

Evolution of Corporate Governance Mechanisms in Greece and Earnings Management.

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Abstract

This paper investigates the relationship between earnings management and corporate governance in a Greek context, examining non-financial firms listed on the Athens Stock Exchange (ASE) from 2006-2012. Greece has been in the spotlight for poor quality of financial reporting and it is of interest to investigate if companies in a code law country have made improvements in one dimension of financial reporting quality, earnings management, after the creation and implementation of corporate governance laws. The nature of accrual accounting gives managers the opportunity to determine earnings at their own discretion. The role of corporate governance is to ensure credible financial reporting by limiting managers' opportunistic behavior through a number of monitoring measures.

The basic premise underlying the relationship between these two variables is that firms with stronger corporate governance constrain earnings management, thus a negative relationship is expected to exist between them. This research examines whether corporate governance attributes are more effective in helping Greek firms effectively control earnings management practices after the implementation of Law 2008, concerning the mandatory existence of audit committees for all Greek listed firms. The research will take advantage of two settings: 2006/2008 (pre-law period) and 2010/2012 (post-law period) with a final sample of 763 firm year observations with complete data. The CG-earnings management relationship is moderated by using a dummy year variable. A dummy year variable equaling one is given to firms in the post-law period and zero to firms in the pre-law period. The purpose of the use of this dummy year

variable is to examine the effect of corporate governance on earnings management before and after the implementation of the audit committee law. For this reason, the use of interaction variables is implemented in this study between the dummy year variable and the corporate governance index used in the regressions. The coefficients of such interaction variables show the marginal effect of corporate governance variables, before and after the implementation of the audit committee law. It is expected that firms with stronger governance quality will continue to more effectively constrain earnings management after the implementation of the audit committee law.

Greek businesses are mainly family-oriented with poor legal protection for investors (Sikalidis and Leventis, 2016). The expansion of Athens Stock Exchange in the late 1990's, followed by the crash of 2000-2001, made the need for effective corporate governance mechanisms imperative. The year 2002 was a critical year for corporate governance in Greece. In May 2002, the first law was created that mandated Greek listed companies to enforce a set of governance guidelines. Based on an effort of continuous improvement, other corporate governance laws were also established, such as the mandatory creation of an audit committee from 2008, as well as other corporate governance laws in 2010. The establishment of laws concerning corporate governance mechanisms provided a stimulus for Hellenic Federation of Industries to prepare an updated Corporate Governance Code for listed companies as of December 2010, so as to educate and guide Greek listed companies on governance best practice.

Motivated by these developments, this study examines earnings management through the use of accrual earnings management models. Earnings management is estimated using the DeFond and Park 2001 model and the cross-sectional version of the modified Jones model. Corporate Governance is examined through the use of a corporate

governance index, which captures the multidimensional nature of corporate governance.

An important issue considered in the analysis is that of controlling for the possible endogeneity of the variables that could bias the results obtained. According to Hermalin and Weisbach (2003) and Carcello et al. (2011) an OLS regression analysis in governance research can lead to endogeneity between corporate governance variables and other variables of interest, in this case earnings management. For this reason a system of simultaneous equations is used in this study to examine the hypotheses. The analysis is carried out using GMM.

Data for corporate governance characteristics is hand-collected from annual reports found on the ASE website, while earnings management is calculated based on data obtained from DataStream. The sample consists of all firms listed on the ASE for the years 2006, 2008, 2010, and 2012, excluding only firms in financial, real estate and insurance industries since they require additional governance regulations.

1.1 Introduction

This study investigates the effect of corporate governance mechanisms in Greece on earnings management and firm performance in a Greek setting. Based on Law 3693/2008, named “Mandatory audit of annual and consolidated financial reports”, the effect of corporate governance on earnings management practices is studied before and after the implementation of this law. This study covers all non-financial Greek listed companies for the fiscal years 2006 (two years before the implementation of the law), 2008 (the year the law was created), 2010 (two years after the implementation of the law) and 2012 (four years after the implementation of the law). These specific years are intentionally chosen to examine the change of any potential effect of corporate governance on earnings management before and after the implementation of Law 3693/2008. The data is broken down into two periods, the pre-law period sample (2006/2008)¹ and the post-law period sample (2010/2012). It is expected that the effect of corporate governance variables on EM will be stronger after the implementation of the governance law.

