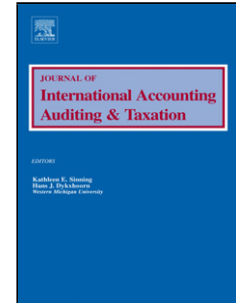


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## **Board of Directors, Audit Committee, and Firm Performance: Evidence from Greece**

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### **ABSTRACT**

This paper investigates whether the characteristics of boards of directors and audit committees and the formation of the latter are associated with firm performance. Agency theory suggests that well-governed firms perform relatively better than their poorly-governed counterparts. However, resource dependency theory suggests that a board with more insider

directors could have more expertise on how to better operate the firm, thus contributing to better firm performance. Using a sample of firms publicly traded on the Athens Stock Exchange during 2008-2012, we find that those having large-sized boards performed better, but firms having more independent board members performed poorly. We also find that firms with small-sized boards and those with boards having more independent members are more likely to form audit committees, but we failed to find any association between audit committee characteristics and firm performance. In addition, we do not find a negative relation between board independence and *future* firm performance. These findings suggest that boards of Greek firms take more active role in advising than monitoring. These findings have implications for policymakers, researchers, corporate managers, and investors, in general, and particularly, those in emerging markets.

**Keywords:** Board characteristics; Audit committee; Firm performance; Corporate governance; Agency theory, Resource dependency theory; Greece.

**JEL Classification:** G30, G34, M41.

## 1. Introduction

Due to worldwide corporate governance failures and accounting scandals in recent years, there is a growing interest in studying the impact of corporate governance on firm performance (e.g., Brown and Caylor, 2006; Dittmar and Mahrt-Smith, 2007; Gompers et al., 2003). Among corporate governance elements, the oversight responsibilities of boards of directors and audit committees have been emphasized by policy makers, regulators, and researchers. Such emphasis is based on the idea that independent, informed, and proactive boards and audit committees can and should be key in protecting the interests of investors (Sarbanes-Oxley Act, 2002 [SOX]). This

paper investigates the association between characteristics of boards and audit committees and the formation of the latter, and firm performance.

Our study is motivated by conflicting results in the literature and lack of research on the association between corporate governance practices and firm performance in emerging markets. Agency theory suggests that a better-governed firm should have better performance and higher valuation due to lower agency costs. For example, Gompers et al. (2003) find that better corporate governance is associated with higher firm valuation. Brown and Caylor (2006) find that better-governed U.S. firms have higher return on equity, higher return on assets, and higher Tobin's Q—a measure of performance. However, resource dependency theory argues that corporate directors bring information and expertise to the firm, create channels of communication with the firm's important external constituents, obtain commitments of support from outsiders, and work to create legitimacy for the firm in its external environment (Pfeffer and Salancik, 1978). Thus, this theory views corporate directors as “insiders, business experts, support specialists, and community influentials” (Hillman et al., 2000). From the resource dependency theory perspective, there could be a negative relation between board independence and firm performance and value (Singh and Gaur, 2009; Khosa, 2017; Adams and Ferreira, 2007; Harris and Raviv, 2008). Our study investigates such board-performance relationships in an emerging market of Greece, where both monitoring and resource dependency/advisory roles of boards might be important to firms.

The extant literature has also documented the role of audit committees in reducing internal control weakness and financial statement restatement frequency, and increasing earnings quality (Abbott et al., 2004; Klein, 2002; Krishnan, 2005; Zhang et al., 2007). However, none of these studies have investigated whether audit committees play a significant role in assuring better firm performance. Fan and Wong (2005) opine that conventional corporate control mechanisms such

as boards of directors and threats of takeover may not be sufficient to reduce agency conflicts between controlling and minority stockholders in emerging markets. They argue that given concentrated share ownership in emerging economies, controlling owners may introduce monitoring and/or bonding mechanisms that limit their abilities to hold up minority shareholders, and hence, mitigate agency conflicts (Jensen and Meckling, 1976). Their results suggest that firms with more agency problems in emerging economies tend to hire external auditors to alleviate agency problems. Following this line of reasoning, we argue that firms in emerging economies may use audit committees as a monitoring and/or bonding mechanism to alleviate agency problems. Thus, we investigate whether audit committees in emerging markets play a significant corporate governance role.

While prior studies investigate aspects of corporate governance, most concentrate on developed markets, especially U.S. equity markets, to the neglect of emerging markets. Other studies investigate the characteristics of audit committees in U.S. firms and find that independent audit committees help reduce earnings management (Klein, 2002), and firms with audit committees whose members lack financial expertise are more likely to have internal control weakness (Krishnan, 2005; Zhang et al. 2007). Again, while the formation and characteristics of audit committees are well-researched in the developed economies, such are lacking in emerging markets, especially in Greece. For example, while most listed firms in developed economies have audit committees, only about 6.94 percent in 2007 and 19.33 percent in 2009 of Greek firms had audit committees. Thus, Greece provides ideal conditions to test whether board and audit committee characteristics have any discernible association with firm performance.

We find that Greek firms with large-sized boards have better performance, while those with more independent boards are associated with poor performance. One plausible explanation is that

a more independent board may pay more attention to monitoring management to the neglect of its advisory role. This explanation is consistent with an emerging finance theory on the role of boards, which predicts that board independence is not always in the best interest of stockholders, especially where the board's advisory role is more important than its monitoring role. In such situations, Schmidt (2015) demonstrates that board independence can decrease firm value. Bhagat and Black (2002) find that less profitable firms tend to strengthen the independence of their boards, but firms with more independent boards do not out-perform other firms.

We do not find a negative relation between board independence and *future* firm performance, indicating that Greek firms with low-profitability seek to increase the independence of their boards, but firms with more independent boards do not perform better than other firms. These findings are consistent with the literature on emerging markets, which documents a negative relation between board independence and firm performance in China and India (Singh and Gaur, 2009; Khosa, 2017).

We find that Greek firms with small-sized boards and more independent boards are more likely to form audit committees. In addition, we find that firms whose operations are less complex and those with longer history tend to have more independent audit committees, which are also smaller in size. However, we find little or no association between audit committee formation and firm performance. This finding indicates that Greek firms form audit committees primarily to comply with regulatory requirements rather than to serve any other purpose, such as enhancing profitability.

Our results have implications for policymakers, researchers, corporate managers, and investors in general, and more particularly so, those in the emerging markets. The result that board independence is negatively associated with firm performance suggests that the advisory role of

boards is more important than their monitoring role in emerging economies. This is consistent with resource dependency theory, which suggests that having more insiders on a board provides a unified leadership and helps make more prudent decisions (Davis et al., 1997; Finkelstein and D'Aveni, 1994). Also, the result that few Greek firms established audit committees during the earlier years of our study period suggests that the policy mandating formation of audit committees in Greece was not successful in the earlier years; this might also be the case in many emerging markets. Hence, policymakers and regulators in emerging economies need to pay close attention to the enforcement of such policies.

The rest of the paper is organized as follows. Section two describes the institutional background to the study. Section three reviews the extant literature and develops testable hypotheses. Section four describes the research methodology. Section five reports and discusses empirical findings. Section six concludes the paper.

## **2. Institutional Background**

Over the last two decades, there has been a proliferation of voluntary “comply or explain” corporate governance standards in the European Union (EU), an approach endorsed by the European Commission (EC). While several EU member states were promulgating their own corporate governance codes, there was no such initiative in Greece. The absence of a corporate governance code in Greece made it more difficult for Greek firms to comply with the ever-expanding corporate governance rules and best practice recommendations of the EU. Thus, in March 2011 the Hellenic Federation of Enterprises (SEV), as part of its mandate to promote continuous enhancement of the Greek corporate institutional framework and improvement in the competitiveness of its member firms and of the Greek economy as a whole, drafted the *Corporate Governance Code* (hereafter “the Code”).

The corporate governance framework in Greece developed primarily through mandatory legislation, most importantly, the Law 3016/2002.<sup>1</sup> This law mandates participation of non-executives and independent non-executives on boards of Greek listed firms, establishment of internal control function, and adoption of internal audit charters. Further, several discreet legislative acts transposed European directives into the Greek legal framework, establishing new corporate governance rules, including the Law 3693/2008<sup>2</sup> and Law 3884/2010. The Law 3693/2008 mandates formation of audit committees, with at least two non-executive members and one independent non-executive member of the board; all approved by the General Assembly of Shareholders. The independent non-executive member must have approved knowledge of accounting and auditing. The Law 3884/2010 incorporates into Greek legislation EU Directive 2006/46/EC<sup>4</sup>, which provided significant stimulus and served as a cornerstone for preparation of the Greek Code. It deals with, among other things, the exercise of stockholder rights and obligates firms to disclose information to stockholders prior to annual general meetings. As in many countries, Greek company law<sup>3</sup>, which today incorporates many amendments and provisions inspired by EC legislation, contains core governance rules for *Sociétés Anonymes* (“SAs” – companies limited by shares).

Greek regulators have made significant effort in the past to improve corporate governance practices over and above legal norms. For example, in 1999, the Hellenic Capital Markets Committee (HCMC) produced a white paper titled *Principles on Corporate Governance in Greece – Recommendations for its Competitive Transformation*, also known as the “Blue Book”, which

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<sup>1</sup> The Law 3016/2002 addresses corporate governance, board remuneration and other issues, as amended by Article 26 of the Law 3091/2002.

<sup>2</sup> The Law 3693/2008 transposes the 8th European Directive on Company Law into Greek legislation on statutory audits of annual accounts and consolidated accounts.

<sup>3</sup> The Law 2190/1920 regulates companies limited by shares (*Sociétés Anonymes*), as amended by the Law 3604/2007.



was closely modelled on the Organization for Economic Co-operation and Development's (OECD) Principles. The SEV also developed a limited number of broad corporate governance principles in its *Principles of Corporate Governance by the Federation of Greek Industries* published in 2001. The present Code makes extensive use of the concepts and principles first developed for the Greek market in these pioneering efforts, especially the HCMC's "Blue Book".

In accordance with European best practices of corporate governance, the Code requires a higher proportion of non-executive and independent non-executive board members than required by the Law 3016/2002 to ensure adequate board balance, optimal committee composition and protect against potential conflicts of interests.<sup>4</sup> As indicated earlier, the Code follows the "comply or explain" approach and requires listed firms to: (i) disclose its use as a reference framework, and either (ii) comply with the provisions of the Code, or (iii) explain reasons for non-compliance with specific provisions.

