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ORIGINAL ARTICLE

Audit committee and factors that affect its characteristics: the case of Greece

George Drogalas[1] · Michail Nerantzidis[2] · Margaritis Samaras[3] · Michail Pazarskis[4]

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Abstract
Policy-makers currently place great emphasis on strengthening the audit committees' structure. Underlying this is a belief that strengthening the audit committees' structure may enhance the effectiveness as well as the quality of financial information. In this research, we examine the relationship between audit committee characteristics (number of AC members, percentage of independent audit committee members and percentage of board directors) and structure, accounting and corporate governance-related measures. Using a sample of 126 listed companies on the Athens Stock Exchange, we show that audit committee size has a positive relationship with the number of the firm's employees and negative relationship with operating cash flows and the presence of an executive chairman. Moreover, we find that audit committee effectiveness has a positive relationship with the percentage of independent directors. On that basis, our findings are important since they highlight the usefulness of audit committees and offers insights to academics, practitioners and policy-makers.

Keywords Corporate governance · Internal audit · Athens stock exchange

Introduction

According to Denis and McConnell (2003), corporate governance (hereafter: CG) is the set of mechanisms that induce the self-interested controllers of a company to make decisions that maximize the value of the company to its owners. In other words, it is the link that governs the relationship between management, board of directors, shareholders and any other interested party (for more, see Nerantzidis et al. 2012). On that basis, audit committees (hereafter: AC) as a mechanism of monitoring and assessing financial statements play a crucial role on the reduction of the information asymmetry problem between executive managers and independent directors on the board (Ismael and Roberts 2018; Pandit et al. 2017; Fichtner 2010). Thus, we may say that the presence and the effectiveness of the AC may increase the firm's value (Agyemang-Mintah and Schadewitz 2018).

Although there are many studies around the world investigating the AC's characteristics and/or effectiveness; from Asia (e.g., Alhajri 2017; Othman et al. 2014; Rahmat et al. 2009), to America (Defond et al. 2005; Farber 2005), Europe (Ismael and Roberts 2018; Li et al. 2012) and Africa (Sellami and Fendri 2017), no study has been examined in Greece. A key component of current governance legislation in Greece (i.e., Law 4449/2017) is that ACs should in majority consist of independent members. This illustrates that the size of the AC, as well as its independence, reduces the likelihood of fraudulent accounting (Inaam and Khamoussi 2016; Mohd-Sulaiman 2013; Emmerich et al. 2005). Therefore, exploring the factors that affect the characteristics of this monitoring mechanism in Greece may help third parties to incorporate expertise regarding the effectiveness of this concept. Thus, the research question of this study is as follows:

RQ Which are the main factors that affect the characteristics of AC?

✉ Michail Nerantzidis
nerantzidismike@uth.gr

1 School of Business Administration, University of Macedonia, Thessaloníki, Greece

2 School of Economics and Business, University of Thessaly, Larissa, Greece

3 School of Information Sciences, University of Macedonia, Thessaloníki, Greece

4 School of Economics and Business Administration, International Hellenic University, Thessaloníki, Greece

In line with previous research (Berkman and Zuta 2018; Ismael and Roberts 2018; Sun et al. 2014; Goodwin-Stewart and Kent 2006) regarding AC characteristics, we look at the way the AC's effectiveness (i.e., number of AC members, percentage of independent AC members and percentage of board directors) relate to structure, governance and accounting measures. Considering the results, we provide evidence that AC size has a positive relationship with the number of the firm's employees and negative relationship with operating cash flows and the presence of an executive chairman. Moreover, we find that AC independence has a positive relationship with the percentage of independent directors. On that basis, our findings suggest that a laissez-faire approach is more preferable than a regulatory or legislative approach (see, e.g., Labelle et al. 2015). This means that each company should—on their own—determine their committee's characteristics by interpreting their dynamic environment (Ghafran and O'Sullivan 2017; Daft and Weick 1984). Such an approach to remain free to make decisions may help them to add value to shareholders.

All in all, our study offers a novel contribution to academics, practitioners and especially to policy-makers regarding the effectiveness of ACs. This illustrates that regulatory bodies who continually work for the improvement of the quality of the firm governance and the reform of AC in Greece should be make more evidence-based decisions.

The rest of the paper proceeds as follows: Sect. 2 presents prior literature and hypothesis development. Section 3 analyzes the research methodology including sample and data collection, and research model. Section 4 presents the results, and the next section contains concluding remarks.

Prior literature and hypothesis development

Prior empirical studies

Both the internal audit function and the characteristics of the AC have been extensively studied in the international literature. AlQadasi and Abidin (2018) found that extensive audits are less likely to be performed in companies with a higher concentration of ownership. However, the high concentration of ownership does not seem to play a significant role in the positive association between CG and audit quality. Often, the size of the internal audit department is considered an important parameter for determining the quality of the financial statements. Alhajri (2017) used data from listed companies on Kuwait's stock market and found a positive association between the size of the internal audit function (IAF) and three of the parameters he considered: AC's size, the presence of a risk management committee and affiliation to the financial services industry. In particular, he argued that the more dispersed the ownership of a firm, the more extensive internal audits it will demand. He also concluded that larger companies place greater importance on internal audit function, and, among these big entities, it is those belonging to the financial sector that stand out. In addition, perhaps the researcher's most interesting finding relates to the size of the AC and the presence of a risk management committee in the firm, as there seems to be a positive correlation between these two and the scope of internal auditing, which, in turn, is positively associated with the ratio of receivables and inventories to total assets of the firm. Further, Lee and Park (2016), using a sample of South Korean firms, examined the relationship between the number of external audit hours and the ratio of the internal auditors number to the number of employees. The researchers looked at the importance of the internal auditing function for external auditors, in relation to the presence of employees with accounting and legal expertise. Using data from 5.055 firm-years that was collected between 2009 and 2013, they found that the higher the ratio, the more effective and qualitative the internal audit, and therefore the higher the impact on the external audit.