Earnings management is measured using the cross-sectional version of the modified Jones model by Dechow et al. (1995) and the DeFond and Park (2001) model. Both EM measures are employed in this study since the former uses industry-wide estimates, while the latter uses firm-specific measures. The use of both is deemed necessary so as to include both industry and firm specific measures.

¹ Although 2008 is the first year of implementation of Law 3693/2008, it is considered as a pre-law period for this study since the law became effective as of August 2008. Since the firms’ year end is December 2008, many firms CG mechanisms, such as the existence of an audit committee might have been implemented after August 2008, whereby four quarterly meetings of the audit committee might not be possible in 2008. Thus, the first full year of implementation of the Law is considered the financial period starting after January 1, 2009.

Corporate governance is measured through a multi-dimensional indicator of corporate governance created for the purpose of this study in the form of a corporate governance index. The corporate governance index is developed based on Greek CG laws, as well as particular features of the Greek CG code created by the Hellenic Federation of Industries in 2010.

The relationship between corporate governance and earnings management, as a result of Law 3693/2008, is studied in a Greek context. Thus, the research question examined is:

“Do corporate governance mechanisms in Greece restrain earnings management practices and is this relationship stronger after the implementation of Law 3693/2008?”

1.2 Institutional Setting in Greece

Greece is a European country with distinct economic and socio-political characteristics. Although Greece seems to have been influenced by free market thinking over the last thirty years, it continues to reflect a mixture of Eastern and Western influences in terms of culture, politics and economics (Tsipouridou and Spathis, 2014). Greece “industrialized” in the early post-world war II years and after a few years of rapid growth, it entered an era of stagnation and structural economic problems until the mid-1990’s (Tsipouri and Xanthakis, 2004). During that period, investor’s interest in the Athens Stock Exchange (ASE) was insignificant. Very few Greek firms raised capital through IPOs and most domestic and international investors were reluctant to invest in such a small capital market (Dasilas and Papasyriopoulos, 2015). The ASE’s underdevelopment was a result of the heavy reliance of firms on debt financing and thus, the predominance of the banking sector, the high level of state intervention in the

economy, the high ownership concentration of listed firms, as well as a lack of transparent and credible information disclosed to investors by firms (Dasilas and Papasyriopoulos, 2015).

During the period 1995-2000, there was an unprecedented increase in the value of shares quoted on ASE when Greece met the Maastricht criteria and joined Economic and Monetary Union (EMU) in 2001, together with the expansion of many Greek firms in Southern Europe. During this period, Greece maintained a high growth rate, mainly through the entry of international funds listed on the ASE, with the ASE increasing in value much faster than other capital markets in developed countries (Tsipouri and Xanthakis, 2004; Dasilas and Leventis, 2013). Additionally, the ASE went through market microstructure changes such as the expansion of trading hours, the operation of OASIS, an integrated electronic system of settlements, and the extension of margin accounts (Dasilas and Leventis, 2013). As a result, Greece experienced a remarkable increase in its stock market and the ASE was considered a developed market from 2000 until 2015² (FTSE, 2011; Tsalavoutas et al., 2012; Tsipouri and Xanthakis, 2004; Dasilas and Leventis, 2013). During this positive economic growth period, the number of companies listed on the ASE increased, and the significant use of IPO's changed many private-family owned companies to public listed companies, and the need for modernization and supervision by the market became a necessity (Tsipouri and Xanthakis, 2004). Although many private-family owned businesses became publicly listed firms through this expansion of the ASE, this did not change the relatively high levels of concentrated family ownership (Lazarides, 2010). The massive entrance of institutional and individual investors into the capital market, mainly through placements

² Greece was demoted to an advanced emerging market according to FTSE Russell in its FTSE Annual Country Classification Review-2015 as of March 2016.

on small and medium capitalization firms, increased the stock prices and liquidity of these companies.

