minimise financial, operational and compliance risks, and enhance the quality of financial reporting. In other words, audit committees are expected to reduce the information asymmetries that exist between the owners and users of resources (Sarens et al., 2009).

A recent strand in literature supports that effective audit committees provide numerous public benefits including better financial reporting and reduced corporate fraud (Abbott et al., 2000; Beasley et al., 2000; DeZoort et al., 2008; Rupley et al., 2011). To the extent that independence and the composition of the audit committee enhance oversight responsibility for financial reporting in a global securities marketplace, agency costs will decrease because of the enhanced monitoring effectiveness (Deli and Gillan, 2000). Moreover, effective audit committees are expected to lower the cost of raising new equity and increase the informativeness of financial reporting (Chau and Leung, 2006).

The present paper assesses the determinants of audit committees’ structure as well as the determinants of audit fees in a sample of diverse UK firms. The empirical analysis is carried in a large dataset of UK listed firms over the period 2002-2009. Also, to account for the fact

that static econometric frameworks may be insufficient to capture the dynamics of the model, we apply a dynamic framework. Despite the renowned interest in the role of audit committees, the empirical findings are not concentrated on its determinants. Two final distinguishing characteristics of this study are worth noting. We focus on three attributes of the audit committee that are indicators of its effectiveness and have been studied in prior literature: (1) audit committee size; (2) audit committee independence and (3) audit fees. We examine audit committees determinants along four dimensions: (1) corporate governance characteristics, (2) financial indicators, (3) ownership structure and (4) macroeconomic indicators. In addition, we account for the possible endogeneity between audit committee determinants.

The present study comprises five sections. The following section provides a concise theoretical basis of the increased regulatory and academic interest on audit committees. Section 3 explains the empirical model and discusses the dataset used in the present study. Section 4 presents the empirical results. Section 5 concludes the paper.

2. Literature review

2.1 Audit committees

Existing agency theory proposes a series of mechanisms that seek to reconcile the interests of stakeholders and managers. The board of directors and the audit committee are considered pivotal in a company's corporate governance architecture. Although board of directors is responsible for oversight of the financial accounting process, this task is often delegated to a subcommittee of the full board, the audit committee. The functions of an audit committee include ensuring the quality of financial accounting and control system (Collier, 1993). The audit committee plays an important role because it is concerned with establishing and monitoring the accounting processes to provide relevant and credible information to the firm's stakeholders (Anderson et al., 2004).

Most empirical research on audit committee effectiveness deals with the impact of audit committees (their existence and externally-observable characteristics) on specific aspects of governance, by relying on several proxies (Beasley, 1996; Dechow et al., 1996; Abbott et al., 2000; Beasley et al., 2000; Raghunandan et al., 2001). The existence of an independent audit committee certifies the veracity of the external auditing processes. An independent audit committee reinforces the independence of the corporation's external auditor, and thereby helps assure that the auditor will have free rein in the audit process (Deli and Gillan, 2000). A number of studies conclude that firms involved in fraudulent financial reporting are less likely to have an audit committee that are active and independent (Dechow et al., 1996; Beasley et al., 2000; Farber, 2005). Firms with audit committees that are independent and active are also less likely to experience other accounting irregularities and reduce earnings management (Dechow et al., 1996; Abbott et al., 2000; Peasnell et al., 2001; Klein, 2002). High quality audit committees are more likely to support the internal audit function (Raghunandan et al., 2001), appoint industry specialist auditors (Abbott et al., 2000), and are

more likely to appoint high quality auditors when switching between auditors (Abbott and Parker, 2002).

Structure and composition of audit committees may be linked to both the quality of reporting and audit processes. Cadbury Committee (1992) recommended the independence of audit committees to ensure that the relationship between auditors and management remains objective and that the auditors are able to put their views in the event of any difference of opinion with management. In this vein, external auditors are able to discuss matters arising from the audit process with non-executive board members and express their opinions on management policies, free from managerial influence while non-executives are expected to place a greater emphasis on the extent and quality of the audit (Turley and Zaman, 2004).

A firm with an audit committee composed of only a couple of members would, on average, have less time to devote to overseeing the hiring of auditors, questioning management, and meeting with internal control system personnel (Anderson et al., 2004). Cohen and Hanno (2000) examined how auditors take corporate governance into consideration when planning an audit, finding that auditors of companies with independent board of directors and audit committees were perceived by auditors to have lower audit risk. Prior empirical evidence by Beasley (1996), Peasnell et al. (2000) and Klein (2002), support the conventional wisdom that audit committees more effectively carry out their oversight of the financial reporting process if they include a strong base of independent outside directors. DeZoort and Salterio (2001) find audit committees with independent members and audit knowledge are more likely to support an independent auditor in a substance-over-form dispute with management.