In line with EC Recommendation 2005/162/EC<sup>5</sup>, the Code recommends the creation of committees to assist boards in fulfilling their responsibilities. The Law 3693/2008 requires listed firms to establish audit committees to assist boards in their financial reporting, internal control, and external audit oversight responsibilities. The audit committee should be composed of at least three non-executive members of the board, the majority of whom should be independent non-executive members.<sup>6</sup> The committee should include at least one member with proven, adequate

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<sup>4</sup> The Code defines an executive member as a board member engaged in the daily management of the company as his/her primary occupation under a contractual employment or service relationship with the company. A non-executive board member, on the other hand, is a board member without any executive responsibilities in the company. The status of a board member as executive or non-executive is ultimately determined by the board and validated by the general meeting of shareholders.

<sup>5</sup> The EC Recommendation (2005/162/EC) of February 15, 2005 addresses the role of non-executive or supervisory directors of listed companies and on the committees of the (supervisory) board among other things.

<sup>6</sup> According to the Code, an independent board member is a non-executive board member who meets certain independence criteria, and by law, such members are appointed by the general meeting of stockholders. It must be pointed out, however, that small-sized listed firms are exempted from this provision among others of the Code that may be too time-consuming and onerous to implement. Small listed firms are defined as those listed firms that are

auditing and accounting experience. To fulfill its responsibilities effectively, the committee should meet at least four times per year, and be chaired by an independent non-executive member. At least twice per year, the audit committee should meet the company's external auditor without the presence of the firm's executive management. A firm's corporate governance statement should describe the work of its audit committee and state the number of meetings held in a year. In addition, it should explain to stockholders how auditor objectivity and independence are safeguarded if the auditor also provides non-audit services to the firm.

It is also a legal requirement in Greece for a board to establish an internal audit function, which should operate under written terms of reference, be independent from other business units, report administratively to the chief executive officer, and functionally to the audit committee of the board. Listed firms are also required by law to review regularly their internal control system. Firms are expected to disclose information on their existing internal controls and procedures in the following areas: (i) identification and assessment of risk related to the reliability of financial reporting; (ii) financial planning and monitoring; (iii) fraud prevention and detection; (iv) roles and responsibilities of company officials; (v) financial year-end closing process (e.g., manuals, documented procedures, access rights, approvals, reconciliations, etc.); and (vi) information technology general controls that ensure the integrity and accuracy of financial information provided through the firm's systems and applications.

### **3. Literature Review and Hypotheses Development**

#### **3.1 The characteristics of board of directors and firm performance**

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not constituents of the FTSE/ATHEX 20 and FTSE/ATHEX Mid 40 indexes. Recently, the FTSE/ATHEX 20 was re-named as FTSE Large Cap, comprising of 25 (instead of 20) largest Greek equity stocks in terms of market capitalization. The FTSE/ATHEX Mid 40 is also re-named as FTSE Mid Cap comprising of the next 20 stocks in terms of market capitalization. These indexes are revised by the Athens Stock Exchange (ASE) every six months in April and October.

Generally, the empirical literature indicates that firms with better corporate governance practices perform better because of lower agency costs and more effective monitoring mechanisms (e.g., Brown and Caylor, 2006; Dittmar and Mahrt-Smith, 2007; Gompers et al., 2003). A major stream of corporate governance research investigates the relation between board characteristics and firm performance and valuation. For example, Bonn (2004) finds that the ratio of outside directors is positively associated with firm performance. Cho and Rui (2009) document that firms with more outside directors tend to have higher market-to-book value. Rosenstein and Wyatt (1990) report that the appointment of additional outside directors is associated with increased firm value. Anderson et al. (2004) demonstrate that the appointment of additional outside directors reduces cost of debt. These results are consistent with agency theory, which suggests that independent boards that are free from the influence of management, are better able to monitor and control management behavior (Jensen and Meckling, 1976).

However, the literature also documents mixed results on board characteristics and firm performance. At one extreme, Fosberg (1989) and Bhagat and Black (2002) find that the percentage of outside directors has no significant relation with firm performance. Patro et al. (2009) also find no relation between firm performance and either board size or composition after controlling for other determinants of board characteristics. At the other extreme, Singh and Gaur (2009) show that board independence has a negative association with firm performance in both China and India. Khosa (2017) finds an inverse relationship between board independence and firm value of group-affiliated firms in India. In another study, using a sample of Oslo Stock Exchange listed firms, Bohren and Odegaard (2004) find that performance decreases with board size. The results of these studies suggest that another theoretical perspective on the role of boards in firm

performance might be at work here.<sup>7</sup> Resource dependence theory—associated with the work of Pfeffer and Salancik (1978)—indicates that firms are open systems, dependent on their external environments to guarantee the flow of critical resources for their survival. Hence, firms must attend to the demands of those in their environments that provide such resources. This results in uncertainties, which in turn, create significant challenges and costs to firms. Pfeffer and Salancik (1978) suggest that firms must manage these uncertainties by creating linkages with important elements in their external environments. Under this perspective, boards of directors are the primary linkage mechanism to connect firms with their external environments by co-opting resources needed to survive and thrive (Pfeffer and Salancik, 1978). This concept has important implications for the role of the board and its structure, which in turn, affects performance. Thus, resource dependency theory suggests that managing external relationships to leverage influence and resources is the prime function of the board. Hence board members are selected for their background, contacts, knowledge and skills (Hillman et al., 2007). Board members could provide management with unique information about their firm's external environments to help in making better strategic and operational decisions. Also, because board members may belong to a network of other powerful people who exercise control over the direction of public life in a series of board interlocks, they may bring their firms much needed legitimacy within these networks.

Unlike agency theory that focuses only on the monitoring role of directors and views board diversity in terms of enhancing director independence, resource dependency theory positions directors as involved business partners and guides. Thus, a more independent board will provide more valuable services to a firm, which, in turn, may result in better overall firm performance

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<sup>7</sup> According to Hillman and Dalziel (2003), researchers seeking evidence of the relationship between boards of directors and firm performance commonly follow one of two distinct paths: (i) the dominant path of agency theory, and (ii) a relatively less explored path based in resource dependency theory.

when the firm needs more monitoring. On the contrary, a less independent board will provide more valuable services to a firm, which, in turn, may result in better overall firm performance when the firm needs more advice.

Given that, in the Greek context, there is a high propensity of controlling interests appropriating corporate resources at the expense of minority stockholders (such practices are prevalent in civil law countries such as Greece [see La Porta et al., 1998]), and that huge business resources are directly and indirectly controlled by the government, both the monitoring and advisory roles of boards could be relevant to Greek firms. However, it remains an empirical question whether an independent board would increase firm performance in the Greek emerging market. No specific empirical study on Greece has addressed this issue. While not directly investigating the effect of board characteristics on performance of Greek firms, Chalevas (2008) examines the effects of board independence, existence of internal audit function, and executive compensation on firm performance. He finds a significant association between executive compensation and firm performance after the implementation of corporate governance code, but not before implementation. In the present study, we examine whether the monitoring or advisory role of boards dominates in the Greek emerging market.

While board independence is highlighted in the literature, it may not be the only aspect of contemporary boards associated with firm performance. Another factor of interest to corporate governance commentators is the size of a board of directors. Interestingly, there is no consensus regarding the direction of the performance relationship one would expect as a function of board size. From an agency theory perspective, it can be argued that larger boards are more likely to be vigilant in monitoring management, but they can also “engender greater focus, participation, and genuine interaction and debate” (Firstenberg and Malkiel, 1994). From a resource dependency

theory perspective, it can be similarly argued that a firm with a larger board performs better because the size of the board creates an opportunity for the firm to form external environmental links to secure critical resources (Kiel and Nicholson, 2003). Alternatively, it can be argued that smaller boards are more susceptible to managerial domination (Zahar and Pearce, 1989). Yet another study documents a strong inverse relationship between board size and firm performance as measured by Tobin's Q (Yermack, 1996). Thus, the literature offers a host of theory-driven rationales, with each suggesting a relationship between board size and firm performance, but provides no consensus about the direction of that relationship. Therefore, we formulate our first two hypotheses in the null format as follows:

***Hypothesis 1:*** *Ceteris paribus*, there is no relationship between board size and firm performance.

***Hypothesis 2:*** *Ceteris paribus*, there is no relationship between board independence and firm performance.

### **3.2 The formation and effectiveness of audit committees and firm performance**

Although the formation of audit committees has long been a regulatory requirement in the developed world, research into their formation, characteristics, and activities has lagged until recently (McMullen, 1996). Prior research examines the voluntary formation of audit committees (Bradbury, 1990; Eichenseher and Shields; 1985; Pincus et al., 1989), the association between audit committee formation and financial statement quality (Anderson et al., 2004; Francis et al., 2012; McMullen, 1996; Wild, 1994), composition and activities of audit committees (Collier and Gregory, 1999; Raghunandan et al., 1998), audit committee composition and auditors' support (DeZoort et al., 2003; Knapp, 1987), audit committee independence (Deli and Gillan, 2000; Klein,

2002), and the financial expertise of audit committee members (Zhang et al., 2007; Krishnan 2005).

Bradbury (1990) uses agency theory to analyze incentives for audit committee formation in New Zealand. He finds that voluntary audit committee formation is not related to auditor incentive variables or to agency cost variables arising from the separation of ownership and control, but to directors' incentives (i.e., the number of directors on a board and intercorporate ownership). However, Eichenseher and Shields (1985) show that an audit committee is more likely to be formed following appointment of a new Big-8 (now Big-4) auditor.

Pincus et al. (1989) find that NASDAQ firms are more likely to form audit committees when they have a lower percentage of managerial ownership, larger firm size, more board independence, higher leverage, and are audited by the then Big-8 international accounting firms. Anderson et al. (2004) find that audit committees of S&P 500 firms whose memberships are entirely independent are associated with a significantly lower cost of debt financing. They also find that yield spreads for these firms are negatively related to both audit committee size and the frequency by which they meet in a year. Thus, they provide market-based evidence that characteristics of audit committees influence the cost of debt financing, which is consistent with their prediction that audit committee monitoring of financial accounting is important to creditors.

Audit committee formation has economic consequences. For example, Wild (1994) provides evidence that earnings are significantly more informative to market participants after formation of an audit committee. Francis et al. (2012) find that board independence and audit committees influence the pricing of bank loans. McMullen (1996) also documents that audit committees are associated with a reduced incidence of errors, irregularities, and other indicators of unreliable financial reporting.