This unprecedented rise in value of the ASE came to an end when international institutional investors discovered that the ASE was overvalued and wanted to realize their profits (Dasilas and Papasyriopoulos, 2015). The stock market started experiencing losses, which reached an average of almost 90% of its peak value, there was a great reduction in trade turnover and the number of IPOs, and thus firms turned to alternative forms of financing, such as bank lending, where access to credit was easy and the cost of debt low (Tsipouri and Xanthakis, 2004; Dasilas and Leventis, 2013). More specifically, the ASE General Index realized an annual decrease of 38.8% in 2000, a 23.5% decrease in 2001 and a 32.5% decrease in 2002. In 2002, the total value of transactions in the ASE decreased by 85.7% in comparison to 1999. Total market capitalization in 2002 amounted to 65.7 billion euros, a decrease of 66.7% in relation to 1999 (Spanos, 2005). Later on, the global credit crunch crisis of 2008 and Greece's subsequent sovereign debt crisis resulted in the ASE reaching even lower levels (Dasilas and Papasyriopoulos, 2015). Greece was demoted from a developed market to an advanced emerging market as of March 2016, due to recent extended market closure, capital control imposition on domestic markets and continuous economic instability (FTSE, 2015).

The ASE is small in comparison to other European stock markets in terms of market capitalization, turnover and number of listed firms (Sikalidis and Leventis, 2016). Greek firms are still to a large extent family owned with high ownership concentration. Only 20-50% of Greek firms are freely floated firms, thus the ability to achieve control of a firm through capital markets is limited. Family members or the controlling

shareholders are part of the management group and there is often no distinction between management and ownership. Thus, financial statements have lower value as a prime source of information and communication for owners (Tzovas, 2006; Tsalavoutas and Evans, 2010; Dasilas and Leventis, 2013). Even in cases where managers are not part of the family or the controlling shareholder, they have close ties with them and are often subject to their control (Lazarides and Drimpetas, 2011). Furthermore, the Greek legal system is based on civil law, resembling the French-code system, which typically is related to high ownership concentration, weak legal protection for shareholders and poor law enforcement (Tsalavoutas and Evans, 2010; Caramanis et al., 2015). Banks are still the main source of capital for firms, which has fostered the development of personal relationships between banks and firms, where bank lending relies on personal relationships, collateral, political intervention and social criteria (Tsalavoutas and Evans, 2010). This creates a situation whereby banks rely heavily on the information provided by the firm's owners, thereby diminishing the importance of public accounting information (Tsipouridou and Spathis, 2014). Furthermore, the need for external financing is greater given the fact that internal financing of projects by Greek firms is limited, due to Greek corporate law which mandates an annual minimum cash dividend distribution equal to 35% of net profits minus the amount needed to maintain regular reserves (net distributable earnings) or 6% of share capital, whichever is higher (Corporate Law 2190/1920, as amended by Laws 148/1967 and 876/1979). The main reason for this law is to minimize potential agency conflicts and protect minority shareholders (Sikalidis and Leventis, 2016). If a firm wanted to bypass this requirement and not distribute a cash dividend, 70% of the voting rights are required, while a smaller distribution than the one required by law needs a 65% voting right agreement. However most Greek shareholders vote in favor of the proposed dividend distribution. Therefore

Greek firms rely on external debt and equity financing for their financial needs (Dasilas and Papasyriopoulos, 2015; Sikalidis and Leventis, 2016).

The Greek accounting environment is tax-driven and conservative (Ballas, 1994). Tax rates are perceived to be high and in their attempt to avoid taxes firms use earnings management techniques (Baralexis, 2004). The link between tax avoidance and earnings management of Greek firms has been examined extensively in the literature (see for example, Leuz et al. (2003), Baralexis (2004), Caramanis and Spathis (2006), Burgstahler et al. (2006), Ghicas et al. (2008)) as stated by Tsalavoutas and Evans (2010).

1.3 Evolution of Corporate Governance in Greece

Although the issue of Corporate Governance can be dated back as far as 1776 (Adam Smith) in developed countries, in Greece the topic was considered much later. Legislators and business people in Greece began trying to change a corporate culture that was highly focused on government affairs since the creation of the modern Greek state (Mertzanis, 2001). It was only after the two major financial crises in South-East Asia in 1997 and in Russia in 1998, that concerns about corporate governance rose in Greece (Mertzanis, 2001).