Pincus et al. (1989) support that situations of high agency costs were significant factors in the creation of audit committees. Menon and Williams (1994) find that the higher the proportion of outside directors, the more likely it is that the audit committee will exclude officers of the company. Collier and Gregory (1999) find evidence that reliance on audit committees by U.K. firms depends on the composition of the board of directors, while audit committee activity is associated with firm size. Vicknair et al. (1993) argue that audit committees should be independent of management, allowing internal and external auditors to remain free of undue influence and interference by corporate insiders. According to Braiotta (2004), the number of members in an audit committee will vary from firm to firm because the size of the committee depends not only on the committee's responsibility and authority but also the size of both the board of directors and the firm.

However, while a positive relation between higher quality audit committees and an enhanced audit function is widely supported by prior studies, the determinants of audit committees are less clear.

2.2 Audit Fees

Carcello et al. (2002) document a positive relation between audit fees and board characteristics and conclude that stronger boards purchase more auditing services, which increases fees. Tsui et al. (2001) find a negative relation between audit fees and board characteristics and conclude that better governance reduces control risk, which decreases fees. Hay et al. (2006) conclude that evidence on the relation between corporate governance

and audit fees is limited and the evidence is mixed. Carcello et al. (2002) find that board independence, diligence and expertise increase the level of audit fees, as the board of directors demands higher quality audit to protect their own interests (i.e., to maintain their reputational capital, avoid legal liability) and to promote shareholder interests.

Goddard and Masters (2000) find that audit committees meeting the Cadbury Report recommendations have no impact on audit fees. In contrast, Abbott et al. (2003) find that audit committees with independence and expertise are positively associated with audit fees in the US, and Collier and Gregory (1996) find a positive association between audit fee and audit committees for a sample of firms in the UK. Finally, Gul (1991) finds size of audit fees to be an important determinant of bankers' perceptions of auditors' independence.

3. Empirical specification and data

3.1. Methodology

In this paper we identify key governance attributes related to audit committees in publicly traded firms. We focus on three attributes of the audit committee: (1) audit committee size (ACS); (2) audit committee independence (IAC) and (3) audit fees (AF). In order to control for the determinants of audit committee structure and audit fees, our analysis consist of four different spectrums (corporate governance, financial indicators, ownership and country level) each includes a number of different variables.

The following parameters of corporate governance have been considered: size of the board (BS); independence of directors (BC); frequency of the board meetings (BM); the chairman/CEO duality (CD); and concentration of corporate ownership (OI).

3.1.1 Corporate Governance Variables

We utilize a number of variables to represent board characteristics. Boards with many directors would be able to assign more people to supervise and advise managers' decisions, thus reducing managers' discretionary power or at least making it easier to detect managers' opportunistic behavior and increasing strategic capabilities to complement that of the CEO. Changanti et al. (1985) suggest that smaller boards might be easier influenced by CEOs and will not have the depth of experience that the larger boards offer.

However, it is widely believed that companies with small board of directors are more effective and profitable since they have a better monitoring role and decision-making processes (Jensen and Meckling, 1976; Lipton and Lorsch, 1992; Yermack, 1996). Several researchers add evidence to the hypothesis that the problems of coordination, control, decision-making, and excessive control of the CEO increase dramatically in oversized boards.

The composition¹ of the board of directors, particularly the presence of outside directors and their proportion to inside directors, has often been identified as an important element to realign shareholders' and managers' interests and improve the agency problem (Fama, 1980; Fama and Jensen, 1983; Brickley and James, 1987; Weisbach, 1988; Byrd and Hickman, 1992; Lee et al., 1992). The independence of the full board is possible to create an audit committee that is more independent and perform certain functions (Rainsbury et al., 2009).

Independent or outside directors are generally thought to be more effective monitors than inside directors since they have no employment or ownership affiliation with management (Weisbach, 1988; Lehn et al., 2003). Fama (1980) and Fama and Jensen (1983) argue that non-executive directors add value to firms by providing expert knowledge and monitoring services. Additionally, outside directors provide additional resources to the firm in terms of expertise or external contacts beyond those associated with their management roles (Hambrick and D'Aveni, 1992; Stearns and Mizruchi, 1993). Moreover, outside directors may contribute to the value of firms through their evaluation of strategic decisions (Brickley and James, 1987; Byrd and Hickman, 1992; Lee et al., 1992) and through their role in the dismissal of inefficient and poorly performing management (Weisbach, 1988). O' Sullivan (2000) examines a sample of 402 UK quoted companies and suggests that non-executive directors encourage more intensive audits as a complement to their own monitoring role.