The literature has also examined the characteristics of audit committees. For example, Collier and Gregory (1999) report that the inclusion of executive directors in audit committee membership has a negative impact on their activities. Menon and Williams (1994) examine audit committee activities of U.S. firms, and find no association between agency costs of equity, as measured by the proportion of shares held by the directors and stockholder diversity, and audit committee activities, as measured by the total hours spent annually at committees' meetings. They find that audit committee activities are positively associated with then Big-6 auditors and debt leverage, but negatively associated with the inclusion of executive directors in audit committee membership.

DeZoort et al. (2003) find that audit committee members provide greater support for auditors when managements' materiality justification interrupts the earnings trend and when an accounting issue is about measurement. In addition, they find that more experienced audit committee members and those who are certified public accountants (CPAs) are more supportive of auditors. Deli and Gillan (2000) document evidence to suggest that the informativeness of accounting numbers is affected by both audit committee independence and activities.

Klein (2002) finds that the magnitude of abnormal accruals (a proxy for earnings management) is negatively related to audit committee independence. Further, she documents that the magnitude of abnormal returns is more pronounced for firms whose audit committees are less independent.

Zhang et al. (2007) find that firms are more likely to have an internal control weakness if their audit committees have less accounting financial expertise. Firms are also more likely to have an internal control weakness if their auditors are more independent (measured as the ratio of the audit fee to the total fee). In addition, firms with recent auditor changes are more likely to have



internal control weaknesses. Krishnan (2005) also finds that firms with independent audit committees and those whose members are more financial experts are significantly less likely to be associated with internal control problems.

The literature also documents the role of audit committee size and its consequences. For example, Dionne and Triki (2005) find that requirements for audit committee size and independence are beneficial to stockholders, although they find no significant results of maintaining a majority of unrelated directors on a board and a director with an accounting background on the audit committee.

In emerging markets, it may be insufficient for firms to use conventional internal corporate control mechanisms such as boards of directors to resolve agency conflicts between controlling and minority stockholders (Fan and Wong, 2005). For these firms, audit committees may be used as monitoring and/or bonding mechanisms to alleviate agency problems. Using a large sample from eight East Asian economies, Fan and Wong (2005) document that firms with agency problems embedded in the ownership structures are more likely to employ Big-5 auditors.

Partly due to the late formation of audit committees in Greece, few studies have investigated Greek corporate governance issues. Citron and Manalis (2001) investigate choice of statutory auditor in Greece after the 1992 liberalization of the audit market. They find that foreign ownership is positively associated with the choice of a Big-6 auditor. Spathis et al. (2003) examine the association between firm performance and audit report, and find that financial ratios and types of audit reports are closely related to each other. Caramanis and Lenox (2008) find that low audit effort increases the extent to which managers are able to report aggressively high earnings. Tsipouridou and Spathis (2012) examine the relationship between earnings management, auditor type (Big-4 *versus* non-Big-4) and audit opinion, and find no significant association.

In this paper, we examine whether the formation of audit committees in Greece and their characteristics, namely, size and independence, have any association with firm performance. From an agency theory perspective, it is argued that audit committee's monitoring role in the financial reporting and auditing processes of listed firms can enhance corporate governance system, as independent, informed, and active audit committees can and should protect investors' interests (SOX, 2002). However, from the perspective of resource dependency theory, audit committees may play more advisory role to firms than monitoring. Therefore, we formulate the hypotheses testing for the relation between audit committee formation and characteristics, and firm performance in the null format as:

**Hypothesis 3:** *Ceteris paribus*, there is no relationship between audit committee formation and firm performance.

**Hypothesis 4:** *Ceteris paribus*, there is no relationship between audit committee effectiveness and firm performance.

## 4. Methodology

### 4.1. Models for the relation between audit committee formation, board characteristics and firm performance

Following Sami et al. (2011), we estimate the following equations to test Hypotheses 1, 2 and 3, which depict the relation between audit committee formation, board characteristics and firm performance:

$$\begin{aligned} \text{ROA} = & \alpha_0 + \alpha_1\text{ACFOM} + \alpha_2\text{FMSIZE} + \alpha_3\text{CURRENT} + \alpha_4\text{LEV} + \alpha_5\text{INV} + \alpha_6\text{REC} \\ & + \alpha_7\text{CSRATIO} + \alpha_8\text{ISRATIO} + \alpha_9\text{BIG-4} + \alpha_{10}\text{AGE} + \varepsilon \end{aligned} \quad (1a)$$

$$\text{ROA} = \alpha_0 + \alpha_1\text{ACFOM} + \alpha_2\text{FMSIZE} + \alpha_3\text{CURRENT} + \alpha_4\text{LEV} + \alpha_5\text{INV} + \alpha_6\text{REC}$$

$$+ \alpha_7 \text{CSRATIO} + \alpha_8 \text{ISRATIO} + \alpha_9 \text{BIG-4} + \alpha_{10} \text{AGE} + \alpha_{11} \text{BDSIZE} + \alpha_{12} \text{INDBD} + \varepsilon \quad (1b)$$

Where:

ROA = net income divided by total assets;<sup>8</sup>

ACFOM = 1 if a firm has formed an audit committee and 0 otherwise;

FMSIZE = log of total assets;

CURRENT = liquidity (current assets to current liabilities ratio);

LEV = leverage (debt to total equity ratio);

INV = complexity of operation (log of inventory);

REC = complexity of operation (log of receivables);

CSRATIO = capital intensity (book value of total tangible assets) to sales ratio;

ISRATIO = operating margin (operating income to sales ratio);

BIG-4 = 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise<sup>9</sup>;

AGE = the listing years of a firm on the Athens Stock Exchange;

BDSIZE = log of total number of directors on a firm's board of directors; and

INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm.

We expect a positive sign on the coefficient of ACFOM in Models (1a) and (1b) if the existence of an audit committee ensures better governance. However, audit committee formation may be determined by firm characteristics that simultaneously also affect firm performance (i.e.,

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<sup>8</sup> In addition to return on assets (ROA), we also use return on equity (ROE) as an alternative measure of firm performance. We find no significant difference in the results for the relationship between each of the alternative measures of firm performance and audit committee characteristics.

<sup>9</sup> To ensure that Models (1a) – (1f) are fully specified to estimate a two-stage least-squares (2SLS) regression, the auditor-type variable, BIG-4, is excluded in all the second-stage regressions (i.e., Models [2a] – [2f]).

they are endogenously determined). In such case, any inference drawn from ordinary least-squares (OLS) estimates may be biased and inconsistent (Gujarati, 1995; Koutsoyiannis, 1977, p. 331-334). Therefore, we employ a 2SLS approach to estimate an equation system to address this endogeneity problem. Following Deli and Gillan (2000), we develop a logit model for the determinants of audit committee formation, which serves as our first-stage regressions for Models (1a) and (1b) respectively:

$$\begin{aligned} \text{ACFOM} = & \beta_0 + \beta_1\text{FMSIZE} + \beta_2\text{CURRENT} + \beta_3\text{LEV} + \beta_4\text{INV} + \beta_5\text{REC} + \beta_6\text{BIG-4} \\ & + \beta_7\text{CSRATIO} + \beta_8\text{ISRATIO} + \beta_9\text{AGE} + \varepsilon \end{aligned} \quad (2a)$$

$$\begin{aligned} \text{ACFOM} = & \beta_0 + \beta_1\text{FMSIZE} + \beta_2\text{CURRENT} + \beta_3\text{LEV} + \beta_4\text{INV} + \beta_5\text{REC} + \beta_6\text{BIG-4} \\ & + \beta_7\text{CSRATIO} + \beta_8\text{ISRATIO} + \beta_9\text{AGE} + \beta_{10}\text{BDSIZE} + \beta_{11}\text{INDBD} + \varepsilon \end{aligned} \quad (2b)$$

Where all variables in Models (2a) and (2b) are defined as in Models (1a) and (1b) above. Based on prior literature (Sami et al., 2011; Joh, 2003), we include the following control variables: (i) FMSIZE as a measure of firm size; (ii) CURRENT as a measure of firm liquidity; (iii) LEV measures a firm's leverage; (iv) INV measures a firm's complexity of operation; (v) REC measures a firm's complexity of operation; (vi) CSRATIO as a measure capital intensity; and (vii) ISRATIO is a proxy for operating margin.

#### **4.1 Models for the relation between audit committee effectiveness, board characteristics and firm performance**

We estimate the following equations to test Hypotheses 1, 2, and 4, which depict the relations between audit committee effectiveness (surrogating by audit committee independence [INDAC]), board characteristics and firm performance:

$$\text{ROA} = \alpha_0 + \alpha_1\text{INDAC} + \alpha_2\text{FMSIZE} + \alpha_3\text{CURRENT} + \alpha_4\text{LEV} + \alpha_5\text{INV} + \alpha_6\text{REC}$$

$$+ \alpha_7\text{CSRATIO} + \alpha_8\text{ISRATIO} + \alpha_9\text{BIG-4} + \alpha_{10}\text{AGE} + \varepsilon \quad (1c)$$

$$\begin{aligned} \text{ROA} = & \alpha_0 + \alpha_1\text{INDAC} + \alpha_2\text{FMSIZE} + \alpha_3\text{CURRENT} + \alpha_4\text{LEV} + \alpha_5\text{INV} + \alpha_6\text{REC} \\ & + \alpha_7\text{CSRATIO} + \alpha_8\text{ISRATIO} + \alpha_9\text{BIG-4} + \alpha_{10}\text{AGE} + \alpha_{11}\text{BDSIZE} \\ & + \alpha_{12}\text{INDBD} + \varepsilon \end{aligned} \quad (1d)$$

Where INDAC = the percentage of non-executive directors on audit committees; and all other variables as previously defined. We expect a positive coefficient on INDAC in Models (1c) and (1d). However, firm performance and audit committee independence might be endogenously determined. Hence, we also employ the 2SLS approach to estimate the equation system with the following being the first-stage regressions for Models (1c) and (1d) respectively:

$$\begin{aligned} \text{INDAC} = & \beta_0 + \beta_1\text{FMSIZE} + \beta_2\text{CURRENT} + \beta_3\text{LEV} + \beta_4\text{INV} + \beta_5\text{REC} + \beta_6\text{CSRATIO} \\ & + \beta_7\text{ISRATIO} + \beta_8\text{BIG-4} + \beta_9\text{AGE} + \varepsilon \end{aligned} \quad (2c)$$

$$\begin{aligned} \text{INDAC} = & \beta_0 + \beta_1\text{FMSIZE} + \beta_2\text{CURRENT} + \beta_3\text{LEV} + \beta_4\text{INV} + \beta_5\text{REC} + \beta_6\text{CSRATIO} \\ & + \beta_7\text{ISRATIO} + \beta_8\text{BIG-4} + \beta_9\text{AGE} + \beta_{10}\text{BDSIZE} + \beta_{11}\text{INDBD} + \varepsilon \end{aligned} \quad (2d)$$