The great increase in the ASE from 1995-2000, followed by the record decrease, created the need to re-establish investor confidence and effective corporate governance was an essential part of this effort. Although international capital providers required effective corporate governance after the expansion of the ASE, the great decline of the ASE that followed indicated that the governance structure of Greek firms was inefficient. Many instances of corporate scandals took place and it became evident that implementation of modern forms of corporate governance structures were necessary so as to protect

shareholders' rights, restore investor's confidence and increase firm performance (Dimitropoulos and Asteriou, 2010; Dasilas and Leventis, 2013).

Following along these lines, the Hellenic Capital Market Commission (HCMC) in collaboration with market participants, company experts, auditors, legal practitioners and investors, began discussing extensively the corporate governance issue (Florou and Galarniotis, 2007; Mertzanis, 2001; Tsiouri and Xanthakis, 2004).

More specifically, the corporate governance topic was first formally introduced in 1998 through a paper published by the ASE. A number of discussions and conferences led to the creation of a voluntary code of conduct in October 1999, known as the Blue Book (Tsiouri and Xanthakis, 2004). In collaboration with all relevant agents, the HCMC developed a Committee of Corporate Governance in Greece, which presented a white paper in 1999, titled "*Principles of Corporate Governance in Greece*" whose voluntary corporate governance code was based on internationally accepted corporate governance principles (Florou and Galarniotis, 2007; Zhou et al., 2018) This voluntary Greek CG code reflected OECD principles (Mallin, 2010: 38) The changes the Committee opted for were focused mainly on corporate transparency, consistency and accountability (Mertzanis, 2001).

The Committee was aware of the fact that the set of practices set out would be effective if they were characterized by the voluntary behavior of all relevant parties involved and should conform to the best practices of the member-states of the European Union and the OECD recommendations (Mertzanis, 2001). The motive behind the voluntary nature rather than a mandatory one, was to minimize the risk of companies complying with the letter rather than the spirit of efficient governance (Mertzanis, 2001).

In 2000, the Center of Financial Studies in the Department of Economics of the University of Athens began a project financed by the ASE, aimed at creating a rating system for compliance with the corporate governance criteria for listed companies on the ASE. This indicated to the financial community that the corporate governance debate was an important issue (Tsipouri and Xanthakis, 2004; Spanos, 2005).

The importance of corporate governance led to the development of two major rules created by the HCMC in 2000. The first rule, Rule 5/204/2000, named “A code of conduct for companies listed in the Athens Stock Exchange and their affiliated parties”, set the duties and obligations of major shareholders, the board of directors, executive management and others. Its aim was to eliminate uncertainty in the market on corporate matters (HCMC Rule 5/204/2000). The second rule, Rule 1/195/2000, named “Tender offers in the capital market for the acquisition of securities”, set the new framework for takeover bids (HCMC Rule 1/195/2000) (Spanos, 2005).

In alliance with the HCMC, the Ministry of National Economy and Development set up a law in 2000, creating a committee on corporate governance, the Rokkas Committee. This led to an intense debate between the Hellenic Federation of Industries, which believed that a corporate governance voluntary code should be applied, and the State, which wanted a law that would make corporate governance application mandatory (Spanos, 2005).

In August 2001, the Hellenic Federation of Industries introduced voluntary principles of Corporate Governance primarily for companies listed in the ASE (Tsipouri and Xanthakis, 2004). In March 2002, a corporate governance rating system was presented by the Center of Financial Studies of the University of Athens (Spanos, 2005). The main conclusions drawn from this survey were that overall Greek companies listed on

the ASE demonstrated a fairly satisfactory degree of compliance with corporate governance principles (Tsipouri and Xanthakis, 2004).

