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Exploring the Effect of Corporate Governance on the Audit Effort: The Case of Greek Port Authorities

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Abstract:

Purpose: *The goal of this paper is to investigate the impact of corporate governance on the implementation of internal audits (IA) in the Greek public sector. Internal audit services have been adopted as a major strategy by the management of public organizations over the last decade in order to achieve their objectives in an efficient and effective manner. Under this framework, the present research investigates how the Board of Directors' williness, support, and implementation of IA, improve public governance.*
Design/methodology/approach: *Data for the study were gathered from the annual financial reports of 13 Port Authorities which have the legal status of Societies Anonymes, between 2012 and 2020. In the regression analysis, audit effort (audit team size) was chosen as dependent variable and as independent variables, the Board of Directors' size, the BIG 5 audit firms and the implementation of internal audit function.To estimate internal audit economic models, various quantitative approaches such as ordinary least squares, weights least squares, fixed effect, and random effect were used.*
Findings: *According to our findings, IA plays a crucial role in the corporate governance system by providing a systematic disciplined approach to monitoring public organizations' policies and procedures and influencing their value. Organizations that completely outsource their IA have been influenced positively in terms of good governance. The high quality of outsourcing IA, has an impact on external auditors' audit services, since external auditors adjust their strategy based on IA reports.*
Practical Implications: *In case of Port Authorities, audit's quality in both internal and external services affects their economic growth and investors' attraction, since it enhances the transparency and accountability of financial reports.*
Originality/value: *In Greece, internal audit was implemented in the public sector, for the first time, in 2005, but it became mandatory in 2019 (Law 4622/2019). Few organizations apply IAF until today, so there are few available information and data of IA' effects on public governance and vice versa. Few researchers focus their studies on IA in public sector.*

Keywords: *Corporate governance, internal audit, outsourcing, external auditors, BIG 5.*
JEL codes: *M41, M42, M48.*
Paper type: *Research article.*

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1. Introduction

One of the most fundamental and essential concerns of economic entities is the concept of "corporate governance." It is a major topic of discussion in academic seminars and political think tanks around the world. Financial scandals in Russia, Asia, Brazil, the USA, and Europe since the late 1990s have instilled deep skepticism in the credibility of corporate governance (Claessens and Yurtoglu 2012). Transparency and accountability, the fundamental principles of corporate governance, have been violated by financial resource owners, investors, corporate executives, managers, and banks, resulting in financial turmoil and disfavor (Bekiaris *et al.*, 2013). Inadequate control systems and ineffective risk management strategies hampered entities' ability to deal with the negative economic events and massive financial scandals that occurred.

The approval of the legislative regulation Sarbanes–Oxley (SOX) in the USA in 2002 played an important role in strengthening corporate governance. It aimed to rid the market of fraud and corruption, as well as to restore investors' trust, which had been severely harmed. In order to align itself with the SOX legislation on matters of public oversight, the EU modernized and updated its own Eighth Council Directive[5] in 2003. In 2002, IA became mandatory for Greek publicly traded companies.

In recent years, governments have focused their attention on efficient public governance as a means of ensuring and achieving adequate oversight of public sector agents (Bowrey, 2008). In Greece, internal audit was implemented in the public sector, for the first time, in 2005, but it became mandatory in 2019 (Law 4622/2019). Recently enactedLaw 4795/21 governs the System of Internal Control and the operations of Internal Audit Units, as well as establishing the institution of Integrity Advisors in Public Administration.

Port Authorities, as public organizations, play an important role in the development of national economies and international trade. According to the World Trade Organization, ports handle 60% of all trade activities due to lower costs, faster speeds, and environmental factors. In the past few years, Greece has created the necessary conditions to attract investments and improve the performance of Port Authorities by gradually privatizing them. Two of the 13 Port Authorities have gone fully private (listed on the Athens Stock Exchange), while the rest are undergoing public procurement (privatization process).

The Port Authorities with the legal status of SA are the focus of this research. Since 2010, they have used internal audit services and are overseen by the Hellenic

[5]*The Eighth Council Directive was published in 1984 and to this day has published a series of rules, regulations, and instructions that regulate matters of such nature.*

Republic Asset Development Fund (HRADF)[6]. All the Port Authorities except that of Piraeus and Thessaloniki do not have audit committees and they apply to outsource internal audit function. Internal auditors are certified by the IIA of Greece, and they report directly to the Board of Directors and to HRADF. The Ports of Piraeus and Thessaloniki have internal audit unit (in house IA) using their own staff (permant staff).

The study's main goal is to look into the impact of corporate governance on the internal audit function. It attempts to answer the following question: "Do the B & D's implementation and support of IA, improve good governance in public organizations?" The paper is structured as follows: in the next section, we provide a discussion of the background literature and outline the development of hypotheses. This is followed by an overview of the research method. Then the results are discussed. The paper ends with some conclusions remarks and highlights the limitations of the study.

2. Literature Review

2.1 Corporate Governance

The term "corporate governance" etymologically is derived from the Ancient Greek word "kyberman" or "cyberman" which means helm, navigation, guidance, steer, lead, drive, and the Latin word "gubemare" (Haslinda and Benedict, 2009). Sir A. Cadbury pioneered the concept of corporate governance in Great Britain in 1992. He founded the Cadbury committee with the intention of establishing strict rules, regulations, and guidelines that economic entities would begin to follow[7].

