Corporate governance and internal audit function quality in listed companies at the Athens Stock Exchange

Christina Vadasi, Michalis Bekiaris, Andreas Andrikopoulos
University of the Aegean

ABSTRACT

Internal audit is fundamental in maintaining information transparency in the dissemination of information about a company's financial position and performance. In this respect, the quality of internal audit is essential for effective corporate governance (CG) mechanisms. We construct a composite measure of the quality of the internal audit function (IAF) and explore its association with "good" CG. Employing data from 45 listed companies in the Athens Stock Exchange, we discovered that "good" CG affects IAF quality, since IAF is improved for companies that comply with certain CG guidelines. On the other hand, we found limited evidence on the effect of IAF quality on effective corporate governance. We also discovered that IA's active role in CG is shaped by company-wide (and therefore external to IAF) characteristics such as size, internationalization and CEO duality.

Keywords: internal audit function, corporate governance, Athens Stock Exchange.

1. Introduction

Major accounting scandals in early 2000’s spawned increased requirements on accountability and transparency. They also triggered increased interest in accounting information and corporate governance (CG). These scandals, combined with major changes in the shareholder structure of listed companies, lead to a richer set of guidelines and regulations on CG. According to CG guidelines, internal audit (IA) is an essential mechanism of control, along with external audit. The increased interest in IA transformed its role, which expanded beyond the traditional framework of compliance audits and was characterized as a fundamental function for CG effectiveness (Gramling et al., 2004; Sarens, 2007; IOD, 2016). However, fifteen years later, the question remains: has IA successfully played its new role? Despite being accepted as an important element of CG, IA and its effectiveness remain a rather unexplored area (Mihret & Grant, 2017; Lenz et al., 2018). In this context, we investigate IA effectiveness, its determinants and its relationship with CG.

Previous studies have focused either on IA quality (Arrena & Azzone, 2009; Regoliosi & d’Eri, 2014) or the factors that shape its effectiveness (Sarens et al., 2012; Alzeban & Gwilliam, 2014). Our contribution to the study of IA and its relationship with CG involves the investigation of two effects, helping us discuss the role of IA within CG. We assessed two aspects of the IA-CG relationship in a unified framework, jointly examining the impact of effective CG on the quality of the internal audit function (IAF) and the effect of IAF quality on the active role of IA in CG. A large part of the literature has investigated the connection between IAF and external audit (Edge & Farley, 1991; Felix et al., 2001; Al-Twajiry et al., 2004; Desai et al., 2010; Mat Zain et al., 2015) and financial statements (Mat Zain et al., 2006; Prawitt et al., 2009; Lin et al., 2011; Johl et al., 2013; Pizzini et al., 2015). In this study, we employed an integrated approach, assessing the connection between IAF and CG in total. We constructed an index for measuring IAF quality as well as a composite measure for the effect of IA in CG effectiveness, avoiding questions of perception that can be highly subjective. We produced arguments about the importance of factors that have been identified in the literature and employed regression models to analyze data that we collected from 45 Chief Audit Executives (CAEs) in listed companies at the Athens Stock Exchange (ASE).

Our findings demonstrate a strong relationship between good CG and IAF quality, but a weak relationship between IAF quality and CG effectiveness. Specifically, the empirical results suggest a strong effect of CG
compliance on IA but a weak effect of IAF quality on the active role of IA on CG. On the contrary, we found that the role of IA in CG is affected by business characteristics like size, internationalization and CEO duality. This evidence shows that, while IA is affected by the implementation of CG guidelines in a company, IA itself cannot affect CG quality and especially the role of IA in CG (even though IA is one of the four key players in CG). On the contrary, there are factors, external to IAF, that shape the effect of IA on CG, indicating that the impact of IA is not strong and that its audit program is partly determined by the management.

2. The case of Greece

Our analysis is based on many international studies that addressed questions of IA quality and effectiveness (Al-Tawaijry et al., 2004; Goodwin-Steward & Kent 2006; Mihr & Yismaw 2007; Arena & Azzone 2009; Soh & Martinov-Bennie 2011; Johl et al., 2013 Alzeban & Gwilliam, 2014; Regoliosi & d’Eri, 2014; Corbella et al., 2015; Mat Zain et al., 2015). We performed a country-specific analysis, since there are substantial differences across countries which account for differences in the effective implementation of IA and CG (Paape et al., 2003; Regoliosi & d’Eri, 2014). Moreover, a country-specific analysis can help us account for the fact that internal auditors may interpret professional standards differently, which may lead to cross-national inconsistencies (Mat Zain et al., 2015). Our paper is a response to previous studies that have highlighted the need to explore IA variations across countries as articulations of diverse institutional frameworks (Sarens & Abdolmohammadi, 2011).

Prior research on IA and CG in Greece is limited. The effective implementation of CG in Greece has been doubted (Spanos 2005). CG quality is rather low with respect to international best practices (Lazarides & Drimpetas, 2011), as Greek companies exhibit increased compliance with mandatory CG guidelines (legal regulations) but limited compliance to optional guidelines such as CG codes and standards (Florou & Falarniotis, 2007). This, in part, can be attributed to inconsistencies and vagueness in the set of principles and laws, which produce difficulties for companies that try to implement CG principles (Lazarides, 2010). Furthermore, in family-controlled companies, which constitute the biggest part of entrepreneurship in Greece, CG is not effective (Spanos et al., 2008), probably because the principal drivers of CG quality in Greece are the company size, leadership, power concentration and the characteristics of the Board of Directors (BoD) (Lazarides & Drimpetas, 2011). Ownership structure in Greece differs from Anglo-Saxon countries, since it is not affected by CG mechanisms, the law and an external market for corporate control, but by a company’s historical trajectory, its organizational structure and the power-control balance within the company (Lazarides et al., 2009). This probably accounts for recent empirical evidence on the Athens Stock Exchange, which showed that companies with more independent BoD members exhibit decreased firm performance, whereas BoDs more often advise than monitor a company’s management (Zhou et al., 2018). With respect to IA in Greek companies, prior research has been rather limited and inconclusive. The implementation of IA principles and international standards is a useful instrument for improving corporate competitiveness, which can help Greece in its track out of the recessionary spiral of the last decade (Kontogeorgis & Filos, 2012). In such macroeconomic and entrepreneurial environment, corporate downsizing is frequent and highlights the importance of an effective IA system (Koutoupi & Kakkos, 2011), effectiveness being shaped by objectivity, the competence of internal auditors and management support for IA (Drogalas et al., 2015). As the Greek economy exhibits signs of recovery, the most important role for IA is to identify and assess essential sources of risk for Greek companies, while its contribution to the architecture of CG is also fundamental.

In brief, the case of Greece exhibits many interesting characteristics:

1. The global economic crisis of 2008, combined with the subsequent sovereign debt crisis in Greece and the Eurozone, shaped the necessary conditions for the investigation of good CG and the implementation of IA in Greek companies¹;

---

¹ The Greek crisis, even though it has primarily fiscal, is directly associated with CG, since it is aggravated by the failures of a CG system. The need for good CG is intensified in times of crisis, since CG contributes to a business environment of trust, accountability and transparency, which are prerequisites for long-term investments, financial stability and,
2. Even though Greece is in the EU and there have been regulatory adjustments to international practices and standards in accounting and auditing\(^2\), the outlook on IA seems stable\(^3\), as business practices in CG and IA do not catch up with global changes in corporate governance.

3. Recent studies have explored CG and IA in developing economies, highlighting the characteristics of IA and CG in diverse institutional settings and growth dynamics (Al-Twajiry et al., 2004; Mihret & Yismaw 2007; Alzeban & Gwilliam, 2014; Mat Zain et al., 2015). While Greece is considered a developed country (IMF\(^4\) & CIA\(^5\)), its socioeconomic environment exhibits many structural elements that are prevalent in developing economies, such as the level of unemployment, the dynamics of the Gross Domestic Product, government debt etc. Characteristically, in 2013, MSCI downgraded Greece market from developed to a developing country status, based on the size, the liquidity and the institutional environment of the capital market\(^6\).

4. Greek companies use an internal system of CG (European system) where, in contrast to the external system (Anglo-Saxon system) that is implemented in the UK and USA (Weimer & Pape, 1999), CG guidelines are largely optional. Therefore, it is interesting to explore CG in Greece and especially the degree in which Greek companies have understood the advantages of CG and have proceeded to its implementation, regardless of the mandatory character of the guidelines.

5. Greek companies use a one-tier CG system, where executive and non-executive directors are members of the same board (BoD), in contrast to the two-tier system, where management executives participate in the Management Board and non-executive “supervisors” participate in the Supervisory Board (Paape, 2007). These structural differences highlight the fact that, in the one-tier system, financial information and internal audit must cope with greater agency problems, since the management executives who run a company’s daily operations are also involved in shaping the company’s strategy through their participation in the Board of Directors.

6. Most Greek companies remain family-controlled, with a single shareholder holding most of the shares, thereby increasing his influence in matters of company strategy and control systems. Moreover, the major shareholder is also often the CEO, thereby having the opportunity to take advantage of inside information and make profits at the expense of minority shareholders (Regoliosi & d’Eri 2014). This framework makes the Greek case even more interesting, since agency theory is relevant not only in the context of the principal-agent problem but also in the context of principal-principal conflicts (HCGC, 2013).

7. Greek companies are indebted, exhibiting high levels of financial leverage in a bank-centric system of corporate financing. This is in sharp contrast to the USA where more corporations seek financing in stock markets (Sarens & Abdolmohammadi, 2011). Therefore, agency theory can be applied in CG not only to shed light on agency costs of equity but also on agency costs of debt.

8. Finally, there is no prior research that assess the quality of IAF in Greece and its relationship with CG.

3. Prior research and conceptual framework

ultimately, economic development. Therefore, there is policy, academic and corporate interest in investigating CG effectiveness in Greece, where it is imperative to implement good CG.

\(^2\) Such regulatory initiatives include the adoption of IFRS in 2006, CG law in 2002, the Greek code of Corporate Governance and multiple auditing standards.

\(^3\) Greece’s EU membership does not seem to have increased its attractiveness for foreign direct investments (Georgopoulos & Gert Preusse, 2006). Moreover, Chavelas and Tzovas (2002) explored the effect of mandatory CG guidelines -in the context of Greek law- on the quality of the Greek companies’ financial statements; they found that while they brought about a decrease in the weighted average cost of capital and increased company financing, they did not bear an effect on company performance and earnings manipulation.

\(^4\) International Monetary Fund (https://www.imf.org/external/index.htm).

\(^5\) Central Intelligence Agency (https://www.cia.gov/index.html).