On the other hand, one potential drawback resides in the fact that outside directors may lack the necessary specific knowledge and experience of the firms' processes compared to the inside directors, who actively participate in the operations of the company. Moreover, since outside directors usually spend only a limited amount of time at the company serving on the board, and lack the necessary information to understand the business in depth, it is also likely that they favour objective financial criteria in evaluating and rewarding top management decisions or emphasize short-term performance (Keasey and Wright, 1993; Calderini et al., 2003).

Duality occurs when the same person undertakes both of the roles of chief executive officer and chairman. The potential advantage of having the same person filling both posts is that they should exhibit a greater understanding and knowledge of the company's operating environment. Forker (1992) asserts that a dominant personality in both roles poses a threat to monitoring quality and is detrimental to the quality of disclosure. The presence of CEO/chairman duality is generally perceived as compromising the independence of the board since one individual possesses a great amount of power and authority (Cadbury, 1992; Jensen, 1993). In the presence of a dominant CEO/chairman, non-executives are expected to have reduced influence in seeking an intensive control. However, an alternative view of corporate governance argues that separating the roles of chairman and CEO can create paralysis if the two powerful positions do not agree on decisions and strategies.

Agency theory argues that in a diffused ownership environment, firms will disclose more information to reduce agency costs and information asymmetry. A number of studies have suggested that large shareholders may behave differently in monitoring managers compared

¹ The standard view in empirical finance, and in practice, is that the degree of board independence is closely related to its composition. The board is presumed to be more independent as the number of outside directors increases proportionately.

with individual shareholders. On the other hand, concentrated ownership can affect the governance of the firm since it provides the largest shareholders with too much discretionary power over using firm resources in ways that serve their own interest at the expense of other shareholders (Mehran, 1995). As Jensen and Meckling (1976) argue, dispersed shareholders also anticipate increased opportunity for managers to pursue their own interests at shareholders' expense and thereby anticipate greater agency costs.

3.1.2 Firm Level Variables

We employ the logarithm of total assets (SIZE) to capture the effect of firm size. This variable controls for cost differences as well as product and risk diversification according to the size of the firm. Poor liquidity is a major cause of business failure. Liquidity risk is measured by the ratio of liquid assets to total assets (LIQ). Based on the expectation that the level of growth opportunities affects the nature of a firm's contracts, and thus the incentives to behave opportunistically as well as the complexity and the need for more intensive monitoring, we employ the firm's book-to-market ratio (BMV) (see also Rainsbury et al., 2009).

Agency costs are higher for firms with more debt. However, we also control for Leverage (LEV). Managers of firms with higher debt-to-equity ratios will select aggressive accounting choices that shift reported earnings from the future to the present and therefore demand stronger monitoring (Skinner, 1993; DeFond and Jiambalvo, 1994; Rainsbury et al., 2009). In the same vein, consecutive firm losses (LOSS) proxy for incentives for firms to manage earnings to improve reported financial performance and avoid losses. It is expected that firms with consecutive losses are more likely to make aggressive accounting choices, thus having greater need for efficient audit committees (Rainsbury et al., 2009).

3.1.3 Country Level Variables

To capture the effect of the macroeconomic environment we use GDP growth (GDP) and inflation (INF). These two macroeconomic indicators serve as a general indicator of economic development by reflecting differences in technology, the mix of firm opportunities and any aspects of regulations omitted from the regression.

3.2 Estimation Model

To measure the effectiveness of audit committees (AC), we focus on three attributes of the audit committee that are indicators of its effectiveness and have been studied in prior literature. We use two membership variables to identify best practice audit committees. The first variable captures the size of the audit committee (ACS). The second audit committee variable measures audit committee independence (IAC). Our third proxy considers the level of audit fees (AF). This empirical model involves the estimation of the following dynamic

specification which includes a lagged dependent variable among the regressors and/or treats some explanatory variables as predetermined²:

$$AC_{it} = c + \alpha AC_{it-1} + \beta_1 BS_{it} + \beta_2 BC_{it} + \beta_3 BM_{it} + \beta_4 CD_{it} + \beta_5 SIZE_{it} + \beta_6 BMV_{it} + \beta_7 LEV_{it} + \beta_8 LIQ_{it} + \beta_9 LOSS_{it} + \beta_{10} SUB_{it} + \beta_{11} OI_{it} + \beta_{12} GDP_t + \beta_{13} INF_t + \beta_{14} D_{year} + \delta D_{IND} + \epsilon_{it} \quad (1)$$

where audit characteristics (AC_{it}) of the firm *i* at year *t* is written as a function of a vector of individual-level variables reflecting board size, BS and board composition, BC of each firm; the number of board meetings per year BM; dummy variable taking the value one (1) if the chairman and CEO positions are held by the same person for the CEO duality CD; firm size, SIZE; Book-to-Market Ratio, BMV; Leverage, LEV; Liquidity, LIQ; Consecutive losses, LOSS; number of subsidiaries, SUB; variable that reflects the ownership structure of the market, OI; macroeconomic conditions, GDP and INF; and the error term *u*. DIND is a set of industry dummies, and D_{year} are the yearly dummy variables.