Ismael and Roberts (2018) examined data from 332 companies listed on the London Stock Exchange [LSE] Main Market, trying to identify the factors leading non-financial corporations to adopt an internal audit function, which, according to UK law, is optional. In addition, very large companies were excluded from the survey sample, as the presence of a relevant department was considered a given. Based on their findings, the size of the company is one of the most important factors for the creation of an internal audit department, considering that, the larger the firm, the greater the loss of control its owners face, as well as the information asymmetry between shareholders and Bod executives (cf. Goodwin-Stewart and Kent 2006; Carcello et al. 2005; Abdel-khalik 1993). Of course, we should not ignore the fact that a large firm can also exploit economies of scale by reducing the marginal cost of control (cf. Chow 1982).

The same survey (Ismael and Roberts 2018) found a positive correlation between the presence of a risk management committee and the creation of an internal audit department. Obviously, proper functioning of the risk management committee is necessary in companies with increased levels of receivables, inventories and cash flows from operations, since in these cases there is room for fraud to be committed by the staff (cf. Goodwin-Stewart and Kent 2006; Knechel and Willekens 2006; Carcello et al. 2005). In addition, the aforementioned survey highlighted the negative correlation between the presence of an internal audit department and the percentage of shares held by board directors. Finally, a significant correlation between the effectiveness of the AC and the presence of an internal audit function has been identified. With regard to effectiveness, the study examined four parameters: (a) the size of the AC; (b) the percentage of

independent members; (c) the number of annual meetings; and (d) the percentage of members who specialize in finance and accounting. The researchers found that an effective AC uses the internal audit department to improve the monitoring of the entity's activities and, as a consequence, to reduce the information asymmetry between executive directors and investors.

Goodwin-Stewart and Kent (2006) did not find a strong correlation between the effectiveness of the AC and the percentage of independent directors on the firms' board. Using a sample of 450 Australian companies where internal auditing is optional, they found that companies with an internal audit function are more likely to belong to the large entity category and also to have a risk committee. On the other hand, there was a negative correlation between the presence of internal audit and three indices: (a) the proportion of receivables to total assets, (b) the proportion of inventories to total assets and (c) the proportion of long-term liabilities to total assets. Previous research in the same country (Carey et al. 2000), conducted on a sample of 186 family businesses (with optional internal auditing), has not been able to identify any association between internal auditing and size, obligations and dispersed ownership.

Li et al. (2012) examined the effect of AC characteristics on intellectual capital (IC) disclosure of the firm. Researchers, looking at data from 100 UK listed companies, found a positive association between IC and the size of the AC as well as the frequency of its meetings. On the other hand, IC was negatively correlated with AC directors' shareholding. Finally, there was no correlation with AC independence and financial expertise of its members. On the contrary, Othman et al. (2014), who surveyed the impact of AC characteristics on ethics disclosure of the Kuala Lumpur Stock Exchange's 94 largest listed companies, concluded that only tenure and multiple directorships were related to the aforementioned issues, whereas there was no correlation with other parameters, such as independence, frequency of meetings or AC size. Finally, Madi et al. (2014) also studied the issue of corporate disclosure in relation to AC characteristics, using as a sample companies from the Malaysian Stock Exchange. The researchers concluded that independence and size of the committee, as well as multiple directorship of its members, are positively correlated with corporate disclosure. On the other hand, no relation was found regarding meeting frequency and financial expertise of the AC members.

Berkman and Zuta (2018) looked at AC size, the percentage of AC members with financial expertise and the percentage of independent members. Their sample consisted of companies listed on the Tel Aviv Stock Exchange where—unlike the Greek framework—it is not the AC that is responsible for financial statement audits, but a different committee. The authors found that the likelihood of a negative event increases as the size of the AC grows, due to the excessively large volume of the committee (which is necessary), which creates difficulties for its operation, as well as conflicts of interest. Also, this research argues that as the percentage of AC members with financial expertise increases, the occurrence of a negative event becomes less likely. Finally, there was no association between the percentage of independent AC members and change (increase or decrease) in negative events, which is attributed to the application of the terms "independence," because the authors believe—despite the supervisory authority's strict framework—that independent directors are independent only in form but not in substance.

Sun et al. (2014) studied the relationship between the independence and expertise of AC members, and the quality of the financial statements, using a sample of insurance companies. They focused on the possibility of manipulated financial statements (mainly in the form of inflated numbers regarding profitability or turnover), which aims at presenting the company as stronger and having better prospects. The authors found that when AC members also hold executive director positions in the company, there is a greater likelihood of manipulation of the financial statements, mainly through the occurrence of abnormalities: (a) cash flows; (b) discretionary expenses; and (c) production costs. The investigation concludes that the potential conflict of interest caused by the additional directorships of AC members affects the effectiveness of the committee. Moreover, the study argues that specialization in accounting, finance and insurance (the sector in which their sample operates) may improve the quality of the company's financial reports, while experience in overseeing similar financial statements and AC members' independence did not appear to be statistically correlated with improvement in the financial statements.

In an earlier study, conducted in Singapore and Malaysia, Bradbury et al. (2006) examined the characteristics of the board of directors and the AC in relation to accounting quality and the manipulation of financial statements that may occur, which aims at misinforming and deceiving investors. The study argued that the size of the board of directors and AC members' independence are associated with lower abnormal working capital accruals, especially when the company's income is increased. Also, the study's results indicate that the AC is effective only when all members are independent directors.