\(^6\) Morgan Stanley Capital International (https://www.msci.com/).
Major corporate scandals have highlighted the need to strengthen the regulatory framework to regain investor confidence. As a result, many guidelines, codes and regulations were issued worldwide, evolving around the 2002 Sarbanes-Oxley Act (SOX) in the USA, which established a broad range of measures that set the ground for effective CG. One of the principal consequences of corporate scandals was the increase in the requirements for the internal safety of CG processes, risk management and internal control (Sarens, 2009; Soh & Martinov-Bennie, 2011). In the years that followed, IAF received increased attention as a decisive determinant of CG effectiveness and the quality of financial reporting (Leung et al., 2004; Sarens & De Beedle, 2006; Prawitt et al., 2009, Soh & Martinov-Bennie, 2011). A few years after the scandals, Allegrini et al. (2006), Cooper et al. (2006) and Hass et al. (2006) conducted extensive literature reviews on IA research in Europe, Asia, Australia and USA. One conclusion in common was that IA had become a permanent part of CG, particularly after the increased attention that was given to good corporate governance and various CG guidelines. While SOX does not directly refer to IAF, it has reinforced the role of IA as an element of CG, since it set increased audit responsibilities for Audit Committees and accountability requirements for BoD and management (Christopher et al., 2009; Prawitt et al., 2009). In fact, SOX substantially affected the role and nature of IA in listed companies in the USA, resulting to an IAF that ranges from an advisory role in designing a project to supervising, constant monitoring and assessing project outcomes (IIA, 2004; Pitt, 2014).

Gramling et al. (2004) have highlighted the importance of IA in improving CG quality and Sarens (2009) produced a response to the question “When can we talk about an effective IAF?”, answering “When IAF quality has a positive impact on the quality of corporate governance”. Quality in governance is achieved when the company focuses on all CG players, placing however heavier emphasis on IAF, as IAF is essential in monitoring and shaping the quality of CG (Yassin et al., 2011). The contribution of IA to CG is mostly about reducing agency costs. Many papers in accounting and auditing have documented that management can appropriate resources at the expense of other stakeholders (e.g. Sarens & Abdolmohammadi 2011). From the point of view of agency theory, the importance of strong CG structures relies on the need to align the interests of management with those of the other stakeholders, thereby reducing agency costs. Since complete alignment is not possible, various mechanisms are employed to monitor management (Cohen et al., 2002). Such mechanisms involve independent BoD members and chairman, an effective Audit Committee, external audit and IA. In the literature these structures are called CG key players or CG cornerstones (Gramling et al., 2004; Goodwin-Steward & Kent, 2006, Prawitt et al., 2009). However, among these structures, only management and IA are involved in the day-to-day operations within the company. Therefore, since management sometimes imposes agency costs on other stakeholders, IA is the fundamental function that is responsible for monitoring management (Prawitt et al., 2009). This highlights the special role of IA in CG and stresses the importance of an effective IAF. These arguments have shaped the evolution of IA so that IA can respond to new requirements and its expanded role within CG.

IA academics and professionals have suggested that IA must undergo major changes to add value to the company. Sarens et al. (2011, p.59) argued that “We wait for a critical evaluation of whether traditional IA activities are still able to meet the current needs of organizations”. In response to its new role, IA has evolved from being a function of assurance services to a function of adding value to the company. According to the definition of IA by the Institute of Internal Auditors (IIA) twenty years ago “Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization’s operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes” (IIA, 2015b, p.6). This definition was designed to account for the expanded role of IA that has undergone major changes, extending beyond monitoring, to risk management and CG (Goodwin-Stewart & Kent, 2006).

According to IA standard 2100, which refers to the nature of IA work, CG and risk management are two of the three fundamental pillars of IAF, along with control processes (IIA, 2013). IIA, in a position paper in 2006, has provided clear guidelines for the integration of IA in CG (IIA, 2006). In the context of Internal Audit Quality Assessment of HM Treasury in the UK, the contribution of IA to CG and risk management is one of the seven pillars that are used in the assessment of IA outcomes (HM Treasury, 2013). In the King IV Code for Corporate Governance in South Africa, IA is identified as a key governance factor and is proposed as a reliable advisor for all company operations (IOD, 2016). The role of IA in monitoring and improving risk management and the
internal control system constitutes an important contribution of IA to CG (Sarens & De Beedle, 2006), since risk management and internal control are two important elements of CG (Sarens, 2009). Moreover, the assurance services of IA play an important role in CG, as they integrate management’s accountability to the BoD and improve the quality of reported earnings (Gramling et al., 2004). Even though every company adjusts its IA plan to its special characteristics so that IA can adopt a different approach based on the particular characteristics of the audit program (Pitt, 2014), it is widely accepted that the new role of IA goes beyond the traditional role of safeguarding assets and monitoring compliance, placing heavier emphasis on adding value for the organization as well as assessing and improving CG systems.

Apart from being a key CG player, IA can provide support to the rest of CG players. Therefore, IA’s position in the CG structure can be approached in two ways. On the one hand, IA is a fundamental component of CG, along with the BoD, the Audit Committee, external audit and management; it is responsible for assessing the effectiveness of CG models and risk management (Lin et al., 2011). According to the International Standards of Auditing, the principal objectives of IAF include the assessment of governance vis a vis the accomplishment of governance objectives with respect to ethics and values, performance management and accountability, targeted information disclosure about risks and effective communication between those parties that implement CG (IFAC, 2009a). Furthermore, IA standards (Standard 2110) explicitly refer to the obligation of effective IAF to provide assurance with respect to the suitability of CG processes, including the provision of proposals for improvement (IIA, 2013).

On the other hand, IA serves as a resource for all CG players (Gramling et al., 2004; Yassin et al., 2011). Specifically, IA helps the Audit Committee (Gramling et al., 2004; Sarens, 2007; Arena & Azzone, 2009) and external audit (Gramling et al., 2004; Arena & Azzone, 2009; Yassin et al., 2011) to achieve their objectives and fulfill their obligations. IA also contributes to the accomplishment of management’s objectives through advisory services and operating audits (Gramling et al., 2004; Sarens, 2007; Yassin et al., 2011). Overall, the largest part of prior research advocates that the role of IA in CG takes place through its relationship with the rest of CG players.

The relationship between key CG players is fundamental for the effectiveness of the CG system. Cohen et al. (2004) describe the complex interactions between CG mechanisms as “corporate governance mosaic”. Given its special position in the organization, IAF is capable of actively contributing to CG as one piece of this mosaic (Soh & Martinov-Bennie, 2011), mostly through interacting with other CG players (Sarens et al., 2012). Among the four CG players, the Audit Committee requires special attention when it comes to IA. Soh και Martinov-Bennie (2011) characterize the Audit Committee as «key internal corporate governance stakeholder with primary responsibility for the oversight of the IAF». On the one hand, it is considered as one of the four cornerstones of CG, along with IA, management and external audit, it operated jointly with the other parts and it relies heavily on IA. On the other hand though, researchers have argued that the Audit Committee bears substantial impact on the quality of IAF (Gramling et al., 2004; Mat Zain et al., 2006; Soh & Martinov-Bennie, 2011); while a strong IAF can contribute to the effectiveness of the Audit Committee, an effective Audit Committee can strengthen the position of IAF in the company (Goodwin-Steward & Kent, 2006; Arena & Azzone, 2009). In the interviews that were conducted by Soh and Martinov-Bennie (2011), both the Chairmen of Audit Committees and CAEs agreed that the Audit Committee should strengthen and support the position and status of IAF within the organization, giving CAE the opportunity to present the findings of IA in committee meetings. This evidence implies that IA is seen as an important function within the company that employs the necessary support and environment to achieve its objective (Ruud, 2003; Gramling et al., 2004). That being the case, the support that is provided by the Audit Committee and its active participation in IAF is a key determinant of IA effectiveness (Prawitt et al., 2009; Pizzini et al., 2015). Therefore, the operation of the Audit Committee should be taken into account in the assessment of IAF quality (Cohen et al., 2004; Gramling et al., 2004).

The change in IA’s role has attracted academic attention and spawned empirical evidence from a plethora of studies across diverse national economies. Even though in the USA and Australia the findings clearly indicate the adoption of IA in accordance to its definition, European evidence has been ambiguous (Allegrini et al., 2009); there is however some evidence of IA’s efforts to extend its implementation and adopt new processes (Paape et al., 2003; Sarens & De Beedle, 2006; Sarens 2007; Arena & Azzone, 2009). The change in IA’s mission
and role forces companies to reorient IAF processes, policies and qualifications (Arena & Azone, 2009). The quality of IA is directly relevant to IA adding value to the company and contributing to CG (Gramling et al., 2004). Therefore, a large part of research on the contribution of IA to CG focuses on the quality of IAF (Arena & Azone, 2009; Sarens, 2009, Soh & Martinov-Bennie, 2011; Regoliosi & d’Eri, 2014). The high quality of IAF increases the probability of collaboration between internal and external audit either using IAF staff in audits or using results from previous audits. This situation can bring about several improvements, such as the decrease in audit delays (Pizzini et al., 2015), the decrease in audit fees (Mat Zain et al., 2015), the decrease in earnings management (Prawitt et al., 2009; Johl et al., 2011) and the disclosure of major weaknesses in financial statements (Lin et al., 2011). A common element in all these cases is that the quality of IAF helps improve the quality of financial reporting and accounting information in general.

Our research draws on the position and role of IA within the company. While IA used to be a function of internal assurance, it evolved into a reliable advisor that adds value to all cornerstones of CG (Gramling et al., 2004; Sarens, 2009; IOD, 2009). However, most prior research on the effect of IA on CG focuses on the relationship between IA and external audit (Al-Twajiry et al., 2004; Prawitt et al., 2009; Mat Zain et al., 2015; Pizzini et al., 2015). On the other hand, IA plays a double role in CG since it is one of the four cornerstones of CG and, moreover, it is used as a resource from the other three cornerstones. Prior research has focused on audits with respect to either the effect of CG on IA or the effect of IA on CG (Regoliosi & d’Eri, 2014; Sarens et al., 2012). In the paper, we develop and test a conceptual framework that accommodates both dimensions, placing special emphasis on IAF quality.

IAF quality is difficult to assess due to the intangible nature of the audit process and, therefore, the choice of the evaluation method is very important. A widely used evaluation approach is based on the contribution of IA to the work of the external auditor. In this case, the quality of IAF is assessed by focusing on various factors which, according to auditing standards (ISA 610 revised, SAS No.128 revised, AS 2201 revised), must be examined by external auditors before they employ the IAF in the audit of financial statements (IFAC, 2009b; AICPA, 2014; PCAOB, 2016b). IA standards suggest another way to evaluate IAF, the quality assurance and improvement programme (QAIP)-IA standard 1300 (IIA, 2013). Even though it is a useful instrument in monitoring the IAF, it focuses mostly on procedural matters (audit completion, feedback, project delivery on time etc) and not on qualitative characteristics of IAF. Apart from evaluation frameworks and best practices, there are also some measurement instruments for the assessment of IA effectiveness, such as key performance indicators, balanced scorecard etc.

In the “managing the IAF” chapter of an IIA report, there is a reference to two ways to assess the value of IAF, a quantitative (the number of reports issued, percent of the work plan completed, percent over/under budget, etc.) and a qualitative one (surveys, based on questionnaires and interviews with third parties on the evaluation of IAF services) (Bailey et al., 2003). Abdolmohammadi (2009) argues that the professionalization of IAF staff -defined as IIA membership and holding professional certifications- is an important element of IAF quality. The importance of professionalization, as key determinant of IAF quality, is also documented by Arena & Azone (2009), while Al-Twajiry et al. (2004), Mat Zain et al. (2006), Mihret and Yismaw (2007) and Sarens (2009) refer to IA professionals as experienced and trained staff. Sarens, in his 2009 IIA editorial, argues that the quality of IA is articulated in two dimensions: a) the relationship between IAF, the BoD, the Audit Committee and management and the implemented audit methodologies and techniques and b) the personal characteristics of internal auditors.