A value of α between 0 and 1 implies a persistence of the dependent variable, but it will eventually return to its normal (average) level. A value close to 0 means that the industry is characterized by high speed of adjustment, while a value of α close to 1 implies very slow adjustment. All variables are expressed in natural logarithms to improve the regression's goodness of fit and to reduce possible simultaneity bias.

3.3 Endogeneity issues

Company boards often purchase additional or higher quality auditing services to effect better corporate governance, which in turn influences how auditors perform. If governance choices affect auditing and vice versa, that is, they are co-determined variables, traditional regression methods can misrepresent what may be jointly determined positive and negative relations (see also Griffin et al., 2008). Given this potential endogeneity, it would appear that modeling corporate governance indicators in the fashion of most of the previous literature may not be appropriate (see also Agoraki et al., 2010). Corporate governance studies often neglect this issue and thus obtain results that are hard to interpret. In this vein, ordinary least squares (OLS) coefficient estimates can be biased. We use a two-step Generalized Method of Moments (GMM) to solve endogeneity bias.³ The estimation controls for unobserved heterogeneity and eliminates a potential omitted variables bias. Using lagged governance indices as instruments for the present values of these variables controls for potential simultaneity and reverse causality (Ammann et al., 2011).

² The validity of the instruments applied is tested with the Sargan test. We use the system GMM estimator proposed by Blundell and Bond (1998).

³ We apply the two-step GMM estimator since it is better applied in models that impose non-linear restrictions. One-step GMM estimators use weight matrices that are independent of estimated parameters, whereas the efficient two-step GMM estimator weighs the moment conditions by a consistent estimate of their covariance matrix (Windmeijer, 2005). For a thorough description of the various GMM estimators, see Baltagi (2001), Bond (2002) and Hsiao et al. (2002).

3.4 Data

Having defined the methodological approach to be followed, we focus on the selection of variables. We construct a balanced sample of 540 listed firms operating in UK over the period 2002-2009. All data were manually collected from Fame Database and annual reports.

We control for the natural logarithm of audit committee size (ACS), measured as the number of audit committee members. We next control for audit committee independence (IAC), defined as the percentage of non-executive directors on the audit committee. In this study we use the amount of the audit fee to proxy for audit quality (AF) since the quality of a company's audit is not observable. To proxy for the quality and integrity of the audit process we use the total audit fees charged to the firm divided by the total revenues of the firm.⁴

We define board size (BS) as the natural logarithm of the number of directors. Turning our attention to the board composition (BC) measure, we use the ratio of non-executive⁵ directors over the total number of directors. Directors that are currently employed by the firm, retired employees of the firm, related company officers or immediate family members of firm employees are classified as executives. Non-executive directors are members other than executives. These directors have no substantial business interest in the firm with their only observable connection to the firm being their appointment as a director.

We use a dummy variable to indicate companies where the same individual occupies the positions of company chairman and CEO (CD). We construct a dummy variable, which takes a value of 1 if the positions of chairman and CEO are split, 0 otherwise. The number of board meetings per year (BM) can be used as an admittedly rough proxy for board activity and vigilance. Frequent board meetings may be a signal of increased vigilance and oversight of the top management of the firm. Alternatively, the frequency of board meetings may increase in times of financial distress or in times of controversial decisions that may involve illegal or questionable activities (Chen et al., 2006).

The size variable (SIZE) controls for cost differences and product and risk diversification. We use the firm's total assets (in a logarithmic form) (TA). Liquidity risk (LIQ) is proxied by the liquid to total assets ratio. Liquidity risk is the variation in net income and market value of equity caused by a firm's difficulty in obtaining cash at reasonable cost from the sale of assets. Leverage (LEV) is captured by the book value of long-term debt to total equity. BMV is the ratio of book value to market value of equity. LOSS is a dummy variable equal to 1 if the firm had consecutive losses for more than two years and 0 otherwise. The natural logarithm of the number of subsidiaries (SUB) is used to control for company complexity

⁴ Intensive investigation will require more audit hours and/or the use of more specialized audit staff, resulting in higher fees (O'Sullivan, 2000).

⁵ For a non-executive director to be considered as independent, the individual should have no connection with the company either as a past employee or as an advisor such as management consultant, investment banker, auditor, and lawyer or as supplier or customer of the firm's products. In the present thesis we will apply only the definition of non-executives, as in some cases, the independence of non-executive directors is difficult to be observed. However, we find that most of the companies declare that non-executive directors have no interests in other companies and are independent. Therefore, we do not intend to make difference between non-executive directors and independent directors in our subsequent analysis (Staikouras et al., 2007; Agoraki et al., 2010; Rupley et al., 2011; Liu and Zhuang, 2011).

and risk. In addition, increased subsidiaries are usually associated with greater decentralization, which leads to higher demand for monitoring.