#### **4.3 Models for the relation between audit committee effectiveness, board characteristics and firm performance**

We estimate the following equations to test Hypothesis 1, 2, and 4, which depict the relation between audit committee effectiveness (surrogating by audit committee size [ACSIZE]) and firm performance:

$$\begin{aligned} \text{ROA} = & \alpha_0 + \alpha_1\text{ACSIZE} + \alpha_2\text{FMSIZE} + \alpha_3\text{CURRENT} + \alpha_4\text{LEV} + \alpha_5\text{INV} + \alpha_6\text{REC} \\ & + \alpha_7\text{CSRATIO} + \alpha_8\text{ISRATIO} + \alpha_9\text{BIG-4} + \alpha_{10}\text{AGE} + \varepsilon \end{aligned} \quad (1e)$$

$$\text{ROA} = \alpha_0 + \alpha_1\text{ACSIZE} + \alpha_2\text{FMSIZE} + \alpha_3\text{CURRENT} + \alpha_4\text{LEV} + \alpha_5\text{INV} + \alpha_6\text{REC}$$

$$\begin{aligned}
& + \alpha_7 \text{CSRATIO} + \alpha_8 \text{ISRATIO} + \alpha_9 \text{BIG-4} + \alpha_{10} \text{AGE} + \alpha_{11} \text{BDSIZE} \\
& + \alpha_{12} \text{INDBD} + \varepsilon
\end{aligned}
\tag{1f}$$

Where ACSIZE = the log of total number of members on audit committee, and all other variables are defined as previously. We expect a positive coefficient on ACSIZE in both Models (1e) and (1f). However, prior research suggests that firm performance and audit committee size might be endogenously determined. Therefore, as before, we employ the 2SLS approach to estimate the equation system with the following being the first-stage regressions for Models (1e) and (1f) respectively:

$$\begin{aligned}
\text{ACSIZE} = & \beta_0 + \beta_1 \text{FMSIZE} + \beta_2 \text{CURRENT} + \beta_3 \text{LEV} + \beta_4 \text{INV} + \beta_5 \text{REC} + \beta_6 \text{CSRATIO} \\
& + \beta_7 \text{ISRATIO} + \beta_8 \text{BIG-4} + \beta_9 \text{AGE} + \varepsilon
\end{aligned}
\tag{2e}$$

$$\begin{aligned}
\text{ACSIZE} = & \beta_0 + \beta_1 \text{FMSIZE} + \beta_2 \text{CURRENT} + \beta_3 \text{LEV} + \beta_4 \text{INV} + \beta_5 \text{REC} + \beta_6 \text{CSRATIO} \\
& + \beta_7 \text{ISRATIO} + \beta_8 \text{BIG-4} + \beta_9 \text{AGE} + \beta_{10} \text{BDSIZE} + \beta_{11} \text{INDBD} + \varepsilon
\end{aligned}
\tag{2f}$$

#### 4.4 Sample Selection

We use companies listed on the Athens Stock Exchange (ASE) during the period 2008-2012. We collected the data on variables investigated in the study from the annual reports of the listed firms on the Website of the ASE. The details of the sample selection procedures are summarized in Table 1. The sample selection starts with the entire population of the firms listed on the ASE from 2008 to 2012. After deleting observations with missing data, we obtain 774 observations for the analyses.

**(Insert Table 1 Here)**

## 5. Empirical Results

Descriptive statistics of the variables investigated are shown in Table 2.<sup>10</sup> The mean of BDSIZE is 2.131 (median 2.197) for firms without audit committees and 2.038 (median 1.946) for those with audit committees, which shows that on average, firms with (without) audit committees have 8.42 (7.68) members on their boards. The mean of INDBD is 0.513 (median 0.500) for firms without audit committees and 0.579 (median 0.571) for those with audit committees, indicating the latter has more independent directors. The results for both Student *t* and Wilcoxon rank-sum tests (not reported here) indicate that the differences of mean and median for both BDSIZE and INDBD are significant between the two sub-samples. The mean (median) of the ACSIZE variable is 1.140 (1.099) for firms with audit committees, which shows that most Greek firms have an average of 3.13 members, which complies with the country's regulatory requirement noted earlier. The mean (median) of INDAC is 0.967 (1.000), indicating that most of the audit committees' members are independent. The median values suggest that most of the firms have three members on their audit committees, and most of the committees have 100 percent independent members. In addition, results of a Student *t* test (not reported here) suggest that firms that formed audit committees are small, less profitable, illiquid, and are less likely to have a Big-4 international accounting firms as their external auditors.

**(Insert Table 2 Here)**

Table 3 reports Pearson correlation coefficients between the explanatory variables included in our models. We find ROA is significantly and positively correlated with REC, INV, FMSIZE, Big-4, and BDSIZE, while significantly and negatively correlated with ISRATIO. The BDSIZE, FMSIZE, and REC variables have high positive correlations (higher than 0.50), indicating that board size is significantly associated with firm size and complexity of operations. In addition, Big-

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<sup>10</sup> To simplify the presentation of our results, we only report the descriptive statistics and correlation coefficients for the raw data of the pooled sample.

4 has a high positive correlation with REC, INV, and FMSIZE (higher than 0.40), indicating that firms audited by Big-4 international accounting firms tend to be large and have complex operations. The BIG-4 variable has a negative correlation with ACFOM (-0.437), indicating firms without audit committees are more likely to be associated with Big-4 international accounting firms. The analysis shows that INDAC and ACSIZE are highly negatively correlated (-0.851), suggesting that: (i) firms with large-sized audit committees tend to have more executive members; and (ii) the two variables should not be put in one model at the same time due to multicollinearity. However, the multicollinearity problem between the two variables is not worrisome because the variables serve as alternative surrogates for audit committee effectiveness. Nevertheless, we compute variance inflation factors (VIFs) for all our models, the results of which (not reported here) suggest that multicollinearity is not a serious problem, as none of the VIFs is greater than the suggested benchmark of 10 (Gujarati, 1995, p. 339).

**(Insert Table 3 about here)**

Table 4 presents OLS regression results for Hypothesis 3, which tests the association between audit committee formation and firm performance on one hand (Model [1a]), and between board characteristics and firm performance on the other hand (Model [1b]).<sup>11</sup> While both models are significant at the 1% level at the two-tailed test, Model (1a) has an adjusted R-squared of 3.95 percent, and that for Model (1b) is 6.18 percent. The coefficient on ACFOM is not significant in Model (1a), indicating that audit committee formation may not necessarily be associated with better firm performance. This is further confirmed when the board characteristics variables are included in Model (1b). In short, Hypothesis 3 is supported by the empirical data. The lack of

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<sup>11</sup> We winsorize all continuous variables at the 1 and 99 percent levels. We obtain similar results to those reported here when we use the unwinsorized version of the variables, or when we truncate the data at the 1 and 99 percent levels.



significant association between firm performance and audit committee formation suggests that Greek listed firms formed such committees not as a deliberate policy to help them to improve performance, but merely to comply with a mandatory requirement.

We find that ROA is significantly and positively associated with BDSIZE (i.e., Hypothesis 1 is rejected), but negatively associated with INDBD (i.e., Hypothesis 2 is rejected). The negative association between ROA and INDBD suggests that independent boards are not always in the best interest of stockholders in the form of superior performance because: (i) external board members lack firm-specific knowledge of operation activities, and (ii) in situations where board's advisory role is more important than monitoring role, independence can decrease firm value (see, e.g., Adams and Ferreira 2007; Schmidt 2015). Bhagat and Black (2002) also report that less profitable firms strengthen the independence of their boards, but firms with more independent boards do not perform better than other firms.

**(Insert Table 4 Here)**

We find ROA to be significantly and positively associated with CURRENT, CSRATIO, and ISRATIO, indicating that profitable firms are more highly liquid, earn higher operating margins, and tend to be more capital intensive. These results remain significant when the board characteristics variables are included in Model (1b).

Table 5 presents results of the 2SLS regression, which tests the association between board characteristics and firm performance on one hand (i.e., Hypotheses 1 and 2), and audit committee formation and firm performance on the other hand (i.e., Hypothesis 3). Thus, Table 5 reports the 2SLS estimates for Models (1a), (1b), (2a), and (2b). Panel A of the table presents the estimates for the first-stage (logit) regressions, Models (2a) and (2b), reporting the determinants of audit committee formation. The pseudo R-squared is 34.6 percent for Model (2a), and 46.2 percent for

Model (2b). The coefficient of BIG-4 is significant and negative in Model (2a). But when the board characteristic variables are included in Model (2b), the coefficient of BIG-4 is no longer statistically significant. The coefficient of BDSIZE is significant and negative, while that of INDBD is significant and positive, indicating that firms having small-sized boards and those having more independent boards are more likely to have formed audit committees. Overall, these results suggest that Greek firms may use audit committees as an alternative governance measure when their external auditors are not Big-4 international accounting firms. However, when boards are smaller and more independent, they are more likely to form audit committees. The predicted values for ACFOM from Models (2a) and (2b) are used in estimating the second-stage regressions, Models (1a) and (1b), respectively.

**(Insert Table 5 Here)**

Panel B of Table 5 reports 2SLS estimates of the regression testing the association between audit committee formation and firm performance (i.e., Hypothesis 3). The systems R-squared are 5.9 and 12 percent respectively for Models (1a) and (1b). Like the OLS results reported in Table 4, we find that ROA is significantly and positively associated with CURRENT, CSRATIO and ISRATIO, indicating that more profitable firms are highly liquid, earn higher operating margins, and tend to be more capital intensive. These results remain significant when the board characteristics variables are included in Model (1b). Also, we find that ROA is significantly and positively associated with BDSIZE (i.e., Hypothesis 1 is rejected), but negatively associated with INDBD (i.e., Hypothesis 2 is rejected). However, the coefficient of ACFOM is negative and not statistically significant in both models (i.e., Hypothesis 3 is supported by the empirical data). As previously mentioned, this lack of significant association between firm performance and audit

committee formation suggests that Greek listed firms form such committees to comply with a mandatory requirement, not as a deliberate policy to achieve any operational objective.