While IAF quality is very important, it lacks an established measurement framework (Bailey et al., 2003; Paape 2007). As IAF quality is shaped by a plethora of factors, prior research has not reached a conclusion about a single set of factors, but, instead, the assessed determinants of IAF quality differ across the authors, depending on diverse criteria. Finally, some authors have used qualitative evidence separately from measurements (Al-Twajiry et al., 2004; Arena & Azone, 2009; Lin et al. 2011; Alzeban & Gwilliam, 2014), while others have produced a composite measure of IAF quality and this is the debate that this paper is a part of (Regoliosi & d’Eri, 2014; Johl et al., 2013; Prawitt et al., 2009; Mat Zain et al., 2015; Pizzini et al., 2015).

---

7 These standards are based on principles that focus on three group of characteristics: competence, objectivity, work performance.
4. Instrument development

4.1 Measurement of the internal audit function quality

The assessment of audit quality relies to a great extent on the choice of the characteristics of IAF quality that are to be evaluated. Gramling et al. (2004) reached the conclusion that most studies in the literature associate IAF quality and external audit. This conclusion has not substantially changed during the last fifteen years and this accounts for the fact that many authors still rely on external auditing as a means to select the characteristics for IA that are to be assessed (Lin et al., 2011; Johl et al., 2013; Prawitt et al., 2009; Mat Zain et al., 2015; Pizzini et al., 2015). Apart from auditing standards, the literature is a frequent source of information (e.g., Al-Twajiry et al., 2004; Arena & Azone, 2009; Regoliosi & d’Eri, 2014; Alzeban & Guilliam, 2014), while other studies employ IA standards (Gramling & Vanderveselde, 2006; Sarens et al., 2012). Our measure of IA quality is based on three sources. Our principal source is the literature and prior research was assessed with respect to IA and external auditing standards. Finally, our measurement instrument was extensively discussed with IA professionals through a brainstorming procedure, shaping an outcome which reflects nine qualitative characteristics of IA, which can be grouped into four groups: the relationship of IAF with BoD and management, IA methodology, IA investment and the competence of internal auditors. According to the classification of Sarens (2009), the first three categories refer to IA as a whole, while the fourth group refers to the specific characteristics of internal auditors.

4.1.1 The relationship of IAF with BoD and management

In this group we included two out of nine qualitative characteristics of IAF, namely IA independence and management follow-up to IA findings and recommendations. Independence is the most important criterion for the assessment of IA objectivity (Gramling et al., 2004) and can be represented by many factors. In prior research, the factor that is used more often is the level of the organization to which IA functionally reports (e.g., Gramling & Vanderveselde, 2006; Lin et al., 2011; Soh & Martinov, 2011; Alzeban & Guilliam, 2014; Pizzini et al., 2015). Moreover, the Institute of Internal Auditors (IIA, 2013), in IA standards IA 1100 - Independence and Objectivity and IA 1110 - Organizational Independence, explicitly states the need for an independent IA opinion and places emphasis on the reporting relationship between IAF and BoD. Finally, IA independence and the level of IA reporting is often present in auditing standards on the assessment of IAF by an external auditor (ISA, 610-A4/ SAS 128-A7/ PCAOB AS2605-10), namely on the set of factors that the external auditor must assess during the evaluation of IAF performance (IFAC, 2009b; AICPA, 2014; PCAOB 2016c).

The follow-up of management to IA findings and recommendations is another characteristic that has attracted the interest of prior research (e.g Mihret & Yismaw, 2007; Lin et al., 2011; Soh & Martinov, 2011; Alzeban & Sawan, 2015). Furthermore, in auditing standards about IA (2500 – Monitoring Progress) and external audit (ISA 610-A4/PCAOB AS 2605-10), management follow-up to IA findings and recommendations is recognized as an essential element of the assessment of IA effectiveness (IIA, 2013; IFAC, 2009b; PCAOB 2016c).

4.1.2 IA methodology

To capture the importance of IA methodology, we focused on two characteristics for the assessment of IAF quality, namely the use of the IA manual and the implementation of risk-based audit. The manual is a key element of company methodology on IA and, jointly with other factors, it could have a substantial impact on ability of IAF to effectively monitor and improve risk management and internal control (Sarens, 2009). Moreover, the external audit standard ISA 610-A4 recognizes the importance of the IA manual in the evaluation of IAF by external auditors (IFAC, 2009b). Finally, the importance of the manual was highlighted in our discussions with IA professionals, since they consider it a useful instrument for a proper IAF.

The program for risk-based audit is considered very important for proper and effective IAF (Arena & Azone, 2009; Sarens, 2009; Sarens et al., 2012). The reason is that the implementation of such a programme contributes to the achievement of the principal objective of IA, which is the implementation of a systematic approach to the evaluation and improvement of risk management processes, internal control and governance (IIA, 2015b). Finally, the importance of these characteristics is also stressed in IA standard 2010 (Planning),
according to which the CAE must prepare a program for risk-based audit based on risk assessment, in order to align IAF priorities and company objectives (IIA, 2013).

4.1.3 IA investment

An IAF that is adequately financed can audit a larger part of company transactions (Prawitt et al., 2009). Furthermore, a larger number of internal auditors in IAF results in greater rotation, which contributes to their objectivity (Arena & Azone, 2009). IAF operating costs is one way to measure IA investment (Prawitt et al., 2009; Lin et al., 2011; Johl et al., 2013; Pizzini et al., 2015). However, information on budget or on the expenses of a specific operation are considered sensitive, which is likely to reduce participant response in our study (Goodwin-Steward & Kent, 2006).

Therefore, and in line with prior research, we chose IAF staff (number of internal auditors) as a measure of IA investment (e.g., Goodwin-Steward & Kent, 2006; Mat Zain et al., 2006; Alzeban & Gwilliam, 2014; Mat Zain et al., 2015), to increase participant response. Our choice is also supported by the fact that, according to the external auditing standard SAS 128-A8, the proper number of internal auditors in the IAF (based on company size) is an important measure for the evaluation of IA effectiveness by external auditors (AICPA, 2014). This was also corroborated by Al-Twaijry et al. (2004) who found that the size of the IAF is a significant criterion for external auditors in their decision to rely on the work of internal auditors for their own audits.

4.1.4 Internal auditors’ competence

In our “competence” group we include four characteristics of internal auditors: experience, education, training and professional certifications. Prior research places particular emphasis on experience (e.g., Al-Twaijry et al., 2004; Prawitt, 2009; Sarens et al., 2012; Johl et al., 2013; Alzeban & Gwilliam, 2014; Regoliosi & d’Eri, 2014, Mat Zain et al., 2015). Ziegenfuss et al. (2006) concluded that the experience of internal auditors is one of the most important elements of IAF quality. Regoliosi & d’Eri (2014) argue that IA performance is positively associated with IA experience. Furthermore, in external auditing standards (SAS 128-A8 & PCAOB AS2605-09), the experience of internal auditors is an important factor in the evaluation of IAF (AICPA, 2014; PCAOB 2016c). Prior studies have suggested many ways to measure IA experience. In this paper, we measured experience with the average experience of internal auditors, including CAE, in order to have a more representative account of IA experience (Prawitt et al., 2009; Lin et al., 2011; Pizzini et al., 2015). Furthermore, in the years of professional experience we included not only IA experience, but also experience in external audit, since it contributes to IA effectiveness (Lin et al. 2011 made a similar choice).

The level of academic education is the second characteristic that we included in our measure of IA competence (Al-Twaijry et al., 2004; Sarens, 2009; Lin et al., 2011; Alzeban & Gwilliam, 2014; Pizzini et al., 2015). External auditing standard PCAOB AS2605-09 recognizes the educational level of internal auditors as a factor that should be considered by external auditors in their decision to make use of IAF output (PCAOB, 2016c). The estimation of the educational level was based on the average number of years spent by internal auditors in undergraduate and graduate education (Lin et al., 2011; Pizzini et al., 2015).

Internal auditors’ training includes seminars, conferences, professional laboratories, online education and other forms of training. It is an important element of internal auditors’ professional education and it is essential in the effectiveness of their work and, therefore, in the quality of IAF services (e.g., Prawitt et al., 2009; Lin et al., 2011; Alzeban & Gwilliam, 2014; Pizzini et al., 2015; Mat Zain et al., 2015). Apart from academic arguments, the importance of continuous training for internal auditors is also stressed in IA standard 1230 on Continuing Professional Development (IIA, 2013). Finally, internal auditors’ training is an important factor for the assessment of IAF according to external auditing standards (SAS 128-A8 & PCAOB AS2605-09; AICPA, 2014; PCAOB 2016c). In this study, we used the average number of training hours per internal auditor on a yearly basis, following the methodological approach of Lin et al. (2011) and Pizzini et al. (2015). We did not include professional certifications as we account for them with a separate variable in the measurement of IAF quality.

---

8 Regoliosi & Eri (2014) and Johl et al. (2013) measured experience with the number of years that IAF existed in a company. Another way of measurement is the number of years of professional experience of a company’s CAE (Barac & van Staden, 2009; Sarens et al., 2012; Mat Zain et al., 2015).
The last characteristic that we incorporated in our measure for IAF quality involves the professional certifications of a company’s internal auditors. Prior research has often explored professional certifications as an important element of either IAF effectiveness (Arena & Azone, 2009; Sarens et al., 2012; Alzeban & Gwilliam 2014) or IAF quality (e.g., Prawitt et al., 2009; Lin et al., 2011; Regoliosi & d’ Eri, 2014, Pizzini et al., 2015). Ziegenfuss et al. (2006) concluded that the professional certifications of IA staff are an important factor of IAF quality. The importance of professional certifications is also stressed by IA standard 1210 on Proficiency (IIA, 2013) and external auditing standards (SAS 128-A8 & PCAOB AS2605-09) (AICPA, 2014; PCAOB 2016c). For the same reasons that our measure on experience included prior work on both internal and external auditing, here we included all auditing certifications (internal and external). As a result, our measure on certifications is the number of internal auditors that hold some certification in auditing.