Finally, we apply the percentage of independence (OI) as an ownership structure variable. Ownership Independence OI variable takes numeric values between 1 and 4, defined according to the notation levels of the Independence Indicator, using a linear transformation.⁶ Industry dummies are included to control for variation across different industries including manufacturing, services and other companies (mainly construction, and wholesaling companies). Data for the macroeconomic variables are collected from the World Bank's World Development Indicators. Table 1 provides descriptive statistics of our sample.

⁶ A=1- No shareholder with more than 25% of direct or total ownership="Independent companies"; B=2- No shareholder recorded with more than 50% of direct, indirect or total ownership, one or more shareholders recorded with more than 25% of direct or total ownership; C=3- No shareholder recorded with more than 50% of direct ownership, one shareholder recorded with more than 50% of total ownership = indirectly majority owned; One shareholder recorded with more than 50% of direct ownership = directly majority owned

Table 1**Descriptive statistics (2002-2009)**

Variables	Mean	Std. Dev.	Min	Max
Dependent variable				
Audit committee size (ACS)	4.52	1.87	2.00	10.00
Independence of audit committee (IAC)	0.73	0.19	0.54	0.90
Audit fee (AF)	385,149	354,623	49,795	1,452,741
Corporate Governance				
Board size (BS)	27.96	16.57	7.00	56.00
Board composition (BC)	67.45	27.30	35.00	85.00
Meeting (BM)	7.56	3.45	4	10
Firm variables				
Total assets	132,375,246	93,559,021	3,240,127	520,227,000
Book-to-Market Value (BMV)	0.77	0.89	-5.45	3.75
Leverage (LEV)	0.21	0.13	0.02	0.61
Liquid assets/total assets (LIQ)	0.43	0.49	0.09	0.83
Subsidiaries (SUB)	2.82	0.85	0.00	5.00
Ownership variables				
Independence Indicator (OI)	1.35	0.9	1.00	3.00
Macroeconomic variables				
GDP per capita (GDP)	40,785	2,810	30,438.75	42,352
Inflation (INF)	2.1	0.8	1.7	3.1

Source: Annual reports of the credit institutions; Fame Database; World Bank's World Development Indicators.

Note: Size of audit committee (ACS): number of directors in the audit committee; Independence of audit committee (IAC): proportion of audit committee made up of independent directors; Board size (BS): Number of directors; Board composition (BC): proportion of non-executives in the board of directors; Meeting (BM): Number of board meetings held in a year; Subsidiaries (SUB): number of subsidiaries; Independence Indicator (OI): Independence Indicator to signify the degree of independence of a company with regard to its shareholders. Figures are expressed in percentages for all variables (except of board and audit committee size and GDP per capita) and in £ for GDP per capita. Figures other than ratios and indices are expressed in thousand £.

4. Empirical results

We explore the determinants of audit committee structure and audit fees. The results are reported in Table 2. To take into account the possibility of endogeneity, following Arellano and Bond (1991) and Blundell and Bond (1998), we apply the system-GMM estimators.⁷ To determine whether our instruments are valid in the system GMM approach, we use the specification tests proposed by Arellano and Bond (1991) and Arellano and Bover (1995). First, we apply the Sargan test over-identifying restrictions to examine the overall validity of the instruments. For an instrument to be valid there should be no correlation between the instrument and the error terms. Second, we test whether there is a second order serial correlation with the first differenced errors.

The second test examines the hypothesis of absence of second-order serial correlation in the first-difference residuals AR(1). Thus, failure to reject the null hypothesis could supply evidence that valid orthogonality conditions and instruments are used. In our models, this hypothesis of second-order serial correlation is always rejected. Even though the equations indicate that negative first-order autocorrelation is present, this does not imply that the estimates are inconsistent. Inconsistency would be implied if second-order autocorrelation was present (Arellano and Bond, 1991), but this case is rejected by the test for AR(2) errors.⁸ The models seem to fit the panel data reasonably well, having fairly stable coefficients, while the Wald test of the joint significance of the explanatory variables indicates fine goodness of fit and the Sargan test shows no evidence of over-identifying restrictions. The choice of the lagged levels and lagged first-differences as instruments is made in a way that guarantees validity of the resulting overidentifying restrictions.