Talpur et al. (2018), using a sample of companies operating in Malaysia, studied three AC characteristics (size, independence and number of meetings), with regard to the voluntary disclosure of data that enhance the quality of CG. Their research has shown that the three features that were examined contribute to the improvement of CG and the disclosure of important information. With regard to the number of committee members, the Asian country's regulatory framework is the same as the Greek one, i.e., it requires companies to have at least three members on the AC. Similarly, the

Malaysian Code of CG and the Bursa Malaysia Securities Berhad Listing Requirements require companies to appoint non-executive directors to the AC, the majority of which need to be independent. The positive correlation found by Talpur et al. (2018) with regard to the impact of the independence of AC members on CG improvement agrees with the results obtained by Madi et al. (2014), while Othman et al. (2014) concluded that there is no correlation between them. Finally, regarding the number of annual AC meetings, Talpur et al. (2018) argued that there was a positive correlation with the degree of disclosure, coming to the same conclusion as Allegrini and Greco (2013), but again their results did not agree with those of Othman et al. (2014), who did not find any correlation.

A study conducted in the USA examined a sample of 87 companies that had been accused of having manipulated their accounting records by the Securities and Exchange Commission (SEC). Among the features examined were: (a) the percentage of independent board directors; (b) the number of meetings held by the AC; (c) the percentage of AC members who specialize in accounting; (d) the percentage regarding the assignment of external audits to the largest firms in the industry (the so-called "Big 4," i.e., Deloitte, Ernst & Young or EY, KPMG and PricewaterhouseCoopers or PwC); and (e) the possibility that the BoD chairman simultaneously holds the position of CEO. The author used previous research as a starting point, according to which the first four of the above features had a negative correlation with accounting manipulation, while the fifth one was positively associated with it. The survey showed that, one year prior to the discovery of fraud, companies accused of manipulating their financial statements were at a disadvantage compared to other firms in relation to the five aforementioned characteristics, whereas, three years after the exposure of the fraud, they were on a similar level with regard to the percentage of independent board directors, and improved in terms of AC meeting frequency. The study argues that while there is still a lack of investor confidence in the company, the stock price return is better than the average stock market return (Farber 2005).

Rahmat et al. (2009) studied the correlation between AC characteristics and the financial soundness of companies listed on the Bursa Malaysia/Kuala Lumpur Stock Exchange. Comparing data from 73 financially non-distressed firms with data from 73 financially distressed firms, they found a correlation between financially literate AC members and the company's financial performance. This, according to the authors, is because AC members who have a background in finance and accounting have higher expectations and aim at high audit results and better results in overseeing the company's financial operations and in auditing the accounts.

In the same paper (Rahmat et al. 2009), the other three parameters studied did not seem to be related to the company's financial well-being. The results showed that with respect to size, composition and frequency of AC meetings, firms prefer to maintain the minimum permitted level, which, according to the authors, is likely to mean that companies adapt to the requirements of the legislation in order to avoid penalties and not because they believe these restrictions are necessary for their operation. Regarding the size of the AC, Rahmat et al. (2009) point to an earlier study (cf. Dalton et al. 1999), which showed that the AC is ineffective when it consists of more or fewer individuals than is strictly necessary for its operation, as ACs with greater number of people find it difficult to focus on the most important auditing issues, while committees with a shortage of members lack sufficient expertise and human resources to cope with the demands of their work. Contrary to the above finding, Rahmat et al. (2009) did not identify any kind of correlation between the entity's financial situation and AC size. Similarly, the same survey did not identify any significant correlation in relation to AC composition, i.e., the ratio of executive to non-executive members. Of course, the authors were right to expect that AC independence and prestige would increase when the AC is comprised of many non-executive members, which means that an abundance of non-executive members could lead to a firm's stability. Finally, the annual number of meetings held by the AC, which, according to Malaysian law amounts to three meetings per year, was not found to be associated with the company's financial stability, contrary to earlier research findings (cf. McMullen and Raghunandan 1996).

Appuhami (2018) investigated the relationship between AC characteristics and the cost of equity capital. Using data from 196 firms that belong to the top 500 firms listed on the Australian Securities Exchange (ASX top 500)—and excluding companies in the financial sector, such as insurance companies, banking institutions and other trust funds—the study concludes that AC size, frequency of meetings and independence of AC members are significantly and negatively correlated with the cost of equity capital. On the other hand, no correlation was found between the latter and the financial qualifications of AC directors. This study bases its hypothesis on signaling theory, according to which the presence of an AC with specific characteristics is capable of serving as a "signal" of credibility in the process of monitoring the firm's financial performance as well as a "signal" of effective audits of financial statements.

The Australian Securities Exchange guidelines require listed companies to have an AC with at least three members—the same holds for the USA and the UK—but they do not specify a minimum number of annual meetings, which, when proposed, amounts to 3–4 per financial year. Also, the Australian guidelines state that most AC directors should be independent, whereas in the UK at least three members are required to be independent and the New

York Stock Exchange recommends that all members be independent. Correspondingly, Australia states that AC directors should have accounting and financial training, while in the USA and Britain it is stated that at least one member must have this expertise (Appuhami 2018).

Hassan et al. (2017) surveyed AC effectiveness in 48 non-financial companies listed on the Abu Dhabi Stock Exchange and the Dubai Financial Market. In order to measure the AC effectiveness, they examined four of its parameters: size, independence, financial expertise and diligence. They concluded that the size and degree of board independence are positively correlated with the effectiveness of the AC. On the other hand, CEO duality, i.e., when a single individual serves both as Chief (Executive) Officer and a board director, appeared to be negatively associated with it.

Sellami and Fendri (2017) also looked into AC characteristics in a study of 120 non-financial firms listed on the Johannesburg Stock Exchange in South Africa. The researchers found a positive correlation between company compliance with International Financial Reporting Standards for related party disclosures (CRPD) and independence of committee members. By contrast, AC size and frequency of meetings did not appear to have an effect on compliance. Finally, there was a significant (positive) correlation between the degree of compliance and industry expertise of committee members combined with accounting and financial expertise. However, while specialization in accounting alone has a positive relationship with CPRD, the same does not hold for industry expertise.