Corporate governance is a set of rules, of processes, and structures that a Board of Directors imposes on an economic entity in order to achieve its goals; to improve its financial management and performance; to enhance its integrity and responsibility towards its stakeholders/shareholders; to add extra value to the entity itself [8] to ensure its growth and viability, and to use its resources effectively (Danescu *et al.*, 2015). The need for an internal control system (IC) stems from the relationship between the principals (such as an entity's shareholders or stakeholders) and the agents (like the executive managers of entities). The principals delegate authority to the agents to act and take initiative on their behalf, and the management of the

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[6]HRADF: Hellenic Republic Asset Development Fund (HRADF) utilizes the private property of the State, according to the international obligations of the country. In cooperation with the Greek government, the HRADF promotes the privatization of public organizations in the country with full responsibility for the implementation of the policy that governs them.
[7]Cadbury Committee, 1992 "Report of the Committee on the Financial Aspects of Corporate Governance" (http://www.ecgi.org/codes/documents/cadbury.pdf).
[8]OECD Organization for economic Co-operation and Development 2004 "Principles of Corporate Governance". (https://www.oecd.org/corporate/ca/corporategovernanceprinciples/31557724.pdf).

economic entity. The owners of the economic resources (the principals), who finance the entity, delegate the use and oversight of such resources to the agents (Sarens and Abdolmohammadi, 2001). The citizens/taxpayers are the principals in the public sector, and the administration is the agent (leadership).

In his work "The Wealth of Nations," Adam Smith (1776) expressed the opinion that if a company is managed by an individual or a team of individuals who are not the company's owners, the most likely scenario is that the owners' objectives and expectations regarding their investment will not be met by the person or team in charge of the company's management (Bowrin *et al.*, 2007).

The interests of the owners and the managers do not coincide. They usually diverge and lead to a conflict of interests.[9] The managers have more information on the daily operations (current affairs) of the company compared to the owners. As a result of information asymmetry (asymmetric information), the owners do not have significant control over the managers' decisions and actions. They do not have access to all of the information available to managers, and worse, the information they have is incorrect.

Managers seek to fulfill their own interests during business activities, even if those interests conflict with those of the owners. Profit maximization and company value take on different meanings in the eyes of shareholders and managers. The same applies to how they define the acceptable risk level that they are willing to tolerate in order to achieve the company's goals. This conflict of interest between managers and shareholders arises from asymmetric information in managers' favor. It necessitates the implementation of an IC system (Kasimati, 2007). The balance of all interested parties is ensured by the implementation of control mechanisms (Tabara and Ungureanu, 2012).

IC defines the roles of shareholders, Board of Directors, executive managers, and all other interested parties in the influence and execution of strategic decisions, and ensures accountability, growth, and improved performance (Sternderg, 1998). It is the weapon of shareholders to limit the tendency of managers to partake in opportunistic behaviors and fraudulent actions (Albrecht et al. 2004). The owners appoint the Board of Directors to resolve conflicts that may arise between the executive managers, including the CEO (Mohiuddin and Karbahari, 2010).

The degree of commitment and support of managers for effective, efficient, and successful control mechanisms and audit activities is the most important factor influencing their adoption (Asare, 2009). Without the approval, backing, and support of the managers, both the IC and the IA face the risk of failure but more importantly, wasted time and money (Baharud–din *et al.*, 2014). Unnecessary and ineffective

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[9]*Volonte, C., 2012. Foundations of Corporate Governance. (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1991135).*

control mechanisms cause two major issues: they raise the cost, because multiple audit mechanisms are expensive, and they increase bureaucracy due to the system's complexity.

Managers' commitment to audit activities can be seen in their intention to allocate more funds to them. Systematic audits reduce the occurrence of anomalies, irregularities, and inaccuracies in financial reports while increasing their credibility (Srinivasan, 2005). However, for managers, some of the entity's activities have a bigger added value than the integrity of financial statements and so their attention is not focused on them. As a result, it may seek to implement low-cost control systems in order to save money for such other activities (Ernest & Young, 2006). Prior and recent studies pointed significant relationship between the corporate governance and firms performance (Alexakis *et al.,* 2006; Balios and Zaroulea, 2020; Ravenstein *et al.,* 2013; Kalantonis *et al.,* 2021).

2.2 Internal Audit Function

The examination of economic documents in accordance with legal provisions and accounting standards is referred to as Internal Audit Function AF (Adetoso and Akinselure 2016). The financial statements are validated by an independent and impartial auditor, in order to obtain an opinion on the content, accuracy, and reliability of the economic data. Its role is to ensure that the entity's accounts provide a clear and complete picture of the entity's economic condition and performance (Petrascu and Tamas 2013).

It is an important component of corporate governance because it contributes to the effective estimation and management of business risk, limiting or even eliminating it. It provides a unique added service and value to the entity in terms of performance (Hermanson, 2012). It operates independently and autonomously of management, ensuring adherence to the procedures established by managers (Unegbu and Kida, 2011). It verifies that all financial transactions are carried out according to the laws and wishes of the managers (Adeniji, 2004). IA detects any deficiencies in the procedures and the IC system (Diamond, 2002) and ensures their quality (Turlea and Stefanescu, 2009).

2.3 Internal Audit and the Audit Committee

The Committee of IA is a powerful tool in assisting corporate governance. The four fundamental factors that ensure the committee's effectiveness are its composition, the authority it has been given by the B&D, the economic resources at its disposal and its devotion (Bogdan and Tamas-Szora, 2009). Its success is dependent on its members' independence from management. They have the financial knowledge and professional experience, understand the structure and complexity of the entity's operations and devote time and effort to fulfilling their responsibilities (Magrane and

Malthus, 2010). Their financial and auditing knowledge improves audit activities and decreases the probability of system inefficiencies (Vic and Divesh 2009).

The productive relationship between the committee and the executive members and internal auditors improves the quality of financial reports and the entity's procedures (Turley and Zaman, 2004). The Committee monitors the risk management procedures and the affairs of IA in a systematic and diligent manner in order to ensure the accuracy of financial statements and to protect the interests of all interested parties (Sarens and Abdolmohammadi, 2011).

Its independence determines its audit quality expectations because it increases interest in audit activities and strengthens support for more extensive and detailed audits (Goodwin and Kent, 2006). Its unofficial responsibilities include consistent communication with risk managers and auditors (Turley and Zaman, 2004). The frequency with which a committee meets, reflects its commitment to the IAF. More meetings, greater dedication to the IAF (Barua *et al.*, 2010).