The highly significant coefficient of the lagged dependant variables confirms the dynamic character of the model specification. In the present study, α is highly significant across all models, which means that audit committee characteristics as well as audit fees persist to a moderate extent, justifying the use of dynamic panel data modeling. In the following set of regressions we examine the determinants of audit committee size (Column I), audit committee independence (Column II) and audit fees (Column III), consecutively controlling for the corporate governance, firm and country level as well as industry indicators.

Table 2 reports a positive relation between board size and audit committee activity in terms of audit committee size and independence. In this context, firms with larger audit committees are willing to devote greater resources to overseeing the financial accounting process. As suggested by DeFond et al. (2005), the relative size of the audit committee proxies for the amount of resources devoted to the audit committee. A large audit committee tends to enhance the audit committee's status and power within an organization and to receive more

⁷The drawback of the static model results is that the right-hand side variables maybe endogenous and, therefore, affected by the dependent variable. To account for persistence in the dependent variable and endogeneity of right-hand side variables, we resort to a dynamic model estimation that uses an instrumental variable approach to proxy for endogenous variables. The lagged dependent variable was also treated as endogenous, while the results remained unchanged. The additional variables are considered exogenous (their lags were used as instruments). To test the robustness of the results, different lag structures were estimated.

⁸We apply the adjustment for small samples proposed by Windmeijer's (2005). Since our sample size is not very large, the Windmeijer proposal improves the robustness of our results and avoids any potential downward bias in the estimated asymptotic standard errors.

resources (Pincus et al., 1989). On the other hand, board size does not seem to influence audit fees.

As it concerns board composition, a larger audit committee is more likely to be promoted by greater outside representation (see also Xie et al., 2003). Audit committee activity is an increasing function of the proportion of non-executives on the board. From an agency perspective, companies with high levels of non-executives' participation are more likely to favor stringent monitoring mechanisms in place because of their control over the board. Thus, we find that a large percentage of non-executives improves the quality of controls as well as the level of audit fees, because increased resources and enhanced status will make the audit committee more effective in fulfilling its monitoring role. This finding is consistent with past research and illustrates another setting in which a large proportion of outside directors is associated with better monitoring. The audit committee is responsible for monitoring financial performance and reporting, and having outside corporate members is associated with this committee's ability to monitor.

In other words, non-executive directors can be regarded as professional referees whose task is to stimulate and oversee the competition among the firm's top management (Fama, 1980). A higher proportion of non-executive directors on corporate boards is likely to result in more effective monitoring of boards (Weir and Laing, 2003). This is especially important if auditors seek to question certain aspects of the way in which the financial statements have been prepared by management, or require further (more costly) testing in order to reach an opinion on the quality of the financial statements. Furthermore, non-executives are expected to favour more extensive auditing in order to complement their own monitoring responsibilities (O'Sullivan, 2000). Pincus et al. (1989) suggest that the presence of outside directors on the board should increase the quality of monitoring because they are not affiliated with the company as officers or employees, and thus are independent representatives of the shareholders' interests. Thus, we find that higher percentage of non-executive directors increase the level of audit committee independence as well as the level of audit committee size.

Moreover, non-executive directors have a fiduciary duty to monitor management with due care, diligence and vigilance, being a knowledgeable source of information independent of management to advise the company. We find a positive relationship between audit fees and board independence. Previous literature on the association between board independence and audit fees (Carcello et al., 2002; Griffin et al., 2008) suggests that independent managers purchase better audit or/and auditors correspond to stronger board signals for increased quality (Cohen and Hanno, 2000). This evidence is consistent with outside directors monitoring the actions of managers and protecting shareholders' assets and stakeholders' interests (Abbott et al., 2003; Chahine and Filatotchev, 2011). A fairly extensive literature exists which supports the notion that firms with more independent boards commit less financial statement fraud (Beasley, 1996) and have less earnings management (Peasnell et al., 2000; Xie et al., 2003; Jaggi et al., 2009). In the case of audit fees, boards that exhibit a stronger monitoring focus will demand a higher quality audit resulting in greater audit effort by the auditor and in turn, higher fees (Simunic, 1984; Zaman et al., 2011).

Certainly the literature, both theoretical and professional, seems to suggest that audit committee membership should not include executive directors (see also, Collier and Zaman, 2005). Menon and Williams (1994) observed that an audit committee with inside directors cannot be viewed as an objective monitor of management. The demonstration that the presence of non-executives on the audit committee increases monitoring activity vindicates the recommendation of the Cadbury Committee (1992) that membership of the audit committee should be confined to the non-executive directors of the company.

Frequency of board meetings is positively correlated to the level of audit committee independence, while there is no significant relation in the case of audit fees and size of the audit committee. Frequent meetings may address the board's role and ability to provide independent oversight of management performance and hold management accountable to stakeholders for its actions (Ashbaugh-Skaife et al., 2004; Brick and Chidambaran, 2010). A board with less frequent meetings may be less likely to monitor earnings management (Xie et al., 2003). A more active board that meets more often should be in a better position to monitor the company and promote audit committee's effectiveness.