4.1.5 IAFQ Index

We measured IAF quality with an index (IAFQ) that is the sum of nine binary variables. Every variable reflects a characteristic and takes the values 0 or 1. Therefore, the value of the index ranges from 0 (minimum quality) to 9 (maximum quality)\(^9\). The formula for our index is:

\[
IAFQ = FRL + FREQ + MANUAL + RISK\_BASED + IA\_SIZE + EXP + ACADEMIC + TRAINING + CERT
\]

where, \(FRL\): a binary variable that indicates the IAF reporting line. The variable takes the value of 1 if IA reports to the Audit Committee and 0 if it reports to another level of company hierarchy. \(FREQ\): a binary variable that reflects the frequency with which management implements IAF findings and recommendations. The variable takes the value 1 if management always responds to IA and takes the value 0 in all other cases. \(MANUAL\): a binary variable that reflects the existence of IA manual. It takes the value 1 if there is an IA manual and 0 otherwise. \(RISK\_BASED\): a binary variable that reflects the implementation of a risk-based audit program. The variable takes the value 1 if such a program is implemented and 0 otherwise. \(IA\_SIZE\): a measure of IAF size, measured with the ratio of internal auditors over the total number of company employees. The variable takes the value 1 if IAF size is greater than the median, whereas it is 0 otherwise. \(EXP\): a binary variable that reflects the experience of a company’s internal auditors. The variable takes the value 1 if the auditors’ average experience is greater than the years of an internal auditor’s professional maturity (7 years) and takes the value 0 otherwise. \(ACADEMIC\): the average number of years in undergraduate and graduate education for the company’s internal auditors. It is equal to 1 if the number of years is greater than the median and 0 otherwise. \(TRAINING\): the average number of training hours for a company’s internal auditors, on a yearly basis. It is equal to 1 if the number of training hours is greater than the median and 0 otherwise. \(CERT\): the ratio of internal auditors with professional certifications in auditing to the number of the company’s internal auditors. The variable takes the value 1 if the value of the ratio is greater than the median and it is 0 if it is smaller than the median.

4.2 Model 1: The cross section of internal audit function quality

Prior research has associated IAF quality with four CG dimensions: the composition of the BoD, the composition of the Audit Committee, the commitment of the Audit Committee and the structure of shareholder ownership. Previous studies have identified many CG elements that belong to these categories, can reflect the existence of good CG and are expected to be associated with IAF quality.

4.2.1 BOD composition

With respect to BoD composition, the size and the number of independent members bear a positive impact on IAF quality (Regoliosi & d’ Eri, 2014). A well-structured BoD is more effective in the performance of its duties, such as (in the case of IA) the appointment of internal auditors, the collaboration of BoD members with IA, the provision of necessary information and generally the support for IAF. Therefore, we expect BoD size and independent members to be positively associated with IAF quality. Additionally, the independence of the

\(^9\) To express competence variables in binary form, we employed dichotomization based on the sample median (Prawitt et al. 2009; Johl et al., 2013; Mat Zain et al., 2015).
chairman of the BoD has been found to positively affect the size of the IAF (Goodwin-Steward & Kent, 2006). Since the size of IAF is directly connected with company IA investment and, therefore, with IA quality (reflecting an adequately staffed IA), we expect BoD chairman’s independence to be positively associated with IAF quality.

4.2.2 Audit Committee composition

An effective Audit Committee influences IAF quality and this is due to the responsibilities of the committee such as IAF monitoring, ensuring that IAF has access to the necessary information, approving the IA program and ensuring that IA is independent and objective. In this context, the independent members of the Audit Committee bear a positive impact on IA involvement in auditing the financial statements (Mat Zain et al., 2006). This connection with IA is reinforced by the fact that the knowledge of Audit Committee members on auditing and accounting affects a company’s decision to implement IA (Goodwin-Steward & Kent, 2006). Therefore, we expect Audit Committee’s expertise to be positively associated with IAF quality.

4.2.3 Audit Committee commitment

The commitment of the Audit Committee is expected to affect IAF quality for two reasons. The first has to do with the frequency of Audit Committee meetings that tends to increase IAF size (Goodwin-Steward & Kent, 2006), which, as we showed, is directly affected to its quality. The second reason is IA’s participation on the committee meetings, which has been found to improve IA effectiveness (Arena & Azzone, 2009). The interaction between IA and the Audit Committee improves the flow of information (Mat Zain et al., 2006) and reflects management’s approach to IA. Drawing on these arguments, we expect Audit Committee’s meetings and IA’s participation in these meetings to be positively associated with IAF.

4.2.4 Composition of shareholder ownership

IAF quality has been found to be associated with the composition of a company’s shareholder ownership and especially with the presence of foreign mutual funds (Regoliosi & d’ Eri, 2014). We cannot predict the effect of this variable. Even though one would expect that the presence of foreign mutual funds would reinforce auditing mechanisms and lead to increased IAF quality, Regoliosi & d’ Eri (2014) produces opposite findings. Based on these arguments, we expect that the investment funds are either positively or negatively associated with IAF quality.

4.3 Measurement of the IA’s role in CG

To capture the effect of IA’s active role on CG we constructed a binary variable that takes the value 1 if IA has an active role in CG and 0 otherwise (Sarens et al., 2012). Such estimations are often based on self-evaluation measures (Mat Zain et al., 2006; Sarens et al., 2012, Alzeban & Gwilliam, 2014). We employed a composite variable that captures multiple measurements, to avoid the subjectivity that characterizes isolated self-evaluation measures (Prawitt et al., 2009); to implement this we synthesized many elements with potentially increased objectivity in the responses (Arena & Azzone, 2009; Mat Zain et al., 2015; Martino et al., 2017). That elements that were employed in the estimation of this variable refer to reviews and audits that are performed by IA and are associated with CG practices and policies (Martino et al., 2017).

The participants were asked to assess -in a scale from 1 (none) to 4 (extensive)- IA’s involvement in eight fundamental governance reviews10. Then, for each company, we created a composite variable that was the sum of the company’s score in each of the eight processes (minimum 8, maximum 32). Finally, the binary variable was constructed with a dichotomization based on the median (Prawitt et al., 2009; Johl et al., 2013; Mat Zain et al., 2015; Martino et al., 2017). Each company with a total score greater than the median received

10 Reviews of governance policies and processes in general, reviews of governance policies and processes that are related to the use of information technology in particular, audits of merger and acquisition processes, audits of the internal operations of external providers of major services, audits on ethics, reviews about the connection between company strategy and performance measures, assessments of executive directors’ compensation, audits on environmental sustainability.
the value 1 and 0 otherwise. This process resulted in the IA\_CG variable, which is the dependent variable in the model on the role of IA in CG.

### 4.4 Model 2: The cross section of IA’s role in CG

The active role of IA in CG (IA\_CG) is associated with three dimensions of IAF quality: the relationship with BoD and management, investment in IA and the competence of internal auditors. Prior research has identified many elements of IAF quality that belong in these dimensions, reflect the potential existence of a high-quality IAF and are expected to be associated with IA’s role in CG.

#### 4.4.1 The relationship of IAF with BoD and management

IA independence bears a positive impact on the quality of financial statements (Pizzini et al., 2015), on external auditors’ decision to collaborate with IA (Al-Twajjry et al., 2004) and on IA effectiveness (Alzeban & Gwilliam, 2014). This happens since an independent and objective IA is free from third-party interventions and, therefore, can perform its task with improved efficiency and effectiveness. Based on these arguments, we expect IA’s independence to be positively associated with IA’s active role in CG. Moreover, with respect to the relationship between IA and management, management’s response to IA’s findings and recommendations supports IA effectiveness (Mihret & Yismaw, 2007; Soh & Martinov-Bennie, 2011; Alzeban & Gwilliam, 2014), since it implies that management sees IA as a function that is essential for the company and not as a mandatory implementation of legal requirements. When IA effectiveness increases, IA’s ability to perform its duty is improved. Therefore, we expect implementation of IA recommendations by management to be positively associated with IA’s active role in CG.

#### 4.4.2 IA Investment

Investment in IA, and especially on the size of IAF, is one of the factors that shape IA. Specifically, the size of IA bears substantial influence on the quality of financial statements (Johl et al., 2013; Pizzini et al., 2015), the decision of external auditors to work with IA (Al-Twajjry et al., 2004; Mat Zain et al., 2006) and IA effectiveness (Arena & Azzone, 2009; Alzeban & Gwilliam, 2014). This proposition is based on the argument that an IAF that is staffed with an adequate number of internal auditors is more likely to function efficiently, since it can cover a larger range of audits and is more likely to detect a problem or an error. Based on these arguments, we expect IAF size to be positively associated with IA’s active role in CG.

#### 4.4.3 Internal auditors’ competence

Prior studies suggest that internal auditors’ experience is a significant determinant of their competence. However, evidence is inconclusive. There are studies that document a positive impact of internal auditors’ experience on the quality of financial statements and IA effectiveness, based on the fact that experience can help tackle various company problems (Al-Twajjry et al., 2004; Mat Zain et al., 2006; Alzeban & Gwilliam, 2014). Other studies, however, discovered that internal auditors’ experience is associated with increased earnings management (Prawitt et al., 2009; Johl et al., 2013) and therefore bears a deteriorating effect on the quality of financial statements. Even though one might reasonably expect that internal auditors’ experience would be beneficial for IAF quality, one could attribute the connection with increased earnings manipulation to the fact that, as internal auditors get more experienced, they get increasingly tied to the management and, consequently, they may become less objective and foster earnings manipulation. However, we expect internal auditors’ experience to be positively associated with IA’s active role in CG.

The level of internal auditors’ education tends to improve IA effectiveness (Al-Twajjry et al., 2004), as it strengthens the background of auditors who apply their scientific knowledge to solve company problems. Therefore, we expect internal auditors’ education to be positively associated with IA’s active role in CG, even though Lin et al. (2011) reached the conclusion that highly educated auditors are negatively associated with disclosure of material weaknesses in financial statements. A possible explanation for this finding could be the fact that highly educated auditors help prevent errors in financial statements and, consequently, less weaknesses in financial statements tend to occur and be disclosed.

Internal auditors’ training also bears a positive effect on the quality of financial statements (Prawitt et al., 2009), since continuous training on evolving profession, such as IA, leads to better informed and more
effective internal auditors. In a similar vein, Alzeban and Gwilliam (2014) discovered a positive effect of training on IA effectiveness. Based on these arguments, we expect internal auditor’s training to be positively associated with IA’s active role in CG.

Finally, the professional certifications that internal auditors hold are associated with increased quality in financial statements and the active role of IA in CG (Prawitt et al., 2009; Sarens et al., 2012). This is due to the fact that professional certifications in IA help auditors become more specialized and, thereby, more effective. Therefore, we expect professional certifications to be positively associated with IA’s active role in CG.

Fig. 1 provides a visual synopsis of our study, demonstrating the bidirectional association between IA and CG.

5. Research methodology

The investigation of our research questions required both non-publicly available information on IAF and evidence from published statements, a methodological choice that has been frequently employed in previous research (e.g., Prawitt et al., 2009; Lin et al., 2011; Johl et al., 2013). We collected non-publicly available information on IAF via empirical research in companies that are listed in the Athens Stock Exchange. We excluded financial companies (banks, insurance, financial services), as their institutional environment is highly regulated.