Executive managers do not attend the unofficial meetings. As a result, internal auditors will be able to communicate their findings and recommendations to the committee in a more direct, honest, and confidential manner. The exchange of reliable information during these unofficial meetings benefits the IAF's integrity and independence (Zain and Subramanian 2007).

The managers use the official meetings as a "compass" to indicate the reactions of the Board of Directors. Given the closed nature of the meetings, it is customary for managers to use these occasions to gauge how the Board of Directors might react to a managerial proposal that it has not been a part of, particularly if the issue is controversial. The committee reports the outcomes of the meetings to the B&D, and managers gauge their intentions based on their reactions (De Zoort *et al.,* 2003).

The committee serves as a go-between for internal and external auditors and managers (Knapp 1987). It is in charge of selecting and supervising external auditors as well as their compensation (Drogalas *et al.,* 2016). Its expertise improves audit quality because it can oversee the procedures, approach, and methodology used, and it ensures that the audit activities of external auditors are based on the reports of internal auditors and their assessment of business risks (Goodwin and Kent 2006). When external auditors consider the IA's findings and recommendations, the auditors' manhours and, by extension, their rewards are limited (Wallace, 1984).

2.4 Competency and Managers

Internal auditors' knowledge and expertise enable them to advise on the IC's efficiency, complete audit procedures successfully in the face of complex and conflicting situations, and provide dependable solutions (Zain *et al.,* 2007). Managers frequently don't take account the recommendations of in-house auditors because they believe they do not have a sufficient level of knowledge. As a result, they disregard their findings, which has a negative impact on IA's effectiveness (Van Peursem, 2005).

They have reservations when IA is performed by employees of the entity (in-housing) or when it is delegated to external experts (outsourcing). They believe that large auditing firms or external experts (outsourcing) have more experience (Carey *et al.,* 2006), and that "in-house" internal audit services are costly. They prefer to delegate IA to third parties in the hope that the cost will be lower (Khan *et al.*, 2020). The cost and time required to hire and train internal auditors are high, resulting in an increase in the overall cost of IA services (Sawalga and Otish 2012).

The time spent on auditing is an important factor that limits the effectiveness of external auditors' services. The more time allotted to auditing, the more information about the entity's activities can be gathered. Data that is essential for reaching useful conclusions. External experts do not have at their disposal the same amount of time as in-house auditors. And if they both devote the same amount of time to the audit, the cost will be high. The increased auditing hours spent by auditors to arrive at more precise evaluations raises auditing costs (Zimbelman, 1997). Internal auditors in-house have a better chance of detecting fraud because they have more time and a more complete understanding of an entity's complexity and structure (Byron, 2005).

2.5 Board of Directors

Many researchers have focused on studying the effectiveness of internal audits in the public sector and the factors that affect it, as well as the relationship between management and internal audit. The composition of the Board of Directors, as well as the length of its tenure, have an impact on the effectiveness of corporate governance and enhance its ability to reduce the occurrences of fraud. The BoD's objectivity and independence in decision-making improve as the number of independent members' increases. Independent Members who do not have professional ties to the entity have strong incentives to carry out their responsibilities impartially and to protect the entity's reputation (Beasley and Salterio, 2001).

Fraud is discouraged by the audit committee. The number of committee meetings demonstrates the committee's dedication to its role as an oversight and control mechanism, while also reducing the risk of fraud (Antawirya *et al.,* 2019). The lack of procedures for monitoring audit activities and implementing recommendations has a negative impact on the committee's effectiveness (Motubatse *et al.*, 2015). The IAF has a positive effect on risk management and risk financing (Ojo, 2019). It ensures that risk management is carried out using the most appropriate method and that actualized expenses are within the authorized and approved budget limits (Sherzad *et al.,* 2020). It aids in reducing risks to an acceptable level (risk appetite).
The size of the internal audit unit (number of auditors), the degree of their independence, and the strict adherence and implementation of the rules and

regulations, contribute to facing and managing risks (Asiedu and Deffor, 2017). The key to the success of IA is the planning of audit activities in conjunction with proper communication between the auditor and the auditee. The IA's findings are reliable because they are based on accurate information and data. This is accomplished through the auditor's and auditee's successful cooperation (Setyaningrum *et al.*, 2017).

If management is unwilling to support the IAF, or if the CEO interferes with audit activities, IA's independence is jeopardized. Its objectivity and integrity, in terms of detecting potential risks of fraud and criminal offenses, are compromised (Onoja, 2015). Manager interference and internal auditors' limited expertise are significant impediments to IA effectiveness (Muslimat and Hamid 2012). Simultaneously, one of the primary reasons for the absence of control mechanisms is managers' unwillingness to implement an effective risk management system (Nazarova *et al.*, 2020).

Limited financial resources and the insufficient knowledge and expertise of internal auditors (in-housing) are the two major problems in IA's ability (Ayagre, 2015). The effectiveness of IA is determined i) by the extent to which managers correct deficiencies, oversights, and errors discovered during the audit process, and ii) by the scope and number of corrections made by them (Dominic and Nonna, 2011).

3. Research Hypotheses

Corporate governance is a system of principles, procedures, policies, laws, and institutions that defines the way an economic entity is managed, functions, and is controlled; this system is adjusted to the particular characteristics of the entity in order to ensure the alignment of possible conflicts of interests that might arise between interested parties, both inside and outside the entity (Beerbaum, 2013). By evaluating the business activities and risk management procedures, the IAF plays an important role in corporate governance and accountability. Managers assist internal auditors in carrying out their duties effectively, detecting business risks, developing efficient risk management strategies, and providing assurance about the entity's financial statements (Monfardini and von Maravic, 2018; Asare 2009).