Finally, in the USA, spurred on by the Enron scandal (2001) and the MCI (or WorldCom) bankruptcy (2002), a federal law known as the Sarbanes–Oxley Act (SOX) was passed. Defond et al. (2005) investigated the reaction of investors to company announcements made during discussions on the limitations that would be included in the law, namely with regard to AC chairmen and the expertise they should possess. Upon examining 702 cases (in which there were cumulative abnormal returns within three days after the announcement of the newly appointed AC chairman), they found that markets react positively to the appointment of an AC chairman with both accounting and financial expertise (as was the original proposal for legislation). However, no reaction (positive or negative) was observed in cases where the chairman had financial but not accounting expertise (as eventually provided for by the law). In addition, authors found that investors reacted favorably mainly to companies that maintained a high level of CG before the appointment of a new AC chairman. Consequently, the authors concluded that financial and accounting expertise of the AC chairman is sufficient to improve the attitude of investors toward CG in the particular firm.

Hypothesis development

Prior empirical studies have identified a number of variables that can influence the effectiveness of AC. We review these studies (and the broaden ones), to identify factors that are likely to affect the characteristics of AC. Particularly, we examine structure-related variables (including firm size, ownership structure), accounting-related variables (including degree of internal risk and degree of external risk) and CG-related variables (including the percentage of independent board directors, the presence of a non-executive chairman in the BoD and the CEO duality). It is worth mentioning that for our categorization we rely on previous studies (as Nerantzidis and Tsamis 2017; Alsaeed 2006; Camfferman and Cooke 2002; Wallace et al. 1994; Lang and Lundholm 1993).

Structure-related variables

Firm size Firm size is represented by the firm's assets and the number of employees. According to literature, large firms are more likely to seek to establish a stronger AC due to the inability of shareholders to observe all the firm's operations extensively, which leads to the problem of information asymmetry (Chytis et al. 2020;Ismael and Roberts 2018; Goodwin-Stewart and Kent 2006; Carcello et al. 2005; Abdel-Khalik 1993). Regardless of the ownership structure in Greece, where are many family run businesses and, quite often, the management's performance is sufficiently audited, even when auditors are not the firm's executives, we expect that larger firms have more effective ACs. We therefore formulate our study's first hypothesis as follows:

H1 The firm's size is positively linked to AC effectiveness.

Ownership structure Ownership structure is captured by various variables such as the percentage held by natural persons, small entities and offshore companies, the percentage held by banking institutions etc. The literature indicates that the ownership structure is a potential important element of CG (see Denis and McConnell 2003, p. 2). Therefore, it is reasonable to presume that dispersed ownership should lead to a reduction in conflict of interests since shareholders with the right to vote increase and the major shareholder's share decreases. With regard to dispersed ownership in particular, and based on the data we have collected, we hypothesize that:

H2 Dispersed ownership is positively linked to AC effectiveness.

Accounting-related variables

Degree of internal risk Accounts receivable, inventories, cash and operating cash flows appear to be the most common field of fraud or mismanagement by company personnel. Consequently, many surveys identify a positive correlation between the magnitude of the above elements and the function of the internal audit, whether it is related to AC characteristics or to the cost of internal or external auditing (vide Ismael and Roberts 2018; Alhajri 2017; Sun et al. 2014; Goodwin-Stewart and Kent 2006; Knechel and Willekens 2006; Carcello et al. 2005; Ettredge et al. 1994). Based on the above, we expect that the indicators resulting from the aforementioned data will be positively correlated with AC effectiveness—especially with the percentage of independent AC members. In addition to the relevant indicators, we also intend to examine the association between AC characteristics and the aforementioned company characteristics as absolute figures, awaiting similar results. Consequently, we formulate the third hypothesis as follows:

H3 The degree of internal risk is positively associated with AC effectiveness.

Degree of external risk The degree of external risk is represented by different measures such as long-term liabilities, total liabilities, long-term liabilities/assets and total liabilities/assets. Prior empirical studies indicate that the size of the company's liabilities affects the cost, scope and effectiveness of internal audits (vide Ismael and Roberts 2018; Alhajri 2017; Houghton et al. 2009; Ettredge et al. 1994; Menon and Williams 1994). Therefore, we expect indicators that relate to long-term and total liabilities to be positively related to AC effectiveness. In light of the above, we formulate the fourth hypothesis as follows:

H4 The degree of external risk is positively linked to AC effectiveness.

CG-related variables CG variables are captured by different indicators such as the percentage of independent board directors, the presence of a non-executive chairman in the BoD and the CEO duality. We know that independent board directors use information obtained by the AC in order to reduce information asymmetries between them and other members (see Ettredge et al. 1994). However, studies do not agree on the relationship between the percentage of independent board directors and AC effectiveness (vide Hassan et al. 2017; Goodwin-Stewart and Kent 2006). In any case, though, it seems that particular importance is placed on CEO duality in the literature and it is argued that when the BoD chairman simultaneously serves as CEO, there is an increased likelihood of mismanagement and a reduced level of AC effectiveness (Hassan et al. 2017; Farber 2005). In the present study, we expect the percentage of independent board directors as well as the appointment of an independent BoD chairman—or at least a non-executive member—to be positively linked to AC effectiveness. Therefore, we hypothesize that:

H5 CG is positively linked to AC effectiveness.

Research methodology and design

Sample and data collection

The sample of this study includes listed companies on the Main Market of the Athens Stock Exchange. At the time we collected our data (October 2018–early November 2018), 136 companies were listed on the Main Market, although immediately after the collection of the data we were interested in, one company—Selected Textiled S.A., in particular—was placed under surveillance. We ended up removing ten companies from our sample, as we could not confirm a large portion of the data we needed for our research based on the information we had access to. Therefore, our sample consists of 126 companies.