The fact that many stakeholders are interested in IAF quality (IA professionals, external auditors, management, shareholders, regulatory authorities) (Soh & Martinov-Bennie, 2011) highlights the importance of our study. However, the same fact is also a trap, since each of these stakeholders employs and assesses IAF quality in a manner that is varying and even competitive (Duncan & Trotman, 2014, Roussy & Brivot, 2014). Following the methodological footsteps of prior studies, we addressed the CAEs (e.g., Nagy & Cenker, 2002; Al-Twajjry et al., 2004; Sarens & De Beedle, 2006; Christopher et al., 2009; Sarens et al., 2012, Zaman & Sarens, 2013; Alzeban & Sawan, 2015; Abbott et al., 2016). These interested parties were chosen as the most appropriate source of information due to their central role in the IA process and their fundamental contribution to CG.
We collected data through a structured questionnaire (Zaman & Sarens, 2013; Regoliosi & d’Eri, 2014; Mat Zain et al., 2015; Pizzini et al., 2015; Abbott et al., 2016 et al.) and the survey was carried out via email (Mat Zain et al., 2006; Arena & Azone, 2009; Johl et al., 2013). To maximize the questionnaire’s suitability, we first presented it to two academics and two professionals with substantial experience in accounting and auditing (Arena & Azone, 2009; Alzeban & Gwilliam, 2014). We conducted a preliminary discussion about the questions, to assess the questionnaire’s technical adequacy, clarity, coherence and the suitability of its structure. Then, we performed all the necessary changes that were suggested by the experts, producing the first version of the questionnaire. Before sending the questionnaire, we pilot-tested it (Paape, 2007; Arena & Azone, 2009), which meant that the survey was completed by five companies of our target population. Based on suggestions and comments that we got with the pilot test, we made a few more changes in the structure of the questionnaire and the formulation of the questions, to further facilitate its understanding by the target group. This process lead to the final form of the questionnaire, which consisted of six sections and 35 questions in total. The first section referred to the company characteristics, the second referred to BoD information and the third to information about the company’s audit committee. The fourth section included questions on the IAF and the fifth included questions about the respondents’ demographical characteristics (gender, age, profession, years of professional experience, professional certification etc.).

The population for our survey consists of 187 companies (all listed companies in the Athens Stock Exchange except from financials). Before distributing the questionnaire, we contacted the companies via phone, to verify the existence of IA (Al-Twajry et al., 2004; Arena & Azone, 2009). Out of the 187 companies, one had closed during the period of our study, two companies had been delisted, three companies were under surveillance or in the process of being delisted, while we were not able to reach six companies (we did not find contact information, or they did not respond to our phone calls). Furthermore, one company stated that they had stopped the production process and six companies stated that they had no IA. We contacted the IA departments of the remaining 168 companies via phone and they provided all necessary information about the research, including the email address to which the questionnaires were to be sent (Arena & Azone, 2009; Johl et al., 2013). We collected 51 questionnaires, with six of them being unsuitable to process due to missing answers. We ended up with 45 completed questionnaires that we assessed as suitable for processing and were the sample for our research; they represented 24.06% of the target population, a percentage that is comparable with similar studies in prior research (Carcello et al., 2005; Mat Zain et al., 2006; Sarens, 2007). The response rate to our research was 27.78%, while the most frequent reasons for not responding were the lack of available time and company policy of not responding to surveys. We compared the response rate with similar studies in the literature and found that it was adequate for the investigation of IAF in listed companies at the Athens Stock Exchange (Leung et al. (2004): 21.4%, Mat Zain et al. (2006): 20.03%, Sarens (2007): 32.69%, Arena & Azone (2009): 42%, Johl et al. (2013): 17.4%).

To detect the possibility of non-response bias we compared the responses between early and late respondents (23 and 22, respectively). We tested for differences between the two groups with a t-test for continuous variables and a chi-square test for categorical variables. We did not find any significant difference between the two groups (p values were greater than 5%). The results showed no evidence of a response bias.

5.1 Model 1: Internal audit function quality

Our dependent variable is the IAFQ index that we presented in section 4.1 and it is an ordinal variable. Therefore, we employed an ordinal logistic regression model to assess the effect of “good” CG on IAF\textsuperscript{11,12}.

\textsuperscript{11} We took two methodological measures to tackle common method variance bias which comes about when all variables come from a single respondent: a) the dependent variable is based on a composition of objective measurements and not some measurement based on subjective estimations and b) data for some of the independent variables was collected from another source that was independent from the empirical research (Sarens, 2007).

\textsuperscript{12} There is no multicollinearity problem in the data, since all tolerance values are greater than 0.1 and, respectively, all Variance Inflation Factor values are smaller than 10.
IAFQ = \beta_0 + \beta_1 \cdot BoD_SIZE + \beta_2 \cdot BoD_INDEP + \beta_3 \cdot BoD_CHAIR + \beta_4 \cdot AC_INDEP + \beta_5 \\
* Acknowledge + \beta_6 \cdot ACmeetings + \beta_7 \cdot IApresense + \beta_8 \cdot OUT_FUNDS + \beta_9 \\
* FIRM_SIZE + \beta_{10} \cdot BIG4 + \beta_{11} \cdot REC_INV + \beta_{12} \cdot LEV

where IAFQ: a composite index that measures the quality of IAF and its values range from 0 to 9, 0 reflecting the lowest level of quality and 9 the highest. BoD_SIZE: the number of BoD members. BoD_INDEP: ratio of independent BoD members to the total number of BoD members. BoD_CHAIR: BoD chairman independence (0=independent; 1=not independent). AC_INDEP: independent members of the Audit Committee (0=majority is independent; 1=minority is independent). Acknowledge: there is at least one independent member of the Audit Committee with accounting and auditing knowledge (0=yes; 1=no). ACmeetings: number of Audit Committee meetings per year. IApresense: ratio of Audit Committee meetings with the participation of IA to the total number of meetings per year. OUT_FUNDS: investment/mutual funds in shareholder ownership (0=yes; 1=no). FIRM_SIZE 13: natural logarithm of the number of the company’s employees. BIG4: the company is audited by one of the four biggest audit firms (0=yes; 1=no). REC_INV: ratio of the accounts receivable and inventory to total assets. LEV: ratio of liabilities to equity.

In this model we combined CG factors (predictor variables) with company characteristics (control variables). Predictor variables help us test our argument as outlined in the section 4.2. We chose control variables that prior research has identified as significant in relevant studies. Company size (FIRM_SIZE) is the most frequently used control variable in prior research (e.g., Goodwin-Steward & Kent, 2006; Arena & Azzzone, 2009; Sarens & Abdolmohammadi, 2011; Sarens et al., 2012; Mat Zain et al., 2015). Agency costs, which are targeted by IA processes, stem from asymmetric information between different levels of the company. We expect that bigger companies exhibit a greater distance between top and middle-level executives, bigger agency problems and, therefore higher IAF quality is needed to mitigate these problems. The size of the firm is expected to be positively associated with company investment in IAF (Carcello et al., 2005; Goodwin-Steward & Kent, 2006) and IAF quality (Regolosi καθ d’Eri (2014).

The next control variable is BIG4 which refers to a company’s external audit. The relationship between IA and external audit is important and can affect the quality of financial audits. IAF quality bears a positive impact on the quality of financial statements, via its effect on the restraint of earnings manipulation and its contribution to the reduction of audit delays (Prawitt et al., 2009; Pizzini et al., 2015). IA and external audit are employed as monitoring mechanisms for mitigating agency costs. It is often possible that the use of IA affects the required quality of external audit. Specifically, if there is an adequately staffed and effective IAF, the company is less likely to need a major audit firm since most audits are performed effectively by IA. Therefore, in companies with high IAF quality, IAF may replace an esteemed audit firm, such as Big 4 (Delloitte, PwC, Ernst & Young and KPMG). Goodwin-Steward and Kent (2006) found that while the performance of external audit by one of the Big 4 does not seem to affect a company’s decision to have an IAF, it is associated with smaller IAF size (when IAF is present). There is, however, another approach according to which IA operates as a complement and not as a substitute of external audit. Therefore, companies that face high risks and need strong audit mechanisms are likely to make large investments on both IA and external audit; Mat Zain et al. (2015) suggested that there is a positive association between IAF and audit firm fee. Drawing on all these arguments, we cannot make a prediction on the sign of the association between IAF quality and the type of audit company.

The last two control variables come from the companies’ financial statements. The first variable is REV_INC which refers to financial statement risk. The presence of increased accounts receivable and inventory increases the risk of fraud and error in financial statements (Goodwin-Steward & Kent, 2006). Consequently, there is stronger need for audit mechanisms and high-quality IAF, since it plays an important role in financial statements auditing. Therefore, the effect of this variable on IAF quality is expected to be positive, since the level of receivables and inventory have also been shown to have a positive relationship with a company’s decision to implement an IAF (Goodwin-Steward & Kent, 2006). Mat Zain et al. (2015) also

---

13 We employed a logarithmic transformation to improve the reliability of this measure and reduce collinearity and outlier problems in statistical analysis (Mat Zain et al., 2006; Sarens, 2007; Arena & Azzzone, 2009).
corroborated this hypothesis, since they found that a company’s accounts receivable have a positive effect on the establishment of strong audit mechanisms.

The second variable that is associated with financial statements is financial leverage (LEV). The agency conflict between creditors and owners-managers is fundamental in agency theory (Jensen & Meckling, 1976). As a company gets more indebted there is an increasing need for monitoring through auditing. Drawing on the fact that increased leverage strengthens the need for external audit, Carcello et al. (2005) found that the increased need for auditing applies to IA as well. On the contrary, Goodwin-Stewart and Kent (2006) found a negative association between leverage and internal audit, while financial leverage has also been found to be irrelevant to both IAF size and quality (Sarens and Abdolmohammadi, 2011; Regolosi & d’ Eri 2014). Despite conflicting evidence, leverage has often been examined in prior research on IA. We chose to include leverage in our model because, compared to the USA, debt financing in Europe is more important than stock-market financing (Sarens & Abdolmohammadi, 2011), which is also the case in Greece, the country of our sample. This implies that agency conflicts between creditors and management prevail over agency conflicts between management and shareholders.

5.2 Model 2: IA’s role in CG

We use a binary logistic model to test the effect of IAF quality on CG effectiveness, in consistency with prior research (e.g., Lin et al 2011; Prawitt et al., 2008; Sarens et al, 2012).\(^{14,15,16}\)

\[
IA_{CG} = \beta_0 + \beta_1 \times FRL + \beta_2 \times FREQ + \beta_3 \times IA_{SIZE} + \beta_4 \times EXP + \beta_5 \times ACADEMIC + \beta_6 \times TRAINING_HRS + \beta_7 \times CERT_Ratio + \beta_8 \times SCOPE + \beta_9 \times FIRM_SIZE + \beta_{10} \times CEO_Duality + \beta_{11} \times LEV + \beta_{12} \times IApresence
\]

where \(IA_{CG}\): IA’s active role in CG (1=score greater than the median; 0=score smaller than the median). \(FRL\): level to which IAF reports (1=Audit Committee; 0=otherwise). \(FREQ\): frequency of implementation of IA findings and recommendations (1=always; 0=often/rarely/never). \(IA_{SIZE}\): ratio of internal auditors to the total number of company employees (1 if the ratio is greater than the median; 0 otherwise). \(EXP\): average experience of internal auditors (1 if it is greater than 7 years; 0 otherwise). \(ACADEMIC\): average number of auditors’ years in undergraduate and graduate education (1 if the value is greater than the median; 0 otherwise). \(TRAINING_HRS\): average number of training hours per internal auditor, on a yearly basis. \(CERT_Ratio\): ratio of internal auditors with audit certification to the total number of a company’s internal auditors. \(SCOPE\): range of a company’s activities (1=international; 0=domestic). \(FIRM_SIZE\): natural logarithm of the number of the company’s employees. \(CEO_Duality\): CEO and chairman of the BoD are the same person (1=yes; 0=no). \(LEV\): ratio of total liabilities to equity. \(IApresence\): ratio of Audit Committee meetings with the presence of IA to the total number of meetings, on a yearly basis.\(^{18}\)

The model combines qualitative elements of IAF (predictor variables) with company characteristics (control variables). Predictor variables test our argument as outlined in the section 4.4. Control variables are

\(^{14}\) The dependent variable is a binary variable that takes the values 0 (negative outcome) or 1 (positive outcome). The categories of the dependent variable are independent since there is a clear distinction between the two outcomes (positive/negative). Moreover, non-continuous variables are mutually exclusive and exhaustive, since the model includes binary variables with clearly distinct outcomes.