The effectiveness of IA is determined by the availability of resources, as well as by the acceptance of the findings and the commitment to implement the proposed recommendations. IA's mission is not complete unless the deficiencies and inaccuracies that it detects are corrected and ensured to remain corrected (Sawyer *et al.,* 2019). IA improves management systems, which in turn minimizes the probability of financial mishaps and mismanagement and increases the effectiveness of corporate governance. The technical expertise of the auditors, the size and scope of the services offered, the proper planning and execution of audits, and, of course, the level of commitment that managers demonstrate in implementing the suggested recommendations all contribute to the quality of IA (Mihret and Yismaw 2007).

Hypothesis 1: The support and commitment of managers contribute to the effectiveness of internal audit:

Outsourcing the function of internal audit to external experts is motivated by the perception of higher-quality auditing services as a result of greater expertise. This is primarily due to managers' concerns about the competence and experience of in-house internal auditors, despite the fact that the cost of outsourcing is higher (Sharma and Subramanian, 2005).

The audit committee serves as a liaison between managers, internal and external auditors. Its dedication and active participation in auditing activities define its support and encouragement for corporate governance to achieve its objectives (Scarlata *et al*., 2019). It is in charge of appointing the external auditors who conduct financial audits and ensuring that its auditing activities are based on the findings of the internal auditors. Internal audit findings and recommendations can be considered by large audit firms.

Hypothesis 2: The big audit firms (Big 5) have a better understanding of the findings and recommendations of internal audits and are taken into consideration when carrying out their auditing activities.

4. Research Design

4.1 Research Methodology

We collected data through a questionnaire mailed to Port Authorities and their annual financial statements. In order to measure the IAF, we asked them whether they had an IAF, who performs that function, and its size.

The following equation was used to analyze the relationship between corporate governance and internal audit, and we tested the model's fitness by inserting the variable of large audit firms. Similar to Cao *et al.* (2015), we construct the following regression model to test our hypotheses:

<u>*For Hypothesis 1:*</u>

Audit effort = β_o + β_1 GOV + β_2 AFTER + β_3 GOV*AFTER + β_4 BIG-5 + β_5 TENURE + β_6 SWITCH + β_7 SIZE + β_8 DEBT + β_9 LOSS + β_{10} GROWTH + β_{11} CRO_LIST + β_{12} REV_INV + β_{13} LIQUIDITY + β_{14} LIABILITY

Dependent variable = audit effort (number of auditors – audit team size)

Independent variable = corporate governance (GOV) + BIG 5 + AFTER

GOV = board size

BIG = audit firm in the 5-top list

AFTER = implementation of internal audit function

Control variables =

TENURE = number of years of continuous auditing

When auditor tenure is longer, auditors are more familiar with the organization's corporate governance and the degree of information asymmetry is lower than with new clients
SWITCH = change of external auditors
SIZE = log of total assets
Large organizations need more audit effort
DEBT = total liabilities/total assets
It reflects the ability of the organization to repay its loans.
LOSS = business profit (negative 1, positive 0)
GROWTH = growth rate of main revenue (rate of change)
It is related to an organizations' future profitability and ability to expand production.
CRO _ LIST = listed in the stock market 1, nonlisted 0
Determines the financial reporting requirements
REV_ INV = (Inventory + Account Receivable)/Total Assets.
It is used to measure the complexity of the organization. Greater complexity requires more audit effort
LIQUIDITY = Liquidity (Total Assets − Fixed Assets)/Short Term Liabilities)
It reflects organization's ability to use cash to repay short -tearm borrowings
LIABILITY = Total liabilities

For Hypothesis 2:
Audit Effort = β_o + β_1 GOV + β_2 BIG 5 + β_3 GOV*BIG 5 + β_4 TENURE + β_5 SWITCH + β_6 SIZE + β_7 DEBT + β_8 LOSS + β_9 GROWTH + β_{10} CRO_LIST + β_{11} REV_INV + β_{12} LIQUIDITY + β_{13} LIABILITY

4.2 Data and Descriptives

This study's sample consists of 12 Port Authorities that were examined between 2012 and 2020. The information was gathered from the annual financial reports of organizations. By deleting some missing data, the sample selection criteria were applied in this study. After applying the sample selection criteria, finally, 96 observations were obtained as the main sample in this study. It is worth noting that the Greek economy has been placed on financial probation by the EU and the IMF since 2010. As a result, since the probation status was lifted in 2019, we considered the period from 2012 to 2017 to be a crisis period for the Greek economy.

Descriptive statistics of the equation's variables are presented in Table 1. We observed that the mean for the independent variable (GOV) is greater than the median, therefore the frequency curve for this variable shows positive asymmetry, with values respectively $\bar{\chi}$ = 8,625 and median δ = 7,500 and standard deviation (+/− 2,017) while it is observed that half of the observations of the shares do not exceed 7,500. The Board of Director can have a maximum of 13 members and a minimum of 6. In our sample, the log of total assets (SIZE) shows a slight left slope because the average is greater than the median. The average (SIZE) is 7,199 while the SIZE of half of the ports does not exceed 7,054. Finally, the nonexecutive members of the Board of Directors demonstrated also a positive asymmetry with an average number of 6,792 which is more than the median which is d = 6, the maximum number of the nonexecutive members is 11 while the minimum is 3.

Table 1. *Descriptive statistics*

	Mean	Median	St. deviation	Min.	Max.
GOV	8,625	7,500	2,017	6,000	13,00
SIZE	7,199	7,054	0,6616	6,218	8,674
DEBT	0,3194	0,2835	0,1949	0,0532	0,6978
mhektel	6,792	6,000	1,994	3,000	11,00

Source: *Own study.*

4.3 Pearson Correlation Approach

Correlation analysis is used as a preliminary test to measure the relationship between the variables and their strength of association (Pallant, 2001) The low intercorrelation among the explanatory variables used in the regression indicates no reason to suspect multicollinearity.