Table 6 presents results of the OLS regression, which tests for the association between audit committee effectiveness (surrogating by INDAC and ACSIZE) and firm performance on one hand (i.e., Hypothesis 4), and board characteristics and firm performance on the other hand (i.e., Hypotheses 1 and 2). In Panel A, we present the estimates for Models (1c) and (1d). Again, we find that ROA is significantly and positively associated with CURRENT, CSRATIO, and ISRATIO. The significance levels of these variables do not change even when the board characteristics variables are included in Model (1d). Again, we find that ROA is significantly and positively associated with BDSIZE (i.e., Hypothesis 1 is rejected), but negatively associated with INDBD (i.e., Hypothesis 2 is rejected). The coefficient of INDAC in Model (1c) is not statistically significant, indicating that audit committee independence is not significantly associated with better firm performance. Thus, Hypothesis 4 cannot be rejected. We find a similar result for Model (1d) when the variables capturing board characteristics, BDSIZE and INDBD, are included. The major reasons for the insignificant coefficient of INDAC in both Models (1c) and (1d) could be that most members of audit committees of Greek firms are fully independent, and consequently, there is little or no variability in the sample.

**(Insert Table 6 Here)**

Panel B of Table 6 reports results of the OLS estimates for Models (1e) and (1f), testing the association between audit committee size and firm performance on one hand (i.e., Hypothesis 4) and between board characteristics and firm performance on the other hand (i.e., Hypotheses 1 and 2) respectively. Like the results in Panel A of Table 6, we find that ROA is significantly and positively associated with CURRENT, CSRATIO, and ISRATIO. These variables remain

significant when the board characteristics variables are included in Model (1f). Again, we find that ROA is significantly and positively associated with BDSIZE (i.e., Hypothesis 1 is rejected), but negatively associated with INDBD (i.e., Hypothesis 2 is rejected). However, the coefficient of ACSIZE is not significant in both models (i.e., Hypothesis 4 is supported by the empirical data). A plausible explanation for this finding is that the audit committees of most of our sample firms consist of three members, and thus, little variability exists.

Tables 7 and 8 present 2SLS regression results for the association between board characteristics and firm performance on one hand (i.e., Hypotheses 1 and 2), and between audit committee effectiveness (surrogating by INDAC and ACSIZE) and firm performance on the other hand (i.e., Hypothesis 4). While Table 7 focuses on INDAC, Table 8 focuses on ACSIZE. Panel A of Table 7 presents the first-stage OLS regression estimates for Models (2c) and (2d), testing for the determinants of INDAC. The overall explanatory powers of the models are statistically significant at the 0.05 level. The coefficient of INV is significant, but negative in Model (2c), indicating that firms whose audit committees are more independent tend to have less inventory investment. In addition, the coefficient of AGE is significant and positive in Model (2c), indicating that firms having more independent audit committees have been in business longer. We obtain similar results when board characteristics are included in Model (2d) for both INV and AGE, except that the former loses its statistical significance. Further, we find significant and positive coefficient of INDBD, indicating that audit committee independence is closely tied to the independence of the main board.

**(Insert Table 7 Here)**

Table 7 (Panel B) reports the second-stage regression results for the association between audit committee independence and firm performance on one hand (i.e., Hypothesis 4), and between

board characteristics and firm performance on the other hand (i.e., Hypotheses 1 and 2). Again, the results confirm those reported earlier. Thus, we find that ROA is significantly and positively associated with CURRENT, CSRATIO, and ISRATIO. These variables remain significant when the board characteristics variables are included in Model (1d). Again, we find that ROA is significantly and positively associated with BDSIZE (i.e., Hypothesis 1 is rejected), but negatively associated with INDBD (i.e., Hypothesis 2 is rejected). However, like the OLS estimates reported in Table 6, the coefficient of INDAC is not statistically significant (i.e., Hypothesis 4 cannot be rejected), indicating that audit committee independence is not significantly associated with firm performance.

Panel A of Table 8 reports the first-stage regression results for Models (2e) and (2f) testing for the determinants of audit committee size. Compared to the determinants of INDAC, we find the opposite results for coefficients on both INV and AGE. Thus, firms with less inventory investment and having been in existence longer tend to have highly independent audit committees that are also small. In addition, there is a significant and positive coefficient of FMSIZE and BIG-4, suggesting that firms having large-sized audit committees tend to be large, and are audited by Big-4 international accounting firms.

**(Insert Table 8 Here)**

Panel B of Table 8 presents that the second-stage regression results for the association between audit committee size and firm performance on one hand (i.e., Hypothesis 4), and between board characteristics and firm performance on the other hand (i.e., Hypotheses 1 and 2). Again, we find that ROA is significantly and positively associated with CURRENT, CSRATIO, and ISRATIO. These significant results remain the same when board characteristics variables are included in Model (2f). Again, we find that ROA is significantly and positively associated with

BDSIZE (i.e., Hypothesis 1 is rejected), but negatively associated with INDBD (i.e., Hypothesis 2 is rejected). However, like the OLS estimates reported in Table 6, the coefficient of ACSIZE is not statistically significant (i.e., Hypothesis 4 cannot be rejected), indicating that audit committee size is not significantly associated with firm performance.

## 6. Sensitivity Tests

For our primary tests, we use observations on firms traded on the Greek stock market during 2008-2012, which covers the period of global financial crisis, 2008-2009. In addition, more Greek firms formed audit committees after 2009 as a result of stringent enforcement by Greek regulators. These factors can render the results on the association between characteristics of boards and audit committees, and firm performance to be different for the periods during and after the financial crisis. Therefore, we rerun our tests separately for the period during (2008-2009) and after (2010-2012) the financial crisis. We find that the coefficients of both BDSIZE and INDBD are statistically significant (not reported here) during the financial crisis period, suggesting that the financial crisis experienced by Greek firms significantly affected their performance, and thus, dampened the relation between the characteristics of boards and firm performance. During the post-financial crisis period, we find that while the coefficient of BDSIZE is statistically significant and positively associated with firm performance, that of INDBD is not statistically significant and negatively associated with firm performance. In addition, we find that audit committee formation is significantly and positively related to firm performance.

Our primary tests examine the contemporaneous association between the characteristics of boards and audit committees and the formation of the latter, and firm performance. It is plausible that the monitoring effects of effective boards and audit committees may translate into better future performance. Therefore, we examine the relation between characteristics of boards and audit

committees, and future firm performance. We measure future firm performance using ROAs for the periods,  $t+1$ ,  $t+2$ , and  $t+3$ . We find that board size is significantly and positively associated with  $ROA_{t+1}$  and  $ROA_{t+3}$  in all models. However, we do not find significant results for  $ROA_{t+2}$ . We find no significant results for the relation between board independence and firm performance.

The models estimated in our primary tests have the BIG-4 variable, a proxy to control for the monitoring effect of external auditors. As a sensitivity test, we replace the BIG-4 variable with EXPERT, a measure for auditor industry expertise, which should have a similar effect on corporate monitoring. The results are qualitatively the same as reported earlier. As with the BIG-4 variable, we find that the EXPERT variable has a significant and positive relation with ACSIZE, but a negative relationship with both AC and INDAC. However, we find no association between auditor industry expertise and firm performance.

To control for the effects of both industry and year, we also include dummies for industries and years in our models. The results with these control variables are qualitatively the same as those reported earlier.

## 7. Conclusions

In this paper, we examine whether board and audit committee characteristics and formation of the latter are associated with firm performance in Greece. Agency theory suggests that well-governed firms (e.g., those with more independent boards) perform relatively better than their poorly-governed counterparts. However, resource dependency theory suggests that a board with more diverse directors could have more expertise on how to better operate the firm, thus contributing to better firm performance. Consistent with resource dependency theory is an emerging finance theory predicting that in situations where board advice is more important than

monitoring, board independence can decrease firm value (e.g., Adams and Ferreira 2007; Harris and Raviv, 2008).

Using a sample of firms traded on the Athens Stock Exchange during 2008-2012, we find that firms having large board size had better performance, while those having more independent directors on their boards are associated with poor performance. The findings support resource dependency theory because more independent board members are “outsiders” who lack firm-specific knowledge on operational activities of the firms on whose boards they serve. This explanation is consistent with Bhagat and Black (2002), who report that less profitable firms tend to strengthen the independence of their boards, but firms with more independent boards do not perform better than other firms.

We also find that in Greece, firms having smaller boards, and those whose boards are more independent are more likely to establish audit committees. Further, we find that firms with complex operations and those having longer history tend to have small-sized and more independent audit committees. However, we find little or no association between audit committees and firm performance. This result might occur because the mandatory requirement that Greek firms form audit committees is more recent, and as a result, it might not yet have had any discernible effect on firm performance. We investigate this issue further using the observations in the early part of our sample period (2008-2009). We find that firms with audit committees during this period tend to relatively perform better. The result might also be explained by firms forming audit committees just to comply with the mandatory requirement and not to achieve any other purpose, such as to improve operational profitability.

These results have implications for researchers, corporate managers, and investors in general, and more particularly, policymakers and regulators in emerging markets. For example,



the result that board independence is negatively associated with firm performance suggests that the resource dependency/advisory role of boards in emerging economies is more important than their oversight/monitoring role. Also, the result that few Greek firms established audit committees during the earlier years of our sample period suggests that the policy requiring mandatory formation of audit committees in Greece was not initially successful; this might also be the case in many emerging markets. Hence, policymakers and regulators in emerging economies need to pay close attention to enforcement of policies to ensure maximum outcomes.

Our results also provide insight into the current debate in the literature on the relation between board independence and firm performance. Thus far, the empirical evidence is mixed, with some studies reporting a negative relationship (e.g., Singh and Gaur, 2009; Khosa, 2017), others reporting a positive relationship (e.g., Bonn, 2004), and yet still some other studies reporting no relationship (e.g., Fosberg, 1989; Bhagat and Black, 2002) between board independence and firm performance. Using evidence from the emerging market of Greece, our study presents a better picture on the roles of board of directors, compared with the traditional monitoring role emphasized in the literature on developed economies in which principal-agent conflicts prevail. Thus, our findings address the reasons for the mixed results in the literature.

Further, our result suggests that the economic consequences of board independence may depend on the function that a board serves in a given context (Singh and Gaur, 2009; Khosa, 2017), which is also one of the corporate governance myths addressed by Brickley and Zimmerman (2010). Different from the traditional monitoring role of boards, our results suggest that boards in Greek firms are expected to take on more of an advisory than monitoring role, with the former involving more guidance on vision and mission development as well as strategy formulation. Inside board members are more knowledgeable of the internal functioning of firms, their resources,

capabilities, and complexities (Davis et al., 1997), help reduce the chances of conflicts within a board, and encourage timely decision-making on key issues. As a result, these members, contrary to agency theory, may contribute significantly to firms' performance from the resource dependency theory point of view.