\(^{15}\) The linearity of the continuous variables with respect to the logarithm of the dependent variable was assessed with the Box-Tidwell (1962) process, where all independent variables were found to be linearly associated with the logarithm of the dependent variable.

\(^{16}\) There is no multicollinearity problem in the data, since all tolerance values are greater than 0.1 and all Variance Inflation Factor Values are smaller than 10.

\(^{17}\) We applied logarithmic transformations to improve the reliability of this measure and reduce collinearity and outlier problems in our statistical analysis (Mat Zain et al., 2006; Sarens, 2007; Arena & Azzzone, 2009).

\(^{18}\) The conversion of \(IA_{CG}\), \(IA_{SIZE}\) και \(ACADEMIC\) to binary variables was made with dichotomization based on the sample median (Prawitt et al., 2009; Johl et al., 2013; Mat Zain et al., 2015; Martino et al., 2017). Every company with an outcome below the sample median took the value 0 in the corresponding variable and every company with an outcome above the sample median took the value 1.
based on the literature and involve factors than can potentially affect IA’s active role in CG. Two out of five control variables (FIRM\_SIZE & LEV) have been discussed in section 5.1. With respect to the range of a company’s activity’s (SCOPE), (Sarens et al., 2012) have argued that companies with international activities are exposed to international competition, face increased risks due to their participation in international markets and hence need to adopt best practices and monitoring mechanisms. In this framework, internationalized companies are expected to exhibit an active IA role in CG.

CEO\_Duality is the variable that we employed to explore the effect of CEO and chairman of the BoD being the same person on IA’s role in CG. The separation of the role of the chairman of the BoD from that of the CEO is an essential issue in CG and it is explicitly addressed in many relevant guidelines and best practices (KING, 2009; ICGN, 2014; OECD, 2015). CEO duality matters because, among other things, it weakens the role of the chairman in monitoring the management, since the chairman is also an executive with access to information that is not available to other members of the BoD. Therefore, we expect that in companies with CEO duality increased monitoring is required and, consequently, a more active role for IA in CG.

Finally, prior research (Arena & Azzone, 2009) has identified an association between IA’s presence in the meetings of the Audit Committee (IA\_presence) and IA effectiveness. Hence this variable may affect IA’s role in CG. This variable was measured with the percentage of Audit Committee meetings where IA participated, on a yearly basis (Paape et al., 2003).

6. Results

6.1 Model 1: Internal audit function quality

Table 1 presents descriptive statistics on the dependent variable (IAFQ) and all independent variables in the model, predictor and control ones.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>S.D</th>
<th>Minimum</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IAFQ</td>
<td>5.27</td>
<td>1.53</td>
<td>2.00</td>
<td>4.00</td>
<td>5.00</td>
<td>6.00</td>
<td>8.00</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BoD_SIZE</td>
<td>8.44</td>
<td>2.58</td>
<td>5.00</td>
<td>6.00</td>
<td>8.00</td>
<td>10.50</td>
<td>15.00</td>
</tr>
<tr>
<td>BoD_INDEP</td>
<td>0.30</td>
<td>0.135</td>
<td>0.00</td>
<td>0.220</td>
<td>0.28</td>
<td>0.39</td>
<td>0.60</td>
</tr>
<tr>
<td>BoD_CHAIR</td>
<td>0.67</td>
<td>0.480</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>AC_INDEP</td>
<td>0.22</td>
<td>0.420</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>0.07</td>
<td>0.250</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>AC_meetings</td>
<td>4.73</td>
<td>2.910</td>
<td>0.00</td>
<td>4.00</td>
<td>4.00</td>
<td>5.00</td>
<td>16.00</td>
</tr>
<tr>
<td>IApresence</td>
<td>0.78</td>
<td>0.380</td>
<td>0.00</td>
<td>0.530</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>OUT_FUNDS</td>
<td>0.49</td>
<td>0.500</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIRM_SIZE</td>
<td>5.81</td>
<td>1.850</td>
<td>1.790</td>
<td>4.600</td>
<td>5.55</td>
<td>7.24</td>
<td>9.85</td>
</tr>
<tr>
<td>BIG4</td>
<td>0.62</td>
<td>0.490</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>REC_INV</td>
<td>0.26</td>
<td>0.200</td>
<td>0.002</td>
<td>0.085</td>
<td>0.24</td>
<td>0.40</td>
<td>0.72</td>
</tr>
<tr>
<td>LEV</td>
<td>1.13</td>
<td>2.800</td>
<td>-9.280</td>
<td>0.270</td>
<td>0.78</td>
<td>1.72</td>
<td>9.90</td>
</tr>
</tbody>
</table>

Variable definition: IAFQ: IA quality, BoD\_SIZE: number of BoD members, BoD\_INDEP: ratio of independent board members to the total number of BoD members, BoD\_CHAIR: BoD chairman independence, AC\_INDEP: independent members of the Audit Committee, Acknowledge: there is at least one independent member of the Audit Committee with accounting and auditing knowledge, AC\_meetings: number of Audit Committee meetings on a yearly basis, IApresence: IA participation in Audit Committee meetings, OUT\_FUNDS: investment/mutual funds, FIRM\_SIZE:
natural logarithm of the number of employees, BIG4: audit firm is one of the biggest four, REC_INV: ratio of accounts receivable to total assets, LEV: ratio of total liabilities to equity.

The IAFQ has an average value of 5.27 (greater than the 4.5 median), which a better outcome in comparison with other studies where the average was below the median\(^{19}\). With respect to predictor variables, evidence on IApresense shows that IA is present in 78% of Audit Committee meetings on average. This result corroborates findings in Paape et al. (2003) who explored IA in Europe and found that, while in most countries IA participation in Audit Committee meetings was 100%, participation in Greece and France was 70%. This shows that no improvement was achieved in this area over the last fifteen years.

The average number of Audit Committee meetings is 4.73 per year, which is very close to the four meetings that is prescribed by the Greek CG code (HCGC, 2013). 71.1% of the respondents stated that the Audit Committee does not meet more than four times per year and 57.8% stated that the Committee meets exactly four times. The fact that the high percentage of those who comply with the law is accompanied by a low percentage of those who exceed legal requirements (28.9%) might create concerns on actual (as opposed to formal) implementation of regulation. Moreover, a 0.67 average value for BoD_CHAIR shows that most participants do not comply with CG guidelines (BoD_CHAIR is a binary variable with the compliance outcome corresponding to 0).

Table 2 presents correlation measurements for all variables of our model.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Pearson correlation coefficients for the variables.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1 IAFQ</td>
<td>1.00</td>
</tr>
<tr>
<td>2 BoD_SIZE</td>
<td>0.10</td>
</tr>
<tr>
<td>3 BoD_INDEP</td>
<td>0.45***</td>
</tr>
<tr>
<td>4 BoD_CHAIR</td>
<td>-0.16</td>
</tr>
<tr>
<td>5 AC_INDEP</td>
<td>-0.09</td>
</tr>
<tr>
<td>6 ACKnowledge</td>
<td>-0.28*</td>
</tr>
<tr>
<td>7 ACMmeetings</td>
<td>0.17</td>
</tr>
<tr>
<td>8 IApresense</td>
<td>0.52***</td>
</tr>
<tr>
<td>9 OUT_FUNDS</td>
<td>-0.41***</td>
</tr>
<tr>
<td>10 FIRM_SIZE</td>
<td>-0.01</td>
</tr>
<tr>
<td>11 BIG4</td>
<td>-0.47***</td>
</tr>
<tr>
<td>12 REC_INV</td>
<td>-0.07</td>
</tr>
<tr>
<td>13 LEV</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (two-tailed).
* Correlation is significant at the 0.05 level (two-tailed).
 Correlation is significant at the 0.10 level (two-tailed).

Please refer to Table 1 for variable definition.

Correlation evidence corroborates many of our theoretical arguments. Namely, IAF quality is significantly positively correlated with the independent members of the BoD (BoD_INDEP), Audit Committee’s accounting and auditing knowledge (ACKnowledge), IA presence in Audit Committee meetings (IApresense) and shareholder ownership by investment funds (OUT_FUNDS). Furthermore, we observe significant correlation between IAF quality with the status of the external auditor (BIG4). Apart from correlations with the dependent variable, Table 2 shows that there is significant correlation between some independent variables. BoD chairman independence (BoD_CHAIR) is correlated with many variable and so is shareholder ownership

\(^{19}\) Prawitt et al. (2009): average 2.33 in an index that ranged from 0 to 5; Johl et al. (2013): average 2.59 with in an index that ranged from 0 to 6; Mat Zain et al. (2015): average 4, in an index that ranged from 0 to 9.
(OUT_FUNDS), firm size (FIRM_SIZE) and two variable that refer to the Audit Committee (ACmeetings & IApresense). Despite significant correlations between some independent variables, our data set does not exhibit multicollinearity problems. Only one correlation is greater than 0.5 (FIRM_SIZE vs BOD_SIZE) and in this case the Variance Inflation Factor is smaller than 10.