In this study, we discovered that the Debt variable was weakly positive and linearly correlated with the Rec_ Inv, whereas the Liability, Liquidity, and Size features were negatively correlated. In other words, when the Liquidity increases, the Debt is resolved. However, the Loans variable has no relationship with the Debt variable (Pearson's coefficient is close to zero), but it is strongly positively correlated with the Liability. Size and Debt have a strong negative linear relationship (Table 2).

Table 2. *Pearson correlation matrix*

	DEBT	LIABILITY	LOANS	Liquidity	REC_INV	SIZE
DEBT	1	-0.21	0.043	-0.67	0.26	-0.69
LIABILITY	-0.21	1	0.81	0.14	-0.52	0.78
LOANS	0.043	0.81	1	0.11	-0.52	0.6
Liquidity	-0.67	0.14	0.11	1	-0.27	0.51
REC_INV	0.26	-0.52	-0.52	-0.27	1	-0.69
SIZE	-0.69	0.78	0.6	0.51	-0.69	1

Source: *Own study.*

4.4 Estimation Techniques

To avoid issues of endogeneity and autocorrelation, we used panel data regression, which is a useful method for estimating micro- and macrodynamic effects. As we have the same 96 cross-sectional units surveyed over the 8 years, we have balanced panel data. Thus, according to the literature, we adopted panel data analysis by applying a linear regression model. By following this procedure, we avoid the methodological issues associated with time-series analysis and cross-section methods, which frequently fail to detect dynamic factors that may affect the dependent variable. Furthermore, panel data analysis has several advantages because it not only provides efficient and unbiased estimators, but it also provides a greater number of degrees of freedom for estimation and allows the researcher to overcome the linear regression model's restrictive assumptions.

Several estimation techniques were used in the literature to estimate the effect of internal audit, these include, the Ordinary Least Square (OLS), the fixed and random effects, and the Weights Least Squares (WLS). In this study, we investigated the impact of internal audit on corporate governance mechanisms. We also looked for the best method within OLS, WLS panel data regression analysis, and fixed and random effect regression.

Before we proceed to the final estimation model, we found a very high R-squared 99% because he used all of the variables on the estimation model, and we can assume that R-squared in our regression output is a biased estimate based on our sample. In addition, provided that we wish to preserve a balanced panel, variables that make our model biased were removed as you can see in Tables 3 and 4.

Table 3. *Estimation model for H1*

Variables	OLS	WLS	Fixed effect	Random effect
constant	0,372881	0,0733352	−24,2626***	0,372881
Governance	0,179580***	0,225561***	0,0442699	0,179580***
Loans	−7,342e-08***	−6,25192e-08***	−5,36932e-08***	−7,34206e-08***
Liabilities	7,01e-08***	5,98927e-08***	4,75786e-08**	7,01462e-08***
Size	−0,0964847	−0,0817015	3,32239***	−0.0964847
Liquidity	−0,107427	0,00837579	0,0232765*	0,00778759
Nonexecutive Members of the Board of Directors	−0,107427**	−0,130978***	0,0700818	−0,107427**
R- squared	0,620047	0,780061	0,772318	
F- statistics	24,20657	52,60959	15,56372	
Hausman test				58,3589

Note: **** 1%, ** 5%, * 10% significance level.*
Source: *Own study.*

Table 4. *Estimation model for H2*

Variables	OLS	WLS	Fixed effect	Random effect
constant	1,92726*	1,68360*	−24,9589***	1,92726*
Governance	0,08508 **	0,0982678***	0,108419**	0,0850882**
Loans	−5,1367e-08***	−4,52904e-08***	−4,98191e-08***	−5,13678e-08***
Liabilities	4,97695e-08***	4,40677e-08***	4,23107e-08**	4,97695e-08***
Size	−0,313850*	−0,295073*	3,41379 ***	−0,313850*
Liquidity	−0,007164	0,0103270*	0,0232209*	0,00716403
Big4	1,02680***	1,10538***	−0,0244694	−1,02680***
R- squared	0,65357	0,844821	0,769938	

F- statistics	27,9848	80,75517	15,35522	
Hausman test				42,725

Note: **** 1%, ** 5%, * 10% significance level.*
Source: *Own study.*

Previous studies on the estimation of the effect of internal audits used panel data regression analysis. We discovered that many of them investigated the impact of corporate governance on internal audit using the ordinary least squares regression analysis approach (Prawitt, Smith, and Wood, 2009). Nevertheless, they did not mention whether they proceeded to the appropriate tests for the heteroscedasticity of the residuals. Because the available data of this study are time series and cross-sectional, we first tested whether OLS regression analysis could be the most appropriate method searching first for possible heteroscedasticity. We used the White test, which has been recognized as an appropriate test for heteroscedasticity. The null hypothesis of this test assumes the lack of heteroscedasticity. In the results of that test Tables 5 and 6 we did not find any significant evidence, to accept the null hypothesis and consequently, we could not reject the heteroscedasticity of the residuals.

Table 5. *H1*

Test statistics : TR^2 = 69,01337,
With p- value = P(Chi –squared (27) > 69,013337) = 0,000015

Table 6. *H2*

Test statistics : TR^2 = 68,83533
With p- value = P(Chi –squared (26) > 68,83533) = 0,000010

To avoid heteroscedasticity, we assume that OLS regression is not an appropriate method for estimating the effect of corporate governance on internal audit and the effect of the big audit firm's variable, and we used WLS regression. Before analyzing the WLS results it is appropriate to consider the other methods the fixed and random effect. In order to select which, one should be used regarding our dataset we have two major tests. The first test is an F-statistics test. This test will basically examine which regression pooled OLS or fixed effect we have to choose (Tables 7 and 8).

Table 7. *H1*

F(11,78) = 4,74232 with p- value = 1,5442e-005

Table 8. *H2*

F(11,78) = 3,58653 with p- value = 0,000407641

A low p-value favors the random-effects alternative over the null hypothesis that the pooled OLS model is adequate.