Most of the data necessary for this study is available on the ASE website. Through the listed profile, we identified information regarding board members and chair, the largest shareholders, the number of employees, the stock market value and the branch owned by each company. For almost our entire sample, we used the same website to record the required data pertaining to the companies' financial statements (assets, accounts receivable, cash and cash equivalents, total liabilities, long-term liabilities, cash flows from operations); in order to acquire the information we wanted to look into and to calculate the indices used in our study (receivables and cash to total assets, receivables and inventories to total assets, total liabilities, long-term asset liabilities, operating cash flows to assets). Finally, the data regarding AC members (number of members, percentage of independent members and percentage of board directors) were collected from the companies' websites.

Effectiveness of the AC

In this paper, three AC characteristics are examined: size (in terms of number of members), independence (based on the percentage of independent members) and relationship with the BoD (based on the percentage of non-BoD members). For the purposes of the present study, we borrow the term *effectiveness* (of the AC) and interpret it as a product of the combination of the above three characteristics, although the (important) parameter of AC director's

expertise has not been taken into consideration in our research, for reasons mentioned below.

Number of AC members

As already mentioned, Greek law (Article 44, Law 4449/2017) stipulates that the AC cannot be comprised of fewer than three members. As a result, we expect the average of our sample to be very close to the above number, not only because it can be considered sufficient for the AC to function efficiently, but also because firms tend to adjust to the requirements set by the legislation and do not tend to voluntarily adopt stricter rules (Rahmat et al. 2009). However, we can argue that the positive correlation between AC size and the quality of CG (vide Ismael and Roberts 2018; Talpur et al. 2018; Alhajri 2017; Inaam and Khamoussi 2016; Madi et al. 2014) must be recorded—albeit marginally—in some of the parameters we consider, such as property dispersion, internal risk level and the level of liabilities. Obviously, we do not expect to find a statistical relationship regarding most of the dependent variables (compare Sellami and Fendri 2017; Othman et al. 2014), nor do we expect a negative correlation (compare Berkman and Zuta 2018), mainly due to the dominance of the number "3" in terms of the number of AC members, as already mentioned.

Percentage of independent AC members

The particular importance attached to the presence of independent AC members (vide Wolnizer 1995) is based on the belief that independent members, or even non-executive members, can increase the AC's prestige (Rahmat et al. 2009). Moreover, the international literature highlights the positive relationship between the percentage of independent members and many parameters related to the quality of CG, such as accounting disclosure, the effectiveness of the AC, maintenance of the firm's financial stability (vide Appuhami 2018; Ismael and Roberts 2018; Talpur et al. 2018; Hassan et al. 2017; Sellami and Fendri 2017; Bradbury et al. 2006), although in some cases the authors did not find a statistical relationship, either positive or negative (vide Berkman and Zuta 2018; Othman et al. 2014; Sun et al. 2012). Therefore, taking into account the risk mentioned above regarding the formal—but not substantial—independence of AC members (vide Berkman and Zuta 2018), we expect a positive correlation between the percentage of independent AC directors and—as in the case of AC size—the independent variables related to dispersed ownership.

Percentage of AC members who are also members of the Board of Directors

Expanding the rationale regarding the independence of AC members, we expect larger companies that have a higher proportion of liabilities and a widely dispersed ownership, to be more likely to select individuals outside the company's board of directors as AC members. Although we believe that the positive and negative correlations we will observe will not differ from those we may find upon examining independence, we chose to add this parameter to confirm this position.

AC characteristics that are not used as variables in the present study

Three other AC characteristics, independence of chairman, number of annual meetings and expertise of its members, are not addressed in this study. As far as the committee chairman is concerned, the relevant legislation (Article 44, Law 4449/2017) stipulates that in public interest companies, such as listed companies, the AC chairman should be independent. Additionally, with regard to the other two characteristics, it was not possible to obtain sufficient and confirmed information. Often, the firms' annual reports included a minimum number of AC meetings, but not the actual number of meetings eventually held. Accordingly, no data were obtained pertaining to the professional expertise of AC members, so there is no way of knowing exactly how many of them possess accounting and financial expertise.

Research model

In the present study, as already mentioned, we use the term *AC effectiveness* as a dependent variable, including the size of the committee, its independence, as well as the percentage of its members coming from the Board of Directors. Therefore, the research model is formed as follows:

$$\begin{aligned}\text{ACEFF} = {} & b_0 + b_1\text{SIZE} + b_2\text{VALUE} + b_3\text{STUFF} + b_4\text{SECTOR} \\ & + b_5\text{REC} + b_6\text{INV} + b_7\text{CASH} \\ & + b_8\text{RECINV} + b_9\text{REVCASH} + b_{10}\text{OCF} + b_{11}\text{OCFTAS} \\ & + b_{12}\text{DEBTS} + b_{13}\text{LONGD} + b_{14}\text{DEBTSTAS} + b_{15}\text{LONGDTAS} + b_{16}\text{SHSMALL} \\ & + b_{17}\text{SHINST} + b_{18}\text{SHHOLD} + b_{19}\text{SHCOM} + b_{20}\text{SHFIRST} + b_{21}\text{SHFIRSM} \\ & + b_{22}\text{SHDIR} + b_{23}\text{SHFIVE} + b_{24}\text{INDDIR} + b_{25}\text{CHAIRNON} + b_{26}\text{CHAIRCEO} + e\end{aligned}$$

where

Variable name	Description
ACEFF	AC effectiveness, which includes three dependent variables: AC Size (ACSIZE) Percentage of independent AC members (ACIND) Percentage of AC members participating in the Board of Directors. (ACBOARD)
SIZE	Firm's assets in EUR millions
VALUE	Firm's stock market value in EUR millions
STUFF	Number of employees in the business group
SECTOR	Sector in which the firm operated, where: 1 = Real estate 2 = Insurance 3 = Industrial products and services 4 = Trade 5 = Construction and construction materials 6 = Media 7 = Oil and gas 8 = Personal and household goods 9 = Raw materials 10 = Travel and Leisure 11 = Technology 12 = Telecommunications 13 = Banks 14 = Food and beverages 15 = Health 16 = Services of general interest 17 = Chemicals 18 = Financial services
REC	Accounts receivable in EUR millions
INV	Inventories in EUR millions
CASH	Cash and cash equivalents in EUR million
RECINV	Receivables and inventories to total assets ratio
REVCASH	Receivables and cash to total assets ratio