Table 3 presents the results of an ordinal logistic regression of CG factors on IAF quality.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Expected sign.</th>
<th>β</th>
<th>Wald χ²</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>BoD_SIZE</td>
<td>+</td>
<td>0.052</td>
<td>0.116</td>
<td>0.733</td>
</tr>
<tr>
<td>BoD_INDEP</td>
<td>+</td>
<td>4.791</td>
<td>3.432</td>
<td>0.064*</td>
</tr>
<tr>
<td>BoD_CHAIR</td>
<td>+</td>
<td>-0.123</td>
<td>0.029</td>
<td>0.864</td>
</tr>
<tr>
<td>AC_INDEP</td>
<td>+</td>
<td>-1.150</td>
<td>1.888</td>
<td>0.169</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>+</td>
<td>3.396</td>
<td>5.702</td>
<td>0.017**</td>
</tr>
<tr>
<td>ACmeetings</td>
<td>+</td>
<td>-0.047</td>
<td>0.133</td>
<td>0.715</td>
</tr>
<tr>
<td>IApresense</td>
<td>+</td>
<td>2.197</td>
<td>5.375</td>
<td>0.020**</td>
</tr>
<tr>
<td>OUT_FUNDS</td>
<td>+/-</td>
<td>1.499</td>
<td>4.971</td>
<td>0.026**</td>
</tr>
<tr>
<td>FIRM_SIZE</td>
<td></td>
<td>-0.459</td>
<td>3.681</td>
<td>0.055*</td>
</tr>
<tr>
<td>BIG4</td>
<td></td>
<td>1.693</td>
<td>4.743</td>
<td>0.029**</td>
</tr>
<tr>
<td>REC_INV</td>
<td></td>
<td>-0.245</td>
<td>0.022</td>
<td>0.883</td>
</tr>
<tr>
<td>LEV</td>
<td></td>
<td>0.068</td>
<td>0.323</td>
<td>0.570</td>
</tr>
</tbody>
</table>

LR chi² = 36.804
Prob>chi² = 0.000
Pseudo R² = 0.575 (Nagelkerke) & 0.228 (McFadden)

**, * indicate statistical significance at the p-value ≤ 0.05 and 0.10 levels respectively. Please refer to Table 1 for variable definition.

The model is significant at p<0.001, with a pseudo $R^2$ of 0.575 and some independent variables are significant at 0.05 and 0.10 levels of statistical significance. Regarding the control variables, the statistical analysis showed a positive relationship between IAF quality and firm size (FIRM_SIZE) (p<0.10). We also observe that IAF quality is higher when the external auditor is one of the Big 4 audit companies (p<0.05).

With respect to predictor variables, our regression analysis showed a positive relationship between BoD independence (BoD_INDEP) and IAF quality at a 10% level of significance. These results are in contrast with evidence in the literature, which indicated that BoD independence bears a negative impact on the size of IAF (Sarens & Abdolmohammadi, 2011) and no impact at all on a company’s decision to have an IAF (Goodwin-Steward & Kent, 2006). Furthermore, we observe that IAF quality increases when at least one of the members of the Audit Committee has accounting and auditing knowledge. This finding is in accordance with the results of Mat Zain et al. (2006), while it is in contrast with Goodwin-Steward & Kent (2006) who discovered a negative impact, which they attributed to the possible substitution of IA by experienced members of the Audit Committee. Moreover, we found a positive relationship between IAF quality and the participation of IA in the meetings of the Audit Committee, corroborating prior studies (Arena & Azzone, 2009). Finally, we found a significant effect of investment-fund ownership on IAF quality; Regoliosi & d’Eri (2014) also discovered a significant relationship, but it was a negative one.

Overall, our findings indicate that IAF quality is affected by CG compliance. Nevertheless, it seems that “good” CG, in terms of compliance, does not always reflect a “good” IAF in terms of quality (Regoliosi & d; Eri, 2014), since we did not come up with significant results (on IAF quality) for some factors that reflect

---

20 These are the significance levels that have been employed in previous studies (Johl et al., 2013; Corbella et al., 2015; Mat Zain et al., 2015; Pizzini et al., 2015).
compliance with CG, such as the independence of the chairman of the BoD and the meetings of the Audit Committee.

We performed two more tests, in which we added and removed several variables, to check the model’s robustness. First, we removed the correlated variables one by one and ran the regression repeatedly to explore the effect of each variable on the significance of the other variables of the model. The results produced small differences in coefficient values and confidence intervals but no change on statistical significance. Then we performed the same procedure on control variables and reached similar results.

The second robustness check involves IA outsourcing. Mat Zaïn et al. (2006), in a study on the contribution of IA on external audit and the effect of this contribution on IAF, excluded the companies that had outsourced all IA processes. However, in this paper we chose to include the companies that have outsourced part of (or all) their IAF, since the answer to our research question does not depend on IA outsourcing but also because IA outsourcing is an integral part of IA in Greece. 15.6% of the companies in the sample have outsourced IA, whereas 42.8% of them has outsourced 100% of IAF. To explore the effect of outsourcing we ran our model incorporating a binary variable (IA_OUT) which took the value 0 if IA was outsourced and 1 otherwise (Arena & Azzone, 2009). The regression results showed that outsourcing does not affect the statistical significance of the variables, it only causes small changes in coefficient values.

6.2 Model 2: IA’s role in CG

Table 4 presents descriptive statistics on the dependent variable (IA.CG) and all independent variables in the model, predictor and control ones.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>S.D.</th>
<th>Minimum</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IA.CG</td>
<td>0.62</td>
<td>0.490</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRL</td>
<td>0.64</td>
<td>0.480</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>FREQ</td>
<td>0.67</td>
<td>0.480</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>IA_SIZE</td>
<td>0.27</td>
<td>0.450</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>EXP</td>
<td>0.62</td>
<td>0.490</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>ACADEMIC</td>
<td>0.51</td>
<td>0.500</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>TRAINING_HRS</td>
<td>30.42</td>
<td>24.290</td>
<td>0.00</td>
<td>10.00</td>
<td>30.00</td>
<td>40.00</td>
<td>100.00</td>
</tr>
<tr>
<td>CERT_Ratio</td>
<td>0.48</td>
<td>0.435</td>
<td>0.00</td>
<td>0.00</td>
<td>0.50</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCOPE</td>
<td>0.64</td>
<td>0.484</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>FIRM_SIZE</td>
<td>5.81</td>
<td>1.850</td>
<td>1.79</td>
<td>4.60</td>
<td>5.55</td>
<td>7.24</td>
<td>9.85</td>
</tr>
<tr>
<td>CEO_Duality</td>
<td>0.40</td>
<td>0.495</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>LEV</td>
<td>1.13</td>
<td>2.800</td>
<td>-9.28</td>
<td>0.27</td>
<td>0.78</td>
<td>1.72</td>
<td>9.90</td>
</tr>
<tr>
<td>IApresence</td>
<td>0.78</td>
<td>0.380</td>
<td>0.00</td>
<td>0.53</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Variable definition: IA.CG: IA active role in CG, FRL: level to which IAF reports, FREQ: frequency of management response to IA findings (1=always; 0=often/rarely/never), IA_SIZE: size of the IAF, EXP: internal auditors’ experience, ACADEMIC: internal auditors’ academic education, TRAINING_HRS: internal auditors’ training, CERT_Ratio: ratio of internal auditors with professional certification to the total number of internal auditors, SCOPE: range of a company’s activities, FIRM_SIZE: natural logarithm of the number of the company’s employees, CEO_Duality: CEO and chairman of the BoD are the same person, LEV: ratio of total liabilities to equity. IApresence: IA participation in the meetings of the Audit Committee.

The average value of our binary dependent variable (IA.CG) is 0.62 (1 corresponding to positive outcome), which means that IA has an active role in CG in 62.2% of the companies in the sample. Furthermore, the
average score for the composite index on IA contribution to CG is 19.87%, a value which is smaller than the median of 20 (minimum 8/ maximum 32). Our findings corroborate international evidence; Marino et al. (2017) found an average of 18 in a similar index.

Our results on the Audit Committee (64%) are also similar to international evidence: Prawitt et al. (200) came up with 69%. Furthermore, this finding is improved in comparison with 2003, when all Greek companies stated that IA refers to the CEO (Paape k.a., 2003). With respect to management’s response to IA, it seems that response is complete in 66.7% of the cases, whereas in the joint assessment of the two variables (FRL & FREQ) we see that when IA reports to the Audit Committee, management’s response is better. Since most companies do not employ many internal auditors (partly because they are not particularly large themselves), the ratio of internal auditors to the total number of employees (IA_SIZE) is often used to interpret the results in similar studies. Ideally, there should be one internal auditor per 100 employees (Regoliosi & s’ Eri, 2014). The results are not particularly encouraging in this respect: only one in three companies meet the 1% criterion for the optimal percentage of auditors over total employees.

Taking a close look at data on internal auditors’ competence, we see that: (a) 38% of the companies stated that the average length of internal auditors’ experience is less than 7 years, (b) 50.3% of internal auditors state that their education does not include postgraduate studies, 44.5% hold a master’s degree and 5.2% hold a doctorate diploma, (c) the average number of training hours per year is 30.42 hours for the internal auditors in our sample, and d) in 33.3% of the companies there is no internal auditor with professional certification in auditing, while 52% of certified auditors hold CIA certification, which shows that it is the most widely used certification in IA. The percentage of internal auditors that hold professional certification is rather low (30%), which is in accordance with the findings of previous research on the Athens Stock Exchange in 2006 (Koutoupius, 2006). Therefore, professionalization is stable and low in Greece, in contrast to international evidence where professionalization reaches 58% (Prawitt k.a., 2009). Finally, CEO duality occurs in 40% of the sample, which is similar to European evidence. E.g. Regoliosi & d’ Eri (2014) report CEO duality at 47% of Italian companies in their sample.

Table 5 presents the correlation matrix for all variables of the model.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IA(CG)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 FRL</td>
<td>-0.20</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 FREQ</td>
<td>-0.06</td>
<td>0.16</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 IA_SIZE</td>
<td>0.26*</td>
<td>-0.18</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 EXP</td>
<td>-0.04</td>
<td>-0.00</td>
<td>0.23</td>
<td>-0.15</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 ACADEMIC</td>
<td>-0.03</td>
<td>0.11</td>
<td>0.16</td>
<td>0.09</td>
<td>0.06</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 TRAINING_HRS</td>
<td>0.21</td>
<td>0.27*</td>
<td>0.26*</td>
<td>-0.22</td>
<td>0.17</td>
<td>-0.08</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 CERT_Ratio</td>
<td>0.05</td>
<td>-0.01</td>
<td>-0.09</td>
<td>-0.20</td>
<td>0.23</td>
<td>0.11</td>
<td>0.17</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 SCOPE</td>
<td>0.28*</td>
<td>-0.07</td>
<td>-0.23</td>
<td>-0.18</td>
<td>-0.00</td>
<td>-0.08</td>
<td>0.08</td>
<td>0.04</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 FIRM_SIZE</td>
<td>-0.01</td>
<td>0.23</td>
<td>-0.06</td>
<td>-0.69***</td>
<td>0.11</td>
<td>-0.05</td>
<td>0.14</td>
<td>0.04</td>
<td>0.18</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 CEO_Duality</td>
<td>-0.30**</td>
<td>0.04</td>
<td>-0.19</td>
<td>0.12</td>
<td>-0.11</td>
<td>0.16</td>
<td>-0.37**</td>
<td>-0.10</td>
<td>-0.15</td>
<td>-0.05</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 IA presenta</td>
<td>-0.12</td>
<td>0.43***</td>
<td>0.41***</td>
<td>-0.12</td>
<td>0.03</td>
<td>0.21</td>
<td>0.36**</td>
<td>-0.03</td>
<td>0.05</td>
<td>0.17</td>
<td>-0.16</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>13 LEV</td>
<td>0.12</td>
<td>0.17</td>
<td>-0.01</td>
<td>0.15</td>
<td>0.07</td>
<td>-0.16</td>
<td>0.01</td>
<td>0.01</td>
<td>0.13</td>
<td>-0.03</td>
<td>-0.11</td>
<td>0.01</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*** Correlation is significant at the 0.01 level (two tailed).
** Correlation is significant at the 0.05 level (two tailed).
* Correlation is significant at the 0.10 level (two-tailed).