In our case, according to the results, the best approach to use for both of the hypotheses is the fixed effect model. The second test is the Hausman test statistics and it has two hypotheses (Tables 9 ans 10).

Table 9. *H1*

H = 58,3589 with p-value = prob (chi-square (6) > 58,3589) = 9,69148e-011

Table 10. *H2*

H = 42,725with p-value = prob (chi-square (6) > 42,725) = 1,32211e-007

A low p-value counts against the null hypothesis that the random-effects model is consistent, in favor of the fixed-effects model. In our case, according to the results, the best estimation method for both of our hypotheses is a fixed-effects model. So, according to the results, we have two possible methods that seem correct. The first one is WLS and the second is Fixed-Effects Regression.

Previous studies with heterogeneity have shown that weighted least squares have wider confidence intervals and larger p-values than fixed effect. The fixed effect is less biased (Stanley and Doucouliagos, 2015). In this study, we have found heterogeneity and the most appropriate method is WLS which is an efficient method that makes good use of small data sets. When corporate governance supports the implementation of internal audit function increase the supervision of the organization

Looking at the WLS regression results for the first hypothesis reveals that corporate governance supports the implementation of the internal audit function and tries to increase organizational supervision. More specifically, the size of the board and the number of nonexecutive members of the Board of Directors have a significant impact on the audit effort. However, the size of the Board of Directors has a positive effect, while nonexecutive members of the Board of Directors have a negative effect. The value r^2 on the first hypothesis indicates that the regression model can explain the relationship between the dependent and independent variables at 78%.

Similarly, WLS regression results for the second hypothesis show that companies' propensity to hire big-name external auditors (Big4) has a positive and significant influence on audit effort. The value r^2 on the second hypothesis indicates that the regression model can explain the relationship between the dependent and independent variables at 84%.

These results are in accordance with research conducted by Dzikrullah et al (2020) who found that companies with good internal governance mechanisms tend to choose auditors with big names and good quality such as Big4.

5. Conclusion

This paper attempted to emphasize the importance of internal audits in public organizations because they are an important part of governance and can be a valuable asset to the public sector. IA provides unbiased, objective assessments of whether public resources are managed responsibly and effectively in order to achieve organizations' objectives, improve their operations, enhance its accountability and integrity and increase the confidence among citizens and stakeholders. It boosts credibility and reduces the probability of public corruption. Outsourcing IA has a positive impact on the corporate governance framework of public organizations, increasing the trust of investors, creditors, regulators, and managers. The extent and nature of external auditors' work relied on their evaluation of internal audit quality.

These findings inform shareholders about the organization's propensity to hire big-name external auditors and provide information about the organization's tendency to hire big-name external auditors (Big4). We also briefly discussed the aspects of ordinary least squares weighted least square regression, as well as fixed and random effects. We argued that the weighted least squares method was the best choice because it appeared to be less complex on the one hand, and it provides analysts with accurate indications of the effect of the independent variables on the dependent even when the sample size is small.

We contributed to the internal audit literature specifying that ordinary least squares, which is the most used econometric approach are sensitive to heteroscedasticity, however, the weighted least squares should offer a more appropriate and accurate method. We also discussed the comparison of weighted least square regression and fixed effects, and we propose an analytically comparative study for the use of statistical and nonparametric approaches in future research.

Prior studies research, from Monfardino and von Maravic (2018), Beasley and Salterio (2001), Muslimat and Hamid (2012), Nazarova *et al.* (2020), that has focused on the association of a public organizations' corporate governance and internal audit function, stressed the positive effects of IA to corporate governance and vice versa.

Due to the availability of data, the study has several limitations. The audit committee's role and impact (number of members, knowledge, experience, and meetings) cannot be measured and are thus excluded from the study. The 11 Port Authorities are supervised by the HRADF and they do not have an independent audit committee. The internal auditors report to the Board of Directors and to HRADF. Their findings and recommendations included in their reports are confidential. The reports contain confidential information that is not available to the general public. As a result, managers' adherence to the IA's recommendations cannot be measured. The researcher is unaware of the available resources and budget for audit activities. As also the level of internal auditors' knowledge and professional experience. The sample consists of outsourcing IA mainly.

References:

Adeniji, A.A. 2004. Auditing and investigations. Ikeja Nigeria: Wyse Associates Limited.
Adetoso, J.A., Akinselure, O.Ph. 2016. Impact of Internal audit on internal control of public and private universities in Nigeria: A study of selected universities in South West Nigeria. Research Journal of Finance and Accounting, 7(12), 197-204.
Albrecht, W.S., Albrecht, C.C., Albrecht, C.O. 2004. Fraud and corporate executives: Agency, stewardship, and broken trust. Journal of Forensic Accounting, 5(1), 109-130.
Alexakis, A., Balios, D., Papagelis, G., Xnthakis, M. 2006. An empirical investigation of the visible effects of corporate governance: the case of Greece. Managerial Finance, 32(8), 673-684.
Antawirya, R.D.E.P., Putri, I.G.A.M.D., Wirajaya, I.G.A., Suaryana, I.G.N.A., Suprasto H. B. 2019. Application of fraud pentagon in detecting financial statement fraud. International Research Journal of Management, IT and Social Sciences, 6(5), 73-80.
Asare, T. 2009. Internal Auditing in the public sector promoting good governance and performance improvement. International Journal on Governmental Financial Management, 19(1), 15-28.
Asiedu, K.F., Deffor, E.W. 2017. Fighting corruption by means of effective internal audit function: Evidence from the Ghanaian public sector. International Journal of Auditing, 21, 82-99, DOI:10.1111/ijau.12082.
Ayagre, P. 2015. Internal audit capacity to enhance good governance of public sector organizations: Developing countries perspective. Journal of Governance and Development (JGD), 11(1), 39-60.
Baharud-din, Z., Shokiyah, A., Ibrahim, M.S. 2014. Factors that contribute to the effectiveness of internal audit in public sector. DOI:10.7763/IPEDR.V70.24
Balios, D., Zaroulea, T. 2020. Corporate Governance, Internal Audit and Profitability: Evidence from P.I.G.S. Countries. Journal of Accounting and Auditing: Research & Practice. ID 668702. ISSN: 2165-9532. DOI: 10.5171/2020.668702.
Barua, A., Rama, D.V., Sharma, V. 2010. Audit committee characteristics and investment in internal auditing. Journal of Accounting and Public Policy, Elsevier, l29, 503-513
Beerbaum, D. 2013. A Taxonomy of Corporate Governance Reporting Concepts. SSRN Electronic Journal, DOI:10.2139/ssrn.2256179.
Beasley, M. S., Salterio, S. E. 2001. The relationship between characteristics and voluntary improvements in audit committee composition and experience. Contemporary Accounting Research, 18(4), 539-570.
Bekiaris, M., Efthymiou, T., Koutoupis, A. 2013. Economic Crisis Impact on corporate governance & internal audit, the case of Greece. Corporate Ownership and Control 11 (1), DOI:10.22495/cocv11i1art5.
Bogdan, D.I., Tamas-Szora, A. 2009. The Public Internal Audit Committee in the Social Health Insurance Sector - A Necessity in Romania. Annales Universitatis Apulensis Series Oeconomica, 11(1), SSRN 1878343 Electronic Journal.
Bowrey, G. 2008. Keeping up appearances: The quest for the governance legitimacy. Accounting, Accountability & Performance, 14(1), 1-13.
Bowrin, A., Sridharan, V.G., Navissi, F., Braendle, C.V. 2007. The Theoretical foundations of Corporate Governance. Virtus Interpress,

Byron, M. 2005. Drying out fraud: an anonymous tip leads auditors to a former employee who used fictitious contracts to steal from the company. Internal Auditor. 62 (4).

Cao, L., Li, W., Zhang, L. 2015. Audit mode change, corporate governance and audit. China Journal Accounting Research, 8 (4), 315 – 335.

Canestrari- Soh., D., Martinov-Bennie, N. 2011. The Internal Audit Function: Perceptions of Internal Audit Roles, Effectiveness, and Evaluation. Managerial Auditing Journal, 26(7), 605-622.

Carey, P., Subramaniam, N., Ching, K.C.W. 2006. Internal audit outsourcing in Australia. Accounting and Finance, 46 (1), 11-30, doi :10.1111/j.1467-629X.2006.00159.x.

Claessens, S., Yurtoglu, B. 2012. Corporate Governance and Development—An Update. The International Finance Corporation, World Bank.

Danescu, T., Prozan, M., Prozan, R.D. 2015. The valances of the internal audit in relationship with the internal control – corporate governance. Procedia Economics and Finance, 26, 960 – 966, DOI:10.1016/S2212-5671(15)00915-6.

Drogalas, G., Arampatzis, K., Anagnostopoulou, E. 2016. The relationship between corporate governance, Internal Audit and Audit Committee: Empirical evidence from Greece. Corporate Ownership & Control (14)1, 569-577, doi.org/10.22495/cocv14i1c4art3.

De Zoort, F., Hermanson, D. Houston, R. 2003. Audit committee support for auditors: The effects of materiality justification and accounting precision. Journal of Accounting and Public Policy, 22(2), 31-47.

Dzikrullah, D. A., Harymawan, I., Ratri, C. M., Ntim, C.G. 2020. Internal audit functions and audit outcomes: Evidence from Indonesia. Cogent Business & Management, Taylor & Francis Journals, 7(1), 1750331-175, doi.org/10.1080/23311975.2020.1750331

Ernest & Young 2006. Board Members on risk leveraging frameworks for the future.New York Ernest & Young LLC.

Goodwin, J. S., Kent, P. 2006. The relation between external audit fees, audit committee characteristics and internal audit. http://epublications.bond.edu.au/business_pubs/14

Hermanson, D. R., Rittenberg, L. E. 2003. Internal audit and organizational governance. The Institute of Internal Auditors Research Foundation, 25-71.

Haslinda, A., Benedict,V. 2009. Fundamental and Ethics Theories of Corporate Governance. Middle Eastern Finance and Economics, 4.

Kasimati, E., 2007. Corporate governance and stock returns: evidence from Greece. Journal of Interdisciplinary Mathematics, 10(1).

Kalantonis, P., Schoina, S., Kallandranis, C. 2020. The impact of corporate governance on earnings management:Evidence from Greece listed firms. Corporate Ownership & Control, 18(2), 140-153, https://doi.org/10.22495/cocv18i2art11.

Khan Sajjad, N., Muzaffar, A., Arooj, F., Kaleem, A., Kalsoon, A. 2020. Outsourcing internal audit services: a review. International Journal of Management, 11 (8), 503-517, DOI:10.34218/IJM.11.8.2020.048.

Knapp, M. 1987. An empirical study of audit committee support for auditors involved in technical disputes with client management. The Accounting Review, 62 (3), 578-588.

Magrane, J., Malthus, S. 2010. Audit Committee Effectiveness: A Public Sector Case Study. Managerial Auditing Journal. 25, 427-443, DOI:10.1108/02686901011041821.

Mihret, D. G., Yismaw, A. W. 2007. Internal audit effectiveness: An Ethiopian public sector study. Management Auditing Journal, 22(5), 470-484, ISSN 0268-6902.

Mohiuddin, Md., Karbahari, Y. 2010. Audit Committee Effectiveness: A Critical Literature Review. AIUB, Journal of Business and Economics, 9(1).

Monfardini, P., Von Maravic P.2018. Too big to be audited? The new world of auditing in international organizations. Financial Accountability & Management, 35(4) DOI:10.1111/faam.12186.