Variable name	Description
OCF	Operating cash flows in EUR millions
OCFTAS	Proportion of operating cash flows to total assets
DEBTS	Total liabilities in EUR million
LONGD	Long-term liabilities in EUR millions
DEBTSTAS	Proportion of total liabilities to total assets
LONGDTAS	Proportion of long-term liabilities to total assets
SHSMALL	Percentage of shares held by natural persons, small entities and offshore companies
SHINST	Percentage of shares held by financial institutions and investment companies as well as public shares
SHHOLD	Percentage of shares held by holding companies
SHCOM	Percentage of shares held by other partnerships
SHFIRST	Percentage of shares held by the major shareholder
SHFIRSM	The largest share of shares held by a natural person
SHDIR	Percentage of shares held by board directors
SHFIVE	Number of shareholders equal to or greater than 5%
INDDIR	Percentage of independent board directors
CHAIRNON	"0" if board chairman is a non-executive member "1" if board chairman is an executive member or simultaneously serves as CEO
CHAIRCEO	"0" if board chairman is a non-executive member or an executive member "1" if board chairman simultaneously serves as CEO

Table 1 Distribution of companies across ASE sectors classification

Sector	*N*	*f%*
Industrial products and services	18	14.29
Personal and household goods	16	12.70
Food and beverages	14	11.11
Construction and construction materials	11	8.73
Technology	11	8.73
Real Estate	9	7.14
Raw materials	6	4.76
Travel and recreation	6	4.76
Services of general interest	6	4.76
Chemicals	6	4.76
Banks	5	3.97
Trade	4	3.17
Financial services	4	3.17
Oil and gas	3	2.38
Health	3	2.38
Media	2	1.59
Insurance	1	0.79
Telecommunications	1	0.79

N Total number of companies

f% relative frequency

Table 2 Number of shareholders whose percentage is greater than or equal to 5%

Number of company's shareholders whose percentage is equal to or more than 5%	*N*	*f%*
1–2	61	48.41
3–4	48	38.10
5 or above	17	13.49

N frequency

f% relative frequency

Table 3 Number of business group employees and number of firms

Number of employees	Number of firms
0–99	22
100–199	23
200–299	15
300–499	13
500–999	11
1000–1999	12
2000–4999	13
5000+	13

Table 4 AC size

AC Size	*N*	*f%*
3 members	115	91.27
4 members	7	5.56
5 members	4	3.17

N frequency

f% relative frequency

Table 5 Percentage of independent AC members

Percentage of independent AC members	*N*	*f%*
(0, 0.25]	1	0.79
(0.25, 0.50]	2	1.59
(0.50, 0.75]	83	65.87
(0.75, 1.00]	40	31.75

N frequency

f% relative frequency

Results

Descriptive statistics

General information about the companies

Business sector Our sample consists of 126 companies that are members of the Main Market of the Athens Stock Exchange and for which we have managed to confirm the available information regarding AC characteristics. The "Industrial Products and Services" sector includes most firms (14.29%, $N=18$), followed by "Personal and Household Goods" (12.70%, $N=16$) and "Beverages" (11.11%, $N=14$). Next up are the sectors of "Construction and Construction Materials" (8.73%, $N=11$), "Technology" (8.73%, $N=11$) and "Real estate," $N=9$). Four sectors with six companies each ("Raw materials," "Travel and Leisure," "Services of General Interest" and "Chemicals" with 4.76% and $N=6$) are listed, succeeded by "Banks" 97%, $N=5$), "Trade" (3.17%, $N=4$) and "Financial services" (3.17%, $N=4$). Finally, we see that firms operating in "Health" (2.38%, $N=3$), "Oil and gas" (2.38%, $N=3$), "Media" (1.59% = 2), "Insurance" (0.79%, $N=1$) and "Telecommunications" (0.79%, $N=1$) sectors are not as common in the Main Market (Table 1).

Dispersed ownership Almost half of our sample companies (48.41%) are controlled by 1 or 2 shareholders, whether natural persons or other companies. As can be seen in Table 2, companies controlled by five, six or seven shareholders are the smallest (13.47%). The distribution of dispersed ownership is also presented in a graph in order to highlight the fact

Table 6 Percentage of AC members participating in the BoD

Percentage of AC members participating in the BoD	*N*	*f%*
(0.25, 0.50]	4	3.17
(0.50, 0.75]	32	25.40
(0.75, 1.00]	90	71.43

N frequency

f% relative frequency

Table 7 Percentage of shares by shareholder category

Category	AVG	SD
Major shareholder	50.73	22.42
Natural persons, small entities and offshore companies	39.93	32.19
BoD members	29.06	29.38
Main natural person	24.11	22.58
Partnerships	9.58	21.41
Financial institutions, investment companies and the state	9.07	19.58
Holding companies	7.85	21.13

AVG average, *SD* standard deviation

that even listed companies are controlled by a very small number of individuals.

Number of staff Looking at the available data on our sample, we observe that—with regard to the number of employees—almost half of the firms (60 out of 122) employ up to 299 people. In Table 3, we attempted to achieve approximately equal distribution between the numbers of firms, in order to highlight the growing range of the number of staff.