Another important corporate governance indicator is the CEO duality. There is strong evidence that firms where one person occupies the positions of both the chairman and the CEO adopt higher risk-taking practices. Prior studies on the separation of CEO and chairman have focused on managerial compensation (Boyd, 1994), firm performance (Pi and Timme, 1993; Beasley et al., 2000; Abbott et al., 2003) and audit committees (Pincus et al., 1989; Collier, 1993). We find that when the CEO and the board chairman are different there is an increase at the size and independence of the audit committee as well as at the level of audit fees. Handing one person a lot of power (chairman and CEO positions) makes it easier for that person to abuse their power and engage in riskier activities (O'Sullivan, 2000). CEO duality may also restrict the information flow to other board directors and hence reduce board's independent oversight of manager (Fama and Jensen, 1983; Jensen, 1993). In the Anglo-Saxon model of corporate governance, the dual appointment of chairman and CEO is seen to give too much power to the individual and this can make it easier to reach a decision that results in fraudulent actions and decisions that are not in the best interests of the minority shareholders (Jensen, 1993; Chen et al., 2006; Pathan, 2009).

Dominant chief executives have a strong negative influence on audit committee activity, so that companies that combine the roles of chairman (president) and CEO appear to opt for significantly less monitoring (Chau and Leung, 2006). A chairman who concentrates all authorities may have more freedom to manage the company according to his/her own decisions (Uzun et al., 2004). Concentrated decision-making power may impair the board's oversight and monitoring roles. On the other hand, an independent chairman is expected to improve board monitoring by providing an independent check on the CEO (Fama and Jensen, 1983; Collier and Gregory, 1999; Abbott et al., 2003). Thus, vesting the power of the CEO and the chairman in separate persons could reduce the strong individual power base, which could enhance the board's ability to exercise effective control, and result in enhancing the role of audit committee. These results suggest that firms with CEO duality are more likely to put in place better corporate governance mechanisms and reinforce the policy

recommendation of the Cadbury Committee (1992) that there must be a clearly accepted division of responsibilities at the head of the company.

Given the governance issues arising from the separation of ownership and control, it is not surprising that the ownership structure has been the subject of empirical investigations (see Pincus et al., 1989; Menon and Williams, 1994; Collier and Gregory, 1999; Chau and Leung, 2006). Concentrated ownership is positively correlated to the audit committee structure and negatively related to audit fees. In the case of concentrated ownership, shareholder and manager interests become more aligned. These large shareholders should have both the incentive and the power to monitor the firm's operations and management effectively. Prior research provides evidence that managers, when left unmonitored, are more likely to manage earnings, commit fraud, or make sub-optimal investment decisions (e.g., Biddle and Hillary 2006; Hope and Thomas 2008).

As the percentage of ownership by individual shareholders increases (concentration increases), their incentives for monitoring management increase as it is economically more feasible for any individual shareholder to incur significant monitoring costs (Hope et al., 2011). Moreover, small shareholders often lack the necessary knowledge and industrial expertise to control the management effectively (Hart, 2001). As it concerns audit fees, we find that diversity in ownership increases audit fees. Mitra et al. (2007) report a positive relation when institutional ownership is diffused because such investors need better governance, which induces boards to purchase higher quality auditing, while there is a negative relation when institutional ownership is more concentrated. Dominant shareholders might increase information asymmetry between dominant owners and management and the demand for auditing increases.

As it concerns firms with subsequent years of losses, there is positive coefficient for each of the audit committee variables and audit fees, suggesting that audit risk and audit fees should be higher for a company that reports negative earnings (Simunic and Stein, 1996; Gul and Tsui, 1997; Klein, 2002). Audit fees and audit committee structure are positively associated with the number of subsidiaries. This implies that more complicated firms need increased audit effort, which would in turn result in higher audit fees and efficient audit structures, presumably due to the higher risk of such companies- increasing also the risk of subsequent investigation of the auditor's work (Rainsbury et al., 2009).

The natural logarithm of total assets (SIZE) controls for higher audit fees charged for larger firms and leverage (LEV) controls for risk associated with highly leveraged firms. The greater the level of debt in a firm's capital structure, the greater the demand for an independent and bigger audit committee. Menon and Williams (1994) conclude that firms with high agency costs will attempt to mitigate these costs by undertaking increased monitoring activity through audit committees. In the same vein, Turley and Zaman (2004) suggest that higher leverage increases debtholders' need to monitor managers.