Our results suggest the relation between board independence and firm performance depends on the economic and institutional settings in which firms operate. For example, in emerging economies, the traditional agency problems related to the conflict between owners and managers are less of a concern due a lack of separation of ownership and control compared to developed markets (Dharwadkar et al., 2000). In addition, investors and managers in emerging markets often perceive board independence as a mere statutory requirement to the extent that board members often consider their roles as ceremonial (Singh and Gaur 2009). These factors suggest that the relation between board independence and firm performance in emerging economies could be different from that in the developed world. Future studies may follow this line of study to further explore the unique role of corporate governance in emerging markets.

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**Table 1: Sample Selection**

| <b>Sample collection procedures</b>   | <b>No. of observations</b> |
|---|----------------------------|
| Companies listed on the Athens Stock Exchange (ASE) during 2008-2012 with financial data available at its Website (The number of companies being 268)               | 1,285                      |
| Sample used in estimation of the models on the relationship between existence of audit committee and firm performance   | 1,285                      |
| <i>Less:</i> Companies with missing data on audit committee composition   | 443                        |
| Sample used in estimation of the models on the relationship between audit committee characteristics (size and independence) and firm performance                    | 842                        |
| <i>Less:</i> Companies with missing data on characteristics of board of directors   | 68                         |
| Sample used in estimation of the models on the relationship between existence of audit committee and firm performance with control variable on corporate governance | 774                        |

**Table 2: Descriptive Statistics of Variables**

| Variable | Formation of Audit Committee (ACFOM) | No. | Mean   | Standard Deviation | Median | Minimum  | Maximum   |
|----------|--------------------------------------|-----|--------|--------------------|--------|----------|-----------|
| AGE      | No                                   | 453 | 37.786 | 25.433             | 32.000 | 3.000    | 178.000   |
|          | Yes                                  | 830 | 35.586 | 23.627             | 29.000 | 7.000    | 168.000   |
| BDSIZE   | No                                   | 130 | 2.131  | 0.380              | 2.197  | 1.609    | 2.996     |
|          | Yes                                  | 764 | 2.038  | 0.321              | 1.946  | 1.386    | 2.996     |
| INDBD    | No                                   | 130 | 0.513  | 0.167              | 0.500  | 0.222    | 0.889     |
|          | Yes                                  | 762 | 0.579  | 0.149              | 0.571  | 0.182    | 0.917     |
| ACSIZE   | No <sup>a</sup>                      |     |        |                    |        |          |           |
|          | Yes                                  | 828 | 1.140  | 0.138              | 1.099  | 1.099    | 1.792     |
| INDAC    | No <sup>a</sup>                      |     |        |                    |        |          |           |
|          | Yes                                  | 828 | 0.967  | 0.110              | 1.000  | 0.500    | 1.000     |
| BIG-4    | No                                   | 148 | 0.838  | 0.370              | 1.000  | 0.000    | 1.000     |
|          | Yes                                  | 732 | 0.275  | 0.447              | 0.000  | 0.000    | 1.000     |
| REC      | No                                   | 441 | 10.324 | 2.483              | 10.294 | 1.946    | 17.714    |
|          | Yes                                  | 821 | 10.110 | 2.274              | 9.998  | 1.946    | 17.714    |
| INV      | No                                   | 365 | 9.036  | 2.072              | 9.183  | 2.398    | 13.589    |
|          | Yes                                  | 713 | 8.852  | 2.079              | 8.994  | 1.609    | 13.589    |
| CSRATIO  | No                                   | 429 | 10.946 | 94.698             | 1.644  | -116.190 | 1397.215  |
|          | Yes                                  | 802 | 40.505 | 694.513            | 1.696  | -137.309 | 18457.667 |
| FMSIZE   | No                                   | 441 | 12.114 | 1.966              | 11.818 | 7.912    | 18.077    |
|          | Yes                                  | 822 | 11.802 | 1.862              | 11.568 | 7.912    | 18.077    |
| LEV      | No                                   | 441 | 4.067  | 10.751             | 2.000  | -21.000  | 78.643    |
|          | Yes                                  | 821 | 3.098  | 10.534             | 1.321  | -23.070  | 78.643    |
| ROA      | No                                   | 440 | -0.012 | 0.180              | 0.004  | -1.740   | 1.952     |
|          | Yes                                  | 822 | -0.053 | 0.221              | -0.023 | -4.618   | 0.891     |
| ISRATIO  | No                                   | 431 | 0.369  | 13.411             | 0.050  | -119.988 | 247.319   |
|          | Yes                                  | 798 | 0.155  | 19.730             | 0.007  | -178.000 | 518.231   |
| CURRENT  | No                                   | 437 | 4.672  | 15.285             | 1.000  | 0.000    | 101.000   |
|          | Yes                                  | 820 | 2.856  | 10.317             | 1.245  | 0.000    | 101.000   |

Note: <sup>a</sup>t-statistic cannot be computed because, at least, one of the groups is blank.

Definition of variables: AGE = the listing years of a firm on the Athens Stock Exchange; BDSIZE = log of total number of directors on board; INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm; ACSIZE = the log of total number of members on audit committee; INDAC = the percentage of non-executive directors on audit committee; REC = log of receivables; INV = log of inventory; CSRATIO = book value of total tangible assets to sales ratio; FMSIZE = log of total assets; LEV = debt to total equity ratio; ROA = net income divided by total assets; ISRATIO = operating income to sales ratio; and CURRENT = current assets to current liabilities ratio; BIG-4 = 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise; and ACFOM = 1 if a firm has formed an audit committee and 0 otherwise.



**Table 3: Pearson Correlation Matrix of Variables**

| VARIABLE | AGE       | REC       | INV       | CSRATIO | FMSIZE    | LEV      | BIG-4     | ISRATIO   | CURRENT  | INDBD    | BDSIZE    | ROA       | INDAC     | ACSIZE    | ACFOM |
|----------|-----------|-----------|-----------|---------|-----------|----------|-----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-------|
| AGE      | 1.000     |           |           |         |           |          |           |           |          |          |           |           |           |           |       |
| REC      | 0.259***  | 1.000     |           |         |           |          |           |           |          |          |           |           |           |           |       |
| INV      | 0.067**   | 0.617***  | 1.000     |         |           |          |           |           |          |          |           |           |           |           |       |
| CSRATIO  | 0.034     | -0.032    | -0.090*** | 1.000   |           |          |           |           |          |          |           |           |           |           |       |
| FMSIZE   | 0.295***  | 0.864***  | 0.606***  | -0.025  | 1.000     |          |           |           |          |          |           |           |           |           |       |
| LEV      | 0.061**   | 0.274***  | 0.039     | -0.009  | 0.249***  | 1.000    |           |           |          |          |           |           |           |           |       |
| BIG-4    | 0.204***  | 0.424***  | 0.419***  | -0.029  | 0.545***  | 0.136*** | 1.000     |           |          |          |           |           |           |           |       |
| ISRATIO  | -0.019    | 0.017     | 0.047     | 0.000   | 0.015     | 0.010    | 0.070**   | 1.000     |          |          |           |           |           |           |       |
| CURRENT  | -0.101*** | -0.291*** | -0.093*** | -0.035  | -0.152*** | -0.057** | -0.035    | 0.006     | 1.000    |          |           |           |           |           |       |
| INDBD    | 0.070**   | 0.151***  | 0.079**   | -0.042  | 0.182***  | 0.020    | 0.181***  | 0.019     | 0.002    | 1.000    |           |           |           |           |       |
| BDSIZE   | 0.225***  | 0.539***  | 0.269***  | -0.056* | 0.611***  | 0.087*** | 0.364***  | 0.006     | -0.037   | 0.078**  | 1.000     |           |           |           |       |
| ROA      | 0.005     | 0.129***  | 0.094***  | 0.008   | 0.153***  | 0.018    | 0.141***  | -0.076*** | -0.008   | -0.051   | 0.162***  | 1.000     |           |           |       |
| INDAC    | 0.004     | -0.045    | -0.093**  | 0.017   | -0.020    | 0.016    | -0.114*** | 0.007     | -0.055   | 0.109*** | -0.013    | -0.073**  | 1.000     |           |       |
| ACSIZE   | 0.052     | 0.103***  | 0.131***  | -0.017  | 0.098***  | -0.007   | 0.213***  | -0.008    | 0.064*   | -0.051   | 0.111***  | 0.079**   | -0.851*** | 1.000     |       |
| ACFOM    | -0.043    | -0.043    | -0.042    | 0.025   | -0.078*** | -0.043   | -0.437*** | -0.006    | -0.070** | 0.152*** | -0.099*** | -0.093*** | 0.085**   | -0.089*** | 1.000 |

*Definition of variables:* AGE = the listing years of a firm on the Athens Stock Exchange; REC = log of receivables; INV = log of inventory; CSRATIO = book value of total tangible assets to sales ratio; FMSIZE = log of total assets; LEV = debt to total equity ratio; BIG-4 = 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise; ISRATIO = operating income to sales ratio; CURRENT = current assets to current liabilities ratio; INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm; BDSIZE = log of total number of directors on board; ROA = net income divided by total assets; INDAC = the percentage of non-executive directors on audit committee; ACSIZE = the log of total number of members on audit committee; and ACFOM = 1 if a firm has formed an audit committee and 0 otherwise.

\*Correlation is significant at the 0.10 level (2-tailed).

\*\*Correlation is significant at the 0.05 level (2-tailed).

\*\*\*Correlation is significant at the 0.01 level (2-tailed).