AC

Number of members Table 4 shows AC size. We find that in most companies (91.27%, $N=115$) there are 3 members on the committee, a figure equivalent to the minimum threshold set by the legislation. In addition, in 5.56% ($N=7$) and 3.17% ($N=4$) of our sample companies there are 4 and 5 AC members respectively.

Percentage of independent members As can be seen in Table 5, in more than half of our sample firms (65.87%, $N=83$), the percentage of independent AC members ranges from 0.50 to 0.75, i.e., between 50% and 75%. In 31.75% of the cases ($N=40$), the percentage is between 0.75 and 1.00, whereas, in 1.59% ($N=2$) of the companies, AC independence ranges between 0.25 and 0.50. Finally, the percentage is from 0 to 0.25 for 0.79% ($N=1$) of the firms.

Table 8 Percentage of independent board directors

Percentage of independent board directors	*N*	*f%*
(0, 0.25]	31	24.60
(0.25, 0.50]	87	69.05
(0.50, 0.75]	7	5.56
(0.75, 1.00]	1	0.79

N frequency

f% relative frequency

Table 9 Board of directors chairman post

BoD chairman post	*N*	*f%*
Non-executive director	30	24.79
Chief executive officer (CEO)	46	38.02
Executive director	45	37.19

N frequency

f% relative frequency

AC members participating in the Board of Directors As we can see in Table 6, in 71.43% ($N=90$) of the cases, the AC is made up of persons participating in the company's BoD, at a percentage between 0.75 and 1.00. Accordingly, in 25.40% ($N=32$) of the cases, this percentage is between 0.50 and 0.75, while in 3.17% ($N=4$) of the firms, this corresponds to 0.25 to 0.50.

Share structure

As depicted in Table 7, the major shareholder of the companies listed on the ASE Main Market holds an average of 50.73%, which suggests that listed companies are controlled to a significant extent by one owner, be it a natural person, another company or the state. If we focus on natural persons (including small entities and offshore companies for which we do not have sufficient information when it comes to ownership), the main natural person owns (on average) a 24.11%.

Additionally, in our sample as a whole, individuals hold an average of 39.93%, banks and government hold a 9.07%, holding companies hold a 7.85%, and other companies hold a 9.58%. Finally, board directors appear to control on average a 29.06%. Standard deviations vary in range [19.58, 32.19].

Board of directors

Independent board directors Table 8 presents the percentage of independent board directors. For 69.05% ($N=87$) of the cases we studied, the degree of independence was between 0.25 and 0.50. In 24.60% ($N=31$) of the compa-

Table 10 Firms' financial figures

Category	AVG	SD
Assets (EUR million)	2887.23	11135.11
Total liabilities (EUR million)	2197.21	9483.32
Market value (EUR million)	404.83	1660.29
Cash and cash equivalents (EUR million)	159.84	529.73
Long-term liabilities (EUR million)	145.95	424.90
Receivables from customers (EUR million)	103.17	271.18
Inventories (EUR million)	88.71	317.57
Operating cash flow (EUR million)	−81.64	903.30

AVG average, *SD* standard deviation

nies, it was between 0 and 0.25, in 5.56% ($N=7$) of them it was between 0.50 and 0.75, and in 0.79% ($N=1$) of the firms the percentage of independent board directors was between 0.70 and 1.00.

Board of directors chair Considering that, in our sample (see, Table 9), we did not find an independent member who serves as BoD chairman, our interest shifted toward cases where the BoD chairman is either the firms' CEO at the same time (38.02%, $N=46$), an executive director (37.19%, $N=45$), or a non-executive director of the company (24.79%, $N=30$).

The company's figures

Accounting figures In our study's sample, as depicted in Table 10, we used financial figures from the companies' financial statements. The figures below are averages and refer to EUR millions. Assets are 2887.23, total liabilities are at 2197.21 and long-term liabilities are at 145.95, cash and cash equivalents are 159.84, customer receivables are 103.17, and inventories amount to 88.71. Finally, the quoted market value of the listed companies is on average at 404.83 and the operating cash flow is −81.64. Standard deviations range from 271.18 to 11135.11.

Table 11 Financial indicators

Category	AVG	SD
Percentage of total liabilities to total assets	0.54	0.25
Percentage of receivables and inventories to total assets	0.28	0.23
Percentage of receivables and cash to total assets	0.26	0.16
Percentage of long-term liabilities to total assets	0.15	0.16
Percentage of operating cash flows to total assets	0.03	0.07

AVG average, *SD* standard deviation

Table 12 Pearson correlation between dependent and independent variables

Independent variables	ACSIZE	ACIND	ACBOARD
SIZE	**0.799****	−0.062	0.128
VALUE	0.059	0.112	0.076
STUFF	**0.377****	0.066	0.144
SECTOR	0.129	0.044	0.169
REC	0.017	0.089	0.041
INV	−0.055	0.129	0.099
CASH	**0.381****	−0.069	0.101
RECINV	−0.150	**0.184***	−0.041
REVCASH	−0.154	0.039	−0.009
OCF	**−0.547****	0.028	−0.076
OCFTAS	**−0.199***	0.129	−0.048
DEBTS	**0.821****	−0.063	0.118
LONGD	0.060	0.104	0.009
DEBTSTAS	**0.264****	0.000	0.037
LONGDTAS	−0.082	−0.03	0.156
SHSMALL	−0.119	0.169	**−0.217***
SHINST	0.082	−0.123	0.17
SHHOLD	−0.017	−0.149	0.142
SHCOM	−0.130	−0.039	−0.007
SHFIRST	**−0.176***	−0.017	−0.031
SHFIRSM	−0.115	**0.185***	**−0.232****
SHDIR	−0.085	**0.185***	−0.131
SHFIVE	−0.019	−0.071	−0.02
INDDIR	0.101	**0.275****	0.012
CHAIRNON	**−0.333****	0.166	−0.078
CHAIRCEO	−0.069	**0.230***	−0.143

**Correlations significant at 0.01 level

*Correlations significant at 0.05 level

Financial indicators Finally, with respect to the financial ratios under scrutiny, as reported in Table 11, total assets liabilities are on average 0.54 (or 54%), the sum of receivables and inventories to assets is 0.28 (28%), the sum of receivables and of cash and cash equivalents is 0.26 (26%), long-term liabilities to assets amount to 0.15 (15%), and operating cash flows to assets are at 0.03 (3%). Standard deviations range from [0.07 to 0.25] for the indicators we examined.