Moreover, large firms face higher visibility and scrutiny (Beck et al., 2005). Larger firms, therefore, tend to report higher levels of audit committee effectiveness (Deli and Gillan, 2000). In particular, we find that the size and independence of audit committee is positively related to firm size and leverage. This association between audit committee activity and

leverage is consistent with Collier (1993) who reported a positive relationship between leverage and audit committee formation in the UK.

We find that firms with growth opportunities have greater need for monitoring, so they tend to increase the audit committee size as well as the independence, while they have a positive relation with audit fees (see also, Skinner, 1993). To the extent that companies in settings with high agency problems are able to signal more credible reporting, financing will be less costly and more accessible. Firms can signal this credibility with an audit. In capturing the extent of auditor investigation, it is reasonable to assume that more investigation will require more audit hours and/or the use of more specialized audit staff—resulting in higher fees. Moreover, higher quality auditors are expected to charge a premium for their expertise (Chan et al., 1993). The relation between liquidity and audit committee structure as well as audit fees is statistically insignificant.

Our results show that GDP per capita has a positive impact on audit fees, while in the case of audit committee structure the influence is insignificant. Finally, the results for industries vary significantly. Manufacturing firms seem to entail higher risk demanding increased levels of monitoring, translated in bigger and more independent audit committees and increased audit fees.

Table 2**Risk-taking and corporate governance**

Dependant variable:	Audit committee size (ACS)	Audit committee Independence (IAC)	Audit Fees (AF)
Lagged dep.var.	0.129***	0.182***	0.212***
BS	0.189***	0.252***	0.082
BC	0.145***	0.102***	0.139***
BM	0.063	0.099***	0.128
CD	0.179**	0.021***	0.092**
LIQ	0.089	0.103	-0.069
BMV	0.017**	0.123**	0.112**
LEV	0.103**	0.025***	0.097**
SIZE	0.155**	0.081***	0.029***
LOSS	0.081**	0.184**	0.155***
SUB	0.015**	0.074***	0.069***
OI	0.023**	0.035***	-0.075***
GDP	0.045	0.018	0.093**
INF	0.012	0.110	0.021
D_{year}	0.025	0.122*	0.131**
Manufacturing	0.061***	0.101***	0.201***
Services	0.132	0.127	0.032
Other companies	0.052	0.014	0.136
Constant	-0.025*	-0.132**	-0.023***
AR(1)	$z=-8.75$	$z=-8.32$	$z=-7.98$
p-value	0.000	0.000	0.000
AR(2)	$z=0.42$	$z=0.47$	$z=0.39$
p-value	0.637	0.832	0.727
Sargan	96.48	97.22	85.32

p-value	0.458	0.627	0.451
Wald test	135.27	142.78	125.82

Note: ACS: Size of audit committee; IAC: Independence of audit committee; AF: Audit fee; BS: board size; BC: board composition; BM: Board Meetings; CD: dummy variable for the CEO duality; LIQ: liquid assets/total assets; BMV: Book-to-market value equity; LEV: Leverage; SIZE: natural logarithm (total assets); LOSS: dummy variable for consecutive losses; SUB: number of subsidiaries; OI: independence indicator; GDP: GDP per capita; INF: inflation rate; D_{year} : yearly dummy variable; D_{IND} : dummy variable for the industry sector. AR (1): Arellano-Bond test that average autocovariance in residuals of order 1 is 0 (H_0 : No autocorrelation); AR (2): Arellano-Bond test that average autocovariance in residuals of order 2 is 0 (H_0 : No autocorrelation); Sargan: The test for over-identifying restrictions in GMM dynamic model estimation.

The ***, **, and * indicate 1 per cent, 5 per cent and 10 per cent significance levels, respectively.

5. Conclusions

In this study, by using a sample of industry-wide UK firms over 2002-2009, we specified an empirical framework to investigate the determinants of audit committee structure and audit fees. How corporate governance relates to and interacts with auditing structure and fees paid by companies raises interesting and significant empirical issues for accounting research and practice. The results suggest that there is a positive association between independence on board and audit committee, suggesting that the inclusion of a higher proportion of independents on corporate boards could result in more effective monitoring of boards. Therefore, high quality boards can be seen as demanding differentially higher audit quality (increased audit effort) to protect own and shareholders' interests. On the other hand, audit committee structure and audit fees are highly influenced by firm characteristics as leverage and growth opportunities. Our results also support that audit committee structure is positively associated with firm size. The combination of the role of chairman and chief executive is also shown to be a significant variable leading to decreased monitoring, supporting the recommendation of the Cadbury Committee (1992) that audit committee should be composed of non-executive members and the combination of the roles of chairman and CEO should be avoided. This study has investigated an unexplored aspect of audit committee effectiveness, and opens several interesting avenues for future research. Our results are important for regulatory agendas about the appropriate structure audit committees and the establishment of appropriate corporate governance mechanisms.

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