Motubatse, N., Barac, K. Odendaal, E. 2015. Perceived challenges faced by the internal audit function in the South African public sector: A case study of The National Treasury. African Journal of Science, Technology, Innovation and Development, 7(6), 401-407, DOI:10.1080/20421338.2015.1096510,

Muslimat, A. S., Hamid, K.T. 2012. The role of Internal Audit in Fraud Prevention in Government Owned Hospitals in a Nigerian Setting. Journal of Business and Management, 2 (5), 39-44.

Nazarova, K., Mysiuk,V., Gordopolov, V., Koval, V., Danileviciene, I. 2020. Prevention audit implementation of SOX control to prevent Fraud. Business Theory and Practice, 21 (1), 293-301.

Ojo, A. 2019. Internal audit and risk management in Nigeria's public sector. International Journal of Business & Law Research, 7(2), 1-15.

Onoja, E. E. 2015. Internal Audit Techniques and Fraud Prevention, a case study of selected government councils in Bauch State. Mediterranean Journal of Social Sciences 6 (4) MCSER Publishing.

Petrascu, D., Tamas, A. 2013. Internal audit versus internal control and coaching. Procedia Economics and Finance 6. International Economics Conference of Sibiu Post Crisis Economy: Challenges and Opportunities, 6, 694-702, DOI:10.1016/S2212-5671(13)00191-3.

Prawitt, D.F., Smith, L.J., Wood, A.D. 2009. Internal Audit Quality and Earnings management. The Accounting Review, 84 (4), 1255-1280, doi.org/10.2308/accr.2009.84.4.1255.

Ravenstein, V. J., Georgakopoulos, G., Kalantonis, P., Kaldis, P. 2013. Does Audit Quality Influence the Relation between Earnings Management and Internal Control Weakness in the Post –SOX Period. International Journal of Sustainable Economies Management (IJSEM), IGI Global, 2(2), 70-100.

Sabauri, L. 2018. Audit risk management and its effect on the audit of the financial statement. Education technologies, information, communication and tourism in terms of globalization. Globalization and Business, 5, 216- 220.

Sarens, G., Abdolmohammadi, J.M. 2011. Monitoring Effects of the Internal Audit Function: Agency Theory versus other Explanatory Variables. International Journal of Auditing, 15(1), 1-20, doi.org/10.1111/j.1099-1123.2010.00419.x.

Sawalqa, F.A., Qtish, A. 2012. Internal Control and Audit program effectiveness, empirical evidence from Jordan. International Business Research 5(9), 128-137, DOI:10.5539/ibr.v5n9p128.

Sawyer, L. B., Mortimer, A. Dr., Scheiner, J. H., Graham, A., Makosz, P. 1996. Sawyer's Internal Auditing: The Practice of Modern Internal Auditing. Institute of Internal Auditors,4th ed.

Scarlata, A. N., Garven, S., Brandon, V., Bahmanziari, T. 2019.Internal audit outsourcing in small organizations an exploratory study. Journal of Small Business Strategy 29 (62), 44-57.

Setyaningrum, D., Kuntadi, C. 2017. The effect of competence, independence, audit work and communication on the internal audit effectiveness. 2nd Asia-Pacific Research in Social Sciences and Humanities, Depok, Indonesia.

Sharma, D., Subramaniam, N. 2005. Outsourcing of internal audit services in Australian Firms, some preliminary evidence. Asian Academy of Management Journal of Accounting and Finance, l(1), 33-52.

Sternderg, E. 1998. Corporate Governance Accountability in the Marketplace. The Institute of Economic Affairs London

Sherzad, S., Hamawandy, N. M., Raqeeb, O. 2020. Role of internal and external audit in public sector governance: A case study of Kurdistan regional government. International Journal of Advanced Science and Technology, 29(8s), 1452-1462.

Srinivasan, S. 2005. Consequences of Financial Reporting Failure for Outside Directors: Evidence from Accounting Restatements and Audit Committee Members. Journal of Accounting Research, 43, 291-334, doi/10.1111/j.1475-679x.2005.00172.x/.

Stanley, T, Doucouliagos, H. 2017. Neither fixed nor random: weighted least squares meta-regression. Mathematics, Medicine, Research synthesis methods, DOI:10.1002/jrsm.1211, Corpus ID: 4229092.

Tabara, N., Ungureanu, M. 2012. Internal Audit and its role in improving corporate governance systems, Annales Universitaris Apulensis Series Oeconomica, 14 (1).

Turlea, E., Stefanescu, A. 2009. Internal audit and risk management in public sector – Entities between tradition and actuality. Annales Universitatis Apulensis Series Oeconomica, 11(1), 210-217.

Turley, S., Zaman, M. 2004. The corporate governance effects of audit committee. Journal of Management and Governance, 8, 305-332.

Unegbu, A.O., Kida, M.I. 2011. Effectiveness of internal audit as instrument of improving public sector management. Journal of Emerging trends in Economics and Management Sciences (JETEMS), 2(4), 304-309.

Vic, N., Divesh, S.S. 2009. Former audit partners on the audit committee and internal control deficiencies. The Accounting Review, 84 (2), 559–587.

Wallace, W. 1984. A time series analysis of the effect of internal audit activities on external fees. The Institute of Internal Auditors Research Foundation Altamonte Springs FL.

Van Peursem, K.A 2005. Conversations with the internal auditors the power of ambiguity. Managerial Auditing Journal, 20 (1), 489-512, https://doi.org/10.1108/02686900510598849.

Zain, M.M., Subramanian, N. 2007. Internal auditor perceptions on audit committee interactions: a qualitative study in Malaysian Public corporations. Corporate Governance an International Review, 15 (5), 894-908, DOI:10.1111/j.1467-8683.2007.00620.x

Zimbelman, M. 1997. The effects of SAS No. 82on auditors' attention to fraud risk factors and audit planning decisions. Journal of Accounting Research, 35 (Suppl).