Correlation analysis

Table 12 presents the correlation analysis between AC effectiveness and the independent variables. These results show that larger firms are more likely to have more effective ACs. On the same direction, the degree of internal and the degree of external risk are also important factors, since the former affects positively their effectiveness while the latter negatively. Moreover, ownership structure affects the

Table 13 Regression model results

Independent variables	(1) ACSIZE	(2) ACIND	(3) ACBOARD
STUFF	0.274**		
CASH	0.054		
OCF	−0.366**		
OCFTAS	−0.048		
DEBTSTAS	0.088		
SHFIRST	−0.008		
CHAIRNON	−0.187*		
CHAIRCEO		0.159	
RECINV		0.114	
SHDIR		0.091	
INDDIR		0.283**	
SHFIRSM		0.02	−0.167
SHSMALL			−0.079
F	13.023**	4.494**	3.647*
Adj R^2	0.42	0.13	0.04
Mean VIF	1.321	1.550	3.199
Max VIF	1.558	2.27	3.199
N	126	126	126

**Correlations significant at 0.01 level

*Correlations significant at 0.05 level

characteristics of ACs since as higher the percentage of share of natural persons, small entities and offshore companies and the percentage of share of major shareholders, the lower its effectiveness. Finally, CG-related variables, such as the percentage of independent directors and the CEO duality, show a positive relationship with the effectiveness of ACs.

After having identified (using the Pearson correlation coefficient) the independent variables that are linearly related to each dependent variable, we checked whether the independent variables are nonlinearly correlated to each other, so that our model is considered satisfactory and in order to avoid the multicollinearity phenomenon. We checked this using the VIF and Tolerance coefficients and concluded that the independent variable is considered suitable for inclusion in the model if VIF < 10 and Tolerance > 0.1. The examination of the VIF and Tolerance coefficients suggests that we need to exclude two variables, because: (i) SIZE (*Tolerance = 0.003 < 0.1 & VIF = 350,293 > 10*) and (ii) DEBTS (*Tolerance = 0.003 < 0.1 & VIF = 293,104 > 10*). We therefore determine the optimal linear model as presented on the next section.

Regression results

This section refers to the findings of the multivariate analysis concerning the influence of the structure, accounting and CG-related measures on the effectiveness of AC (H1–H5).

Starting from Eq. 1, it is shown in Table 13 that STUFF variable (0.274, at the 1% level) has a strong positive effect on AC's size, while OCF variable (−0.366, at the 1% level) a strong negative one. This means that the larger the company the larger the AC's size, a fact that confirms our first hypothesis (H1) based on the assumption that these companies have additional CG constrains. Moreover, the size of AC depends on the degree of internal risk, meaning that the lower it is the higher its size. This is contradictory to our hypothesis (H3) and probably could be explained by the different legal environment in Greece, where government law requires firms to establish an AC. Consequently, as Baxter and Cotter (2009) mention, when the formation of AC is voluntary, it is more likely that it has impact on the improvement of earnings quality, since firms have other incentives to ensure that their AC operates effectively, which also drives the decision to voluntarily form this committee. On the same direction, a strong negative relationship is observed between the existence of a non-executive board chairman and the size of AC, which confirms our hypothesis (H5) and reinforces the position of Hassan et al. (2017) that the size increases (albeit at a marginal level) when the likelihood of the BoD chairman being a non-executive director increases.

Turning to Eq. 2, we find consistent evidence that BoD independence also plays important role in AC effectiveness in Greek listed companies, since as we observe INDDIR variable (0.283, at the 1% level) reports a strong positive relationship with the percentage of independent AC members. This conclusion is in line with our hypothesis (H5) and the findings of Hassan et al. (2017) and could be explained by the fact that in the majority of the firms (89% on average for the whole of our sample) AC members come from the firm's BoD, meaning that the more the independent board directors, the greater the chances that independent AC members will increase.

Conclusions

The belief that strengthening the ACs' structure may enhance the effectiveness as well as the quality of financial information has spawned an ongoing and fruitful CG challenge. In this paper, we explore the relationship between AC characteristics (number of AC members, percentage of independent AC members and percentage of board directors) and structure, accounting and CG-related measures. In a sample of 126 listed companies on the Athens Stock Exchange, we show that AC size has a positive relationship with the number of the firm's employees and negative relationship with operating cash flows and the presence of an executive chairman. Moreover, we find that AC effectiveness

has a positive relationship with the percentage of independent directors. These empirical findings have substantial implications for academics, investors, regulators and policymakers. For instance, our findings suggest that a laissez-faire approach is more preferable than a regulatory or legislative approach (Labelle et al. 2015). This means that each company should—on their own—determine their committee's characteristics by interpreting their dynamic environment (Ghafran and O'Sullivan 2017; Daft and Weick 1984). Such an approach to remain free to make decisions may help them to add value to shareholders.

There are many ways to expand our work. First, qualitative research can employ interviews with members of AC to better assess the efficiency and effectiveness of their decisions. Moreover, the factors that affect its characteristics can be investigated in similar CG environments. Namely, extending the analysis to a broader economy, we can assess whether the characteristics are affected either by the micro-environment or the macro-environment. Furthermore, future research could explore the AC's characteristics on non-listed companies. This interesting extension could help to further understand the factors that affect the ACs' characteristics, especially in less regulated environments.

Compliance with ethical standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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