**Table 4: OLS Estimates of the Relations among Audit Committee Formation, Board Characteristics, and Firm Performance**

| Model          | Model (1a) Dependent Variable: ROA |         |              | Model (1b) Dependent Variable: ROA |         |              |
|----------------|------------------------------------|---------|--------------|------------------------------------|---------|--------------|
|                | Coefficient                        | t-value | Significance | Coefficient                        | t-value | Significance |
| Constant       | -0.707                             | -1.320  | 0.186        | -0.897                             | -1.690  | 0.092        |
| ACFOM          | 0.024                              | 0.250   | 0.802        | 0.007                              | 0.080   | 0.938        |
| FMSIZE         | 0.008                              | 1.030   | 0.302        | 0.001                              | 0.190   | 0.849        |
| CURRENT        | 0.002**                            | 2.490   | 0.013        | 0.002**                            | 2.580   | 0.010        |
| LEV            | 0.000                              | -0.500  | 0.620        | 0.000                              | -0.570  | 0.569        |
| INV            | 0.001                              | 0.200   | 0.843        | 0.000                              | 0.120   | 0.903        |
| REC            | 0.008                              | 1.150   | 0.252        | 0.009                              | 1.220   | 0.223        |
| CSRATIO        | 0.0001***                          | 2.660   | 0.008        | 0.0001***                          | 2.620   | 0.009        |
| ISRATIO        | 0.005***                           | 2.580   | 0.010        | 0.005**                            | 2.520   | 0.012        |
| BIG-4          | 0.009                              | 0.640   | 0.522        | 0.016                              | 1.090   | 0.276        |
| AGE            | 0.0002                             | 0.850   | 0.396        | 0.000                              | 1.240   | 0.214        |
| BDSIZE         |                                    |         |              | 0.065***                           | 2.860   | 0.004        |
| INDBD          |                                    |         |              | -0.099***                          | -2.650  | 0.008        |
| Adj. R-squared | 0.0395                             |         |              | 0.0618                             |         |              |
| F-value        | 3.42***                            |         |              | 4.24***                            |         |              |

*Definition of variables:* ROA = net income divided by total assets; ACFOM = 1 if a firm has formed an audit committee and 0 otherwise; FMSIZE = log of total assets; CURRENT= current assets to current liabilities ratio; LEV = debt to total equity ratio; INV = log of inventory; REC = log of receivables; CSRATIO = book value of total tangible assets to sales ratio; ISRATIO = operating income to sales ratio; BIG-4 = a dummy variable for auditor type coded as 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise; AGE = the listing years of a firm on the Athens Stock Exchange; BDSIZE = log of total number of directors on board; INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm.

\*\*Coefficient is significant at the 0.05 level (2-tailed).

\*\*\*Coefficient is significant at the 0.01 level (2-tailed).

**Table 5: 2SLS Estimates of the Relations among Audit Committee Formation, Board Characteristics, and Firm Performance**

| <i>Panel A. Results for Determinants of Audit Committee Formation (First Stage)</i>                            |  |         |              |  |         |              |
|--|--|---------|--------------|--|---------|--------------|
| Variable   | Model (2a) Dependent Variable: ACFOM=1 |         |              | Model (2b) Dependent Variable: ACFOM=1 |         |              |
|  | Coefficient                            | Wald    | Significance | Coefficient                            | Wald    | Significance |
| Constant   | -0.539                                 | 0.002   | 0.963        | 31.774                                 | 1.162   | 0.281        |
| FMSIZE   | -0.099                                 | 0.364   | 0.546        | 0.137                                  | 0.078   | 0.780        |
| CURRENT  | -0.020                                 | 0.448   | 0.503        | -0.047                                 | 0.030   | 0.862        |
| LEV  | 0.015                                  | 0.831   | 0.362        | 0.015                                  | 0.171   | 0.680        |
| INV  | 0.085                                  | 0.704   | 0.401        | 0.014                                  | 0.005   | 0.942        |
| REC  | -0.108                                 | 0.424   | 0.515        | -0.571                                 | 1.237   | 0.266        |
| CSRATIO  | 0.023                                  | 0.298   | 0.585        | 0.047                                  | 0.199   | 0.655        |
| ISRATIO  | -0.171                                 | 0.362   | 0.547        | 0.400                                  | 1.546   | 0.214        |
| BIG-4  | -4.014***                              | 54.061  | 0.0001       | -8.834                                 | 1.135   | 0.287        |
| AGE  | 0.003                                  | 0.345   | 0.557        | -0.006                                 | 0.191   | 0.662        |
| BDSIZE   |  |         |              | -2.978**                               | 4.234   | 0.040        |
| INDBD  |  |         |              | 4.781***                               | 7.457   | 0.006        |
| -2 Log likelihood  | 525.794                                |         |              | 175.912                                |         |              |
| Pseudo R-squared   | 0.346                                  |         |              | 0.462                                  |         |              |
| <i>Panel B. Results for the Relation between Audit Committee Formation and Firm Performance (Second Stage)</i> |  |         |              |  |         |              |
| Variable   | Model (1a) Dependent Variable: ROA     |         |              | Model (1b) Dependent Variable: ROA     |         |              |
|  | Coefficient                            | t-value | Significance | Coefficient                            | t-value | Significance |
| Constant   | -0.390                                 | -0.860  | 0.389        | -0.837                                 | -1.610  | 0.108        |
| ACFOM  | -0.016                                 | -0.990  | 0.321        | -0.000                                 | 0.000   | 0.996        |
| FMSIZE   | 0.008                                  | 1.340   | 0.181        | 0.001                                  | 0.070   | 0.944        |
| CURRENT  | 0.002***                               | 2.600   | 0.009        | 0.002***                               | 2.640   | 0.009        |
| LEV  | -0.000                                 | -0.600  | 0.547        | -0.000                                 | -0.580  | 0.562        |
| INV  | 0.001                                  | 0.330   | 0.741        | 0.000                                  | 0.060   | 0.951        |
| REC  | 0.006                                  | 1.070   | 0.286        | 0.010                                  | 1.400   | 0.161        |
| CSRATIO  | 0.0001***                              | 2.940   | 0.003        | 0.0001***                              | 2.700   | 0.007        |
| ISRATIO  | 0.005***                               | 2.890   | 0.004        | 0.005***                               | 2.610   | 0.009        |
| AGE  | 0.000                                  | 0.400   | 0.686        | 0.000                                  | 1.190   | 0.235        |
| BDSIZE   |  |         |              | 0.062***                               | 2.840   | 0.005        |
| INDBD  |  |         |              | -0.098***                              | -2.710  | 0.007        |
| System R-squared   | 0.059                                  |         |              | 0.120                                  |         |              |

*Definition of variables:* ACFOM = 1 if a firm has formed an audit committee and 0 otherwise; FMSIZE = log of total assets; CURRENT= current assets to current liabilities ratio; LEV = debt to total equity ratio; INV = log of inventory; REC = log of receivables; CSRATIO = book value of total tangible assets to sales ratio; ISRATIO = operating income to sales ratio; BIG-4 = 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise; AGE = the listing years of a firm on the Athens Stock Exchange; BDSIZE = log of total number of directors on board; and INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm.

\*\*Coefficient is significant at the 0.05 level (2-tailed).

\*\*\*Coefficient is significant at the 0.01 level (2-tailed).

**Table 6: OLS Estimates of the Relations among Audit Committee Characteristics, Board Characteristics, and Firm Performance**

| <i>Panel A. Results for the Relation between Audit Committee Independence and Firm Performance</i> |                                    |         |              |                                    |         |              |
|--|------------------------------------|---------|--------------|------------------------------------|---------|--------------|
| Variable   | Model (1c) Dependent Variable: ROA |         |              | Model (1d) Dependent Variable: ROA |         |              |
|  | Coefficient                        | t-value | Significance | Coefficient                        | t-value | Significance |
| Constant   | -0.6813                            | -1.270  | 0.205        | -0.8840                            | -1.660  | 0.098        |
| INDAC  | -0.0198                            | -0.180  | 0.857        | -0.0154                            | -0.140  | 0.888        |
| FMSIZE   | 0.0077                             | 1.030   | 0.305        | 0.0014                             | 0.180   | 0.855        |
| CURRENT  | 0.0020**                           | 2.490   | 0.013        | 0.0020*                            | 2.580   | 0.010        |
| LEV  | -0.0003                            | -0.490  | 0.626        | -0.0003                            | -0.560  | 0.573        |
| INV  | 0.0006                             | 0.170   | 0.863        | 0.0004                             | 0.110   | 0.913        |
| REC  | 0.0082                             | 1.140   | 0.254        | 0.0086                             | 1.220   | 0.223        |
| CSRATIO  | 0.0001***                          | 2.660   | 0.008        | 0.0001***                          | 2.620   | 0.009        |
| ISRATIO  | 0.0050***                          | 2.590   | 0.010        | 0.0049**                           | 2.520   | 0.012        |
| BIG-4  | 0.0091                             | 0.620   | 0.533        | 0.0157                             | 1.080   | 0.280        |
| AGE  | 0.0002                             | 0.890   | 0.376        | 0.0003                             | 1.260   | 0.207        |
| BDSIZE   |                                    |         |              | 0.0649***                          | 2.870   | 0.004        |
| INDBD  |                                    |         |              | -0.0991***                         | -2.640  | 0.009        |
| Adj. R-squared   | 0.0395                             |         |              | 0.0619                             |         |              |
| F-value  | 3.42***                            |         |              | 4.24***                            |         |              |
| <i>Panel B. Result for the Relation between Audit Committee Size and Firm Performance</i>          |                                    |         |              |                                    |         |              |
| Variable   | Model (1e) Dependent Variable: ROA |         |              | Model (1f) Dependent Variable: ROA |         |              |
|  | Coefficient                        | t-value | Significance | Coefficient                        | t-value | Significance |
| Constant   | -0.8106                            | -1.470  | 0.143        | -0.9593                            | -1.750  | 0.081        |
| ACSIZE   | 0.0653                             | 0.780   | 0.436        | 0.0388                             | 0.470   | 0.642        |
| FMSIZE   | 0.0073                             | 0.970   | 0.332        | 0.0013                             | 0.170   | 0.865        |
| CURRENT  | 0.0020**                           | 2.490   | 0.013        | 0.0020**                           | 2.570   | 0.010        |
| LEV  | -0.0003                            | -0.490  | 0.621        | -0.0003                            | -0.570  | 0.569        |
| INV  | 0.0004                             | 0.110   | 0.909        | 0.0003                             | 0.070   | 0.941        |
| REC  | 0.0083                             | 1.160   | 0.247        | 0.0087                             | 1.230   | 0.220        |
| CSRATIO  | 0.0001***                          | 2.660   | 0.008        | 0.0001***                          | 2.620   | 0.009        |
| ISRATIO  | 0.0050***                          | 2.590   | 0.010        | 0.0049**                           | 2.520   | 0.012        |
| BIG-4  | 0.0081                             | 0.560   | 0.577        | 0.0152                             | 1.040   | 0.298        |
| AGE  | 0.0003                             | 0.960   | 0.336        | 0.0003                             | 1.300   | 0.194        |
| BDSIZE   |                                    |         |              | 0.0637***                          | 2.810   | 0.005        |
| INDBD  |                                    |         |              | -0.0993***                         | -2.650  | 0.008        |
| Adj. R-squared   | 0.0404                             |         |              | 0.0622                             |         |              |
| F-value  | 3.48***                            |         |              | 4.25***                            |         |              |

*Definition of variables:* ROA = net income divided by total assets; INDAC = the percentage of non-executive directors on audit committee; ACSIZE = the log of total number of members on audit committee; FMSIZE = log of total assets; CURRENT = current assets to current liabilities ratio; LEV = debt to total equity ratio; INV = log of inventory; REC = log of receivables; CSRATIO = book value of total tangible assets to sales ratio; ISRATIO = operating income to sales ratio; BIG-4 = 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise; AGE = the listing years of a firm on the Athens Stock Exchange; BDSIZE = log of total number of directors on board; and INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm.