Please refer to Table 4 for variable definition.

Overall, there is not high correlation between the variables. Namely, correlation evidence seems to support only the hypothesis of a positive association between IA’s active role in CG and the size of IAF.
IA’s role in CG is also significantly correlated with the range of company activities (SCOPE) and CEO duality (CEO_Duality). As far as the correlation between independent variables is concerned, the only significant result occurs between internal auditors’ training (TRAINING_HRS) and IA participation in Audit Committee meetings (IApresense). Only one correlation coefficient exceeds 0.5 between independent variables; the correlation between the size of the IAF (IA_SIZE) and the size of the company (FIRM_SIZE) is 0.693. However, this does not create a problem of multicollinearity since Variance Inflation Factor values are less than 10.

Table 6 presents the results of binary logistic regression about the effects of qualitative characteristics of IAF on IA’s active role in CG.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Expected sign.</th>
<th>β</th>
<th>Wald</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRL(1)</td>
<td>+</td>
<td>-1.472</td>
<td>1.388</td>
<td>0.239</td>
</tr>
<tr>
<td>FREQ(1)</td>
<td>+</td>
<td>0.718</td>
<td>0.278</td>
<td>0.598</td>
</tr>
<tr>
<td>IA_SIZE(1)</td>
<td>+</td>
<td>5.602</td>
<td>7.589</td>
<td>0.006***</td>
</tr>
<tr>
<td>EXP(1)</td>
<td>+</td>
<td>-1.406</td>
<td>1.410</td>
<td>0.235</td>
</tr>
<tr>
<td>ACADEMIC(1)</td>
<td>+</td>
<td>0.711</td>
<td>0.479</td>
<td>0.489</td>
</tr>
<tr>
<td>TRAINING_HRS</td>
<td>+</td>
<td>0.046</td>
<td>3.967</td>
<td>0.046**</td>
</tr>
<tr>
<td>CERT_Ratio</td>
<td>+</td>
<td>0.908</td>
<td>0.460</td>
<td>0.498</td>
</tr>
<tr>
<td>SCOPE(1)</td>
<td></td>
<td>2.123</td>
<td>3.587</td>
<td>0.058*</td>
</tr>
<tr>
<td>FIRM_SIZE</td>
<td></td>
<td>0.904</td>
<td>4.403</td>
<td>0.036**</td>
</tr>
<tr>
<td>LEV</td>
<td></td>
<td>0.080</td>
<td>0.079</td>
<td>0.779</td>
</tr>
<tr>
<td>CEO_Duality(1)</td>
<td></td>
<td>-2.271</td>
<td>3.683</td>
<td>0.055*</td>
</tr>
<tr>
<td>IApresense</td>
<td></td>
<td>-3.606</td>
<td>2.718</td>
<td>0.099*</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td>-4.222</td>
<td>1.694</td>
<td>0.193</td>
</tr>
</tbody>
</table>

χ² = 26.730 (p<0.01)**
Classification accuracy = 86.7%
Nagelkerke (pseudo) R² = 0.61

The model has significant explanatory power (86.7% classification accuracy and a pseudo R² of 61%). With respect to the predictor variables, we find that only two (out of six) exert a statistically significant impact on IA’s active role in CG (IA size and internal auditors’ training, p<0.05). Those results are expected and consistent with prior research. IA size has been found to have a positive impact on the quality of financial statements and IA effectiveness (Mat Zain et al., 2006; Johl et al., 2013; Pizzini et al., 2015; Arena & Azzone, 2009; Alzeban & Gwilliam, 2014). Likewise, internal auditors’ training is a competence factor that has been linked to the quality of financial statements (Prawitt et al., 2009; Pizzini et al., 2015) and IA effectiveness (Alzeban & Gwilliam, 2014).

Contrary to predictor variables, the logistic regression analysis yielded significant results for four out of five control variables. Namely, the probability of IA having an active role in CG is significantly higher for companies with international business activities (p < 0.10), a result that was anticipated by our theoretical framework. Moreover, we found that IA’s active role in CG is positively associated with firm size (p < 0.05), corroborating previous findings in the literature (Sarens et al., 2012; Mat Zain et al., 2015). Furthermore, the regression results suggest that IAF having an active role in CG is significantly less likely when the chairman of the BoD is also the company’s CEO (p < 0.10), which is consistent with Goodwin-Steward & Kent (2006) who concluded that CEO duality adversely affects the existence of an IAF. Finally, contrary to our expectations, we find that the chance for IAFs to have an active role in CG is significantly negatively associated with IA presence...
in Audit Committee meetings ($p < 0.10$). This finding contradicts evidence in prior research, which concluded that the participation of IA in the meetings of the Audit Committee has a positive effect on IA effectiveness (Arena και Azzone, 2009).

Overall, the results of the logistic regression indicate that there is a weak connection between IA's active role in CG and IAF quality, since we did not come up with significant results for many factors that affect IAF quality, such as independence, management response, experience, level of education, and professional certifications$^{21}$.

We performed two more tests, to assess the model's robustness. First, we ran the regression having removed the correlated variables one by one. We also tried running the regression and removing the control variables one by one. These tests did not produce different outcomes in terms of significance or sign. The second robustness check involves IA outsourcing. We modeled IA outsourcing with a dummy variable ($IA_{OUT}$) that takes the value 0 if IA is outsourced and 1 otherwise (Arena & Azzone, 2009; Johl et al., 2013). This test did not yield different results on the sign or the significance of the coefficients.

7. Conclusion

In this paper we explored two aspects of the relationship between IAF and CG. The first aspect involves the effect of “good” CG on IAF quality, whereas the second aspect involves the effect of IAF quality on CG effectiveness. Our findings on 45 listed companies in the Athens Stock Exchange suggest that CG compliance bears a substantial impact on IAF quality, but IAF quality does not significantly affect CG quality. While IA is affected by the proper implementation of CG guidelines in the company, IA cannot influence CG quality, even though it is one of four cornerstones of CG. Namely, our statistical results showed that “good” IAF (in terms of quality) does not necessarily reflect “good” CG, in terms of an effective impact of IA on CG processes. This finding is in contrast with evidence in prior research, which suggests that IAF quality is associated with other factors that proxy IA’s active role in CG, such as IA effectiveness (Mihret & Yismaw, 2007) and the quality of financial statements through earnings manipulation (Prawitt κ.α., 2009; Johl κ.α., 2013), audit delays (Pizzini κ.α., 2015) and audit fees (Mat Zain κ.α., 2015). The difference in our results may be due to the fact that we explored the effect of IAF quality on a wide range of CG processes, while previous studies analyzed the effect of IAF on more specific issues, such as the quality of financial statements.

Interestingly, while IAF quality does not affect IA’s active role in CG, it is affected by many other company characteristics. This implies that IAF is not substantially present in the company and, consequently, other factors are more important in shaping CG. Moreover, it seems that IA itself is a follower even in decisions that affect its function, a conclusion that has also been reached by many CAEs who participated in the research. CAEs also argued that IA processes are often shaped by the management and these processes sometimes address matters that are external to IA.

Finally, a general conclusion of our study is that the implementation of CG guidelines in listed companies in the Athens Stock Exchange is not at a satisfactory level. Furthermore, there are many companies that either partially implement the guidelines or comply with them only superficially, without realizing the essential benefits from CG. These results corroborate findings in previous studies about Greece (Spanos, 2005; Florou & Galarniotis, 2007; Lazarides & Drimpetas, 2011), indicating that there has not been any substantial progress over the last fifteen years. One possible explanation for this situation in Greece is that there are inconsistencies and ambiguities in CG guidelines (laws, codes, principles). The confusing CG framework hinders CG compliance. Therefore, the introduction of a unified CG framework that accounts for the idiosyncrasy of the Greek economy is imperative. Organizational attitudes toward CG also must change, since companies will go beyond compliance with mandatory regulation only if they fully understand the potential benefits from implementing CG.

$^{21}$ For some of these factors (FRL και FREQ) insignificant results may be due to the lack of large variations in the sample (Pizzini κ.α., 2015).
Apart from policy implications, our findings constitute a contribution to the IA literature, since IAF, as a CG mechanism, has attracted limited academic attention in the context of a bidirectional analysis and there has been no prior study like this about Greek companies. Furthermore, the examination of publicly available CG data and non-public IA data allows us to better understand the effect of CG on a fundamental part of a company’s operations such as IA. The results of this study are useful for many stakeholders. Internal auditors, and CAEs in particular, are the first who can make use of the findings of this paper to improve their work.

Apart from IA professionals, this study is useful to many other stakeholders. Inside the company, the BoD, the Audit Committee and the management can employ our findings to reorient their approach to IA. To improve IA effectiveness, management must understand the benefits from IA implementation and proceed to necessary initiatives, such as hiring specialized professionals for IAF, choosing a CAE who is specialized on IA, facilitating IAF and responding to its findings.

With respect to external stakeholders, external auditors can benefit from the findings of this study since they work closely with IA and, therefore, a better understanding of the relationship between IA and CG can shape external audit’s collaboration with IA. Moreover, shareholders and creditors who can access only publicly available information, can make use of this study’s findings to understand the determinants of IA through the analysis of the relationship between IA and CG. Finally, our findings are useful to regulators and standard-setting organizations. These organizations can make use of our findings to set the rules that will lead to more effective implementation for IA and CG.

The source of our empirical research is a major limitation of this study. While CAE’s can provide adequate and specialized information, they are also likely to provide biased responses since they are asked to assess their personal competency and the efficiency of their work. To mitigate this limitation, a lot of our questions were asked in a manner that restraints the possibility of subjective answers. Moreover, wherever we had a choice between an estimation question and measuring a variable, we opted for the latter. Another limitation has to do with the fact that our data comes from a sample of Greek companies that operate in an environment with particular social and economic characteristics, which probably restricts the possibility of generalizing our findings and policy implications to companies that operate in fundamentally different economies. The acknowledgement of this limitation is necessary to avoid cross-national inconsistencies which emerges when conducting this kind of research to many countries (Mat Zain et al., 2015).

This study discusses a relatively unexplored area, which, along with the paper’s limitations, creates opportunities for future research. Our finding that IAF quality does bear substantial impact on IA’s active role in CG was unexpected and deserves further investigation. The implementation of our approach in a different socio-economic environment will probably yield different results. Furthermore, it is interesting to expand this study to financial companies, in order to compare our findings and address some of the IA challenges in the credit system. Future research can also investigate our research question from the point of view of the other CG players, such as the Audit Committee, external audit, the CEO or another key executive. Future research can also explore the point of view of those stakeholders that do not shape CG in the company, but are affected by its processes, such as the employees, investors and creditors.

References


Sarens, G. (2007). The Role of Internal Auditing in Corporate Governance: Qualitative and Quantitative insights on the influence of organizational characteristics. Dissertation. Submitted to the Faculty of Economics and Business Administration of Ghent University (Belgium).