\*Coefficient is significant at the 0.10 level (2-tailed).

\*\*Coefficient is significant at the 0.05 level (2-tailed).

\*\*\*Coefficient is significant at the 0.01 level (2-tailed).

ACCEPTED MANUSCRIPT

**Table 7: 2SLS Estimates of the Relations among Audit Committee Independence, Board Characteristics, and Firm Performance**

| <i>Panel A. Results for Determinants of Audit Committee Independence (First Stage)</i>                            |                                      |         |              |                                      |         |              |
|---|--------------------------------------|---------|--------------|--------------------------------------|---------|--------------|
| Variable  | Model (2c) Dependent Variable: INDAC |         |              | Model (2d) Dependent Variable: INDAC |         |              |
|   | Coefficient                          | t-value | Significance | Coefficient                          | t-value | Significance |
| Constant  | 0.6399                               | 3.190   | 0.002        | 0.6067                               | 3.010   | 0.003        |
| FMSIZE  | -0.0010                              | -0.360  | 0.719        | -0.0024                              | -0.810  | 0.418        |
| CURRENT   | 0.0000                               | 0.030   | 0.979        | 0.0000                               | 0.060   | 0.950        |
| LEV   | 0.0001                               | 0.740   | 0.460        | 0.0002                               | 0.810   | 0.419        |
| INV   | -0.0023*                             | -1.710  | 0.089        | -0.0021                              | -1.560  | 0.119        |
| REC   | -0.0003                              | -0.100  | 0.918        | -0.0004                              | -0.130  | 0.895        |
| CSRATIO   | 0.0000                               | 0.020   | 0.983        | 0.0000                               | 0.070   | 0.946        |
| ISRATIO   | 0.0000                               | 0.040   | 0.967        | 0.0000                               | 0.010   | 0.989        |
| BIG-4   | -0.0056                              | -1.030  | 0.306        | -0.0070                              | -1.260  | 0.207        |
| AGE   | 0.0002*                              | 1.960   | 0.050        | 0.0002**                             | 2.010   | 0.045        |
| BDSIZE  |                                      |         |              | 0.0115                               | 1.340   | 0.182        |
| INDBD   |                                      |         |              | -0.0257*                             | 1.800   | 0.072        |
| Adj. R-squared  | 0.0168                               |         |              | 0.0217                               |         |              |
| F-value   | 2.12**                               |         |              | 2.19**                               |         |              |
| <i>Panel B. Results for the Relation between Audit Committee Independence and Firm Performance (Second Stage)</i> |                                      |         |              |                                      |         |              |
| Variable  | Model (1c) Dependent Variable: ROA   |         |              | Model (1d) Dependent Variable: ROA   |         |              |
|   | Coefficient                          | t-value | Significance | Coefficient                          | t-value | Significance |
| Constant  | -0.5763                              | -1.110  | 0.269        | -0.8840                              | -1.660  | 0.098        |
| INDAC   | -0.0646                              | -0.620  | 0.539        | -0.0154                              | -0.140  | 0.888        |
| FMSIZE  | 0.0098                               | 1.380   | 0.167        | 0.0014                               | 0.180   | 0.855        |
| CURRENT   | 0.0019**                             | 2.480   | 0.013        | 0.0020**                             | 2.580   | 0.010        |
| LEV   | -0.0003                              | -0.520  | 0.603        | -0.0003                              | -0.560  | 0.573        |
| INV   | 0.0008                               | 0.240   | 0.813        | 0.0004                               | 0.110   | 0.913        |
| REC   | 0.0052                               | 0.770   | 0.440        | 0.0086                               | 1.220   | 0.223        |
| CSRATIO   | 0.0001***                            | 2.690   | 0.007        | 0.0001***                            | 2.620   | 0.009        |
| ISRATIO   | 0.0051***                            | 2.630   | 0.009        | 0.0048**                             | 2.520   | 0.012        |
| AGE   | 0.0002                               | 0.800   | 0.422        | 0.0003                               | 1.260   | 0.207        |
| BDSIZE  |                                      |         |              | 0.0649***                            | 2.870   | 0.004        |
| INDBD   |                                      |         |              | -0.0991***                           | -2.640  | 0.009        |
| System R-squared  | 0.0401                               |         |              | 0.0619                               |         |              |

*Definition of variables:* ROA = net income divided by total assets; INDAC = the percentage of non-executive directors on audit committee; ACSIZE = the log of total number of members on audit committee; FMSIZE = log of total assets; CURRENT = current assets to current liabilities ratio; LEV = debt to total equity ratio; INV = log of inventory; REC = log of receivables; CSRATIO = book value of total tangible assets to sales ratio; ISRATIO = operating income to sales ratio; BIG-4 = 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise; AGE = the listing years of a firm on the Athens Stock Exchange; BDSIZE = log of total number of directors on board; and INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm.

\*Coefficient is significant at the 0.10 level (2-tailed).

\*\*Coefficient is significant at the 0.05 level (2-tailed).

\*\*\*Coefficient is significant at the 0.01 level (2-tailed).

**Table 8: 2SLS Estimates of the Relations among Audit Committee Size, Board Characteristics, and Firm Performance**

| <i>Panel A. Results for Determinants of Audit Committee Size (First Stage)</i>                            |                                       |         |              |                                       |         |              |
|---|---------------------------------------|---------|--------------|---------------------------------------|---------|--------------|
| Variable  | Model (2e) Dependent Variable: ACSIZE |         |              | Model (2f) Dependent Variable: ACSIZE |         |              |
|   | Coefficient                           | t-value | Significance | Coefficient                           | t-value | Significance |
| Constant  | 1.7863                                | 6.790   | 0.000        | 1.7031                                | 6.440   | 0.000        |
| FMSIZE  | 0.0065*                               | 1.740   | 0.083        | 0.0035                                | 0.910   | 0.363        |
| CURRENT   | 0.0000                                | 0.060   | 0.949        | 0.0001                                | 0.120   | 0.906        |
| LEV   | 0.0000                                | 0.050   | 0.964        | 0.0000                                | 0.050   | 0.958        |
| INV   | 0.0039**                              | 2.210   | 0.028        | 0.0040**                              | 2.270   | 0.024        |
| REC   | -0.0017                               | -0.490  | 0.627        | -0.0017                               | -0.470  | 0.636        |
| CSRATIO   | 0.0000                                | -0.090  | 0.929        | 0.0000                                | -0.100  | 0.923        |
| ISRATIO   | -0.0001                               | -0.130  | 0.896        | -0.0002                               | -0.200  | 0.841        |
| BIG-4   | 0.0158**                              | 2.190   | 0.029        | 0.0163**                              | 2.260   | 0.024        |
| AGE   | -0.0004***                            | -2.970  | 0.003        | -0.0004***                            | -2.720  | 0.007        |
| BDSIZE  |                                       |         |              | 0.0276**                              | 2.450   | 0.015        |
| INDBD   |                                       |         |              | -0.0041                               | -0.220  | 0.826        |
| Adj. R-squared  | 0.0765                                |         |              | 0.083                                 |         |              |
| F-value   | 6.42***                               |         |              | 5.85***                               |         |              |
| <i>Panel B. Results for the Relation between Audit Committee Size and Firm Performance (Second Stage)</i> |                                       |         |              |                                       |         |              |
| Variable  | Model (1e) Dependent Variable: ROA    |         |              | Model (1f) Dependent Variable: ROA    |         |              |
|   | Coefficient                           | t-value | Significance | Coefficient                           | t-value | Significance |
| Constant  | -0.7190                               | -1.340  | 0.180        | -0.9593                               | -1.750  | 0.081        |
| ACSIZE  | 0.0571                                | 0.690   | 0.491        | 0.0388                                | 0.470   | 0.642        |
| FMSIZE  | 0.0095                                | 1.340   | 0.182        | 0.0013                                | 0.170   | 0.865        |
| CURRENT   | 0.0019***                             | 2.480   | 0.014        | 0.0020**                              | 2.570   | 0.010        |
| LEV   | -0.0003                               | -0.530  | 0.595        | -0.0003                               | -0.570  | 0.569        |
| INV   | 0.0007                                | 0.210   | 0.831        | 0.0003                                | 0.070   | 0.941        |
| REC   | 0.0054                                | 0.790   | 0.430        | 0.0087                                | 1.230   | 0.220        |
| CSRATIO   | 0.0001***                             | 2.700   | 0.007        | 0.0001***                             | 2.620   | 0.009        |
| ISRATIO   | 0.0051***                             | 2.640   | 0.009        | 0.0049**                              | 2.520   | 0.012        |
| AGE   | 0.0002                                | 0.840   | 0.403        | 0.0003                                | 1.300   | 0.194        |
| BDSIZE  |                                       |         |              | 0.0637***                             | 2.810   | 0.005        |
| INDBD   |                                       |         |              | -0.0993***                            | -2.650  | 0.008        |
| System R-squared  | 0.0403                                |         |              | 0.0622                                |         |              |

*Definition of variables:* ROA = net income divided by total assets; INDAC = the percentage of non-executive directors on audit committee; ACSIZE = the log of total number of members on audit committee; FMSIZE = log of total assets; CURRENT = current assets to current liabilities ratio; LEV = debt to total equity ratio; INV = log of inventory; REC = log of receivables; CSRATIO = book value of total tangible assets to sales ratio; ISRATIO = operating income to sales ratio; BIG-4 = 1 if the external auditor of a firm is affiliated with a Big-4 international accounting firm and 0 otherwise; AGE = the listing years of a firm on the Athens Stock Exchange; BDSIZE = log of total number of directors on board; and INDBD = the ratio of the number of independent members on the board of directors to the total number of the directors of a firm.

\*Coefficient is significant at the 0.10 level (2-tailed).

\*\*Coefficient is significant at the 0.05 level (2-tailed).

\*\*\*Coefficient is significant at the 0.01 level (2-tailed).