The year 2002 was a critical year for corporate governance in Greece. In May 2002, the Greek Ministry of National economy created Law 3016/2002³, named “On Corporate Governance, board remuneration and other issues”. This law was a response to numerous corporate scandals in the 1990s (Dasilas and Papasyriopoulos, 2015). The law set by the Greek Ministry of National Economy was based on the initial plan of the Rokkas Committee. For the first time Greek listed companies were obliged to enforce a set of governance guidelines. The main requirements according to the new law involved the composition of the Board of Directors, non-executive directors’ remuneration, internal auditing, share capital increases and the participation of shareholders in the decision-making process (Dimitropoulos and Asteriou, 2010). Law 3016/2002 mandates that the number of non-executive directors be at least 1/3 of the total number of board members. At least two of the non-executive directors should be independent, whereby independence is defined as board members that do not own any stock of the firm and are not on the company’s payroll (Dasilas and Papasyriopoulos, 2015). Additionally, the law requires all listed firms to adopt an internal audit function so as to ensure the credibility of the disclosed information. Greek firms are free to choose their leadership structure between a unitary leadership structure, that is CEO duality, or a two-tier leadership structure (non-duality) (Dasilas and Papasyriopoulos, 2015). It is worth noting that throughout this legal process of the creation and implementation of the governance law, the Hellenic Federation of Industries firmly

³ Law 3016/2002 on corporate governance, board remuneration and other issues, as amended by article 26, Law 3091/2002.

believed that governance codes should be voluntary and not legally enforceable (Florou and Galarniotis, 2007).

In an effort to continuously reform and revise the existing corporate governance law, the ASE in July 2002 established qualitative criteria covering corporate governance, transparency and communication, which were optional and in addition to the laws that already existed (Spanos, 2005).

Based on this effort of continuous improvement, Greece transposed a number of discrete legislative acts from several European directives in the area of company law into the Greek legal framework, creating new CG rules. More specifically, Law 3693/2008, named “Mandatory audit of annual and consolidated financial reports”. This law requires all listed firms to have their annual and consolidated financial statements audited by an external auditor. Additionally, the creation of an audit committee is made mandatory for all listed firms and complete disclosure of the firm’s external auditor is required. In accordance with this law, firms are obliged to provide a comprehensive description of their external audit firm including its corporate governance structure, its professional relationship with the firm and all fees provided to it. The audit committee oversees the external auditor and ensures its independency and objectivity, especially in cases where the external audit firm provides non-audit services, such as consulting or tax-related services, that could potentially compromise its objectivity and independence. Law 3693/2008 transposes the 8th European Directive 2006/43/EC on Company Law into Greek legislation on statutory audits of annual accounts and consolidated accounts (Nerantzidis and Filos, 2014).

In 2010, Law 3873/2010 was created, incorporating into Greek legislation EU Directive 2006/46/EC and 2007/63/EC. This law’s greatest contribution is the requirement for

all listed firms to disclose a CG statement in their annual report. This CG statement gives information on which voluntary CG code the firm implements, additional CG practices the firm uses beyond those legally required, while also provide reasons for not conforming to the requirements of CG laws. The law also permitted firms to either adopt existing CG codes or create their own CG code based on their firm's needs. The CG statement should include information on the main features of any principle risk management system the firm has, existing internal controls for the preparation of the firm's financial statements and the composition of the board and its committees. Penalties are imposed on the board members of firms that do not prepare such a CG statement in their annual report (Nerantzidis and Filos, 2014).

In addition to this law, in 2010, Law 3884/2010 was introduced concerning the rights of shareholders and the company's obligation regarding disclosure of information prior to general meetings. This law incorporated into Greek legislation EU Directive 2007/36/EC. This law enables all shareholders to either personally participate and vote in general meetings or appoint a representative for the general meeting. The principle innovation of this law is the establishment of e-participation, i.e. watching or interacting in real time, as well as mail voting or e-voting, to allow for distant voting (Nerantzidis and Filos, 2014).

The presence of voluntary CG codes in Greece appeared for the first time in December 2010 by the Hellenic Association of Investors & Internet (SED), a non-profit association that acts as a representative of private investors of Greece in the advisory Committee of Hellenic Capital Market. In the 8th Conference of their Association, a 'Charter-Map of Corporate Governance' was introduced for Greek listed firms in the ASE. This 'Charter-Map' promotes the use of international CG best practices so as to

enhance transparency and shareholder activism. SED also created a CG index based on the 'Charter-Map', so as to assess Greek listed firms on CG practices they adopted (Nerantzidis and Filos, 2014).

The establishment of laws concerning corporate governance mechanisms provided a stimulus for the Hellenic Federation of Industries to prepare a *Corporate Governance Code* for listed companies. A well-developed first draft was published in 2010 and after suggestions and feedback the final draft, with minor amendments, was published in 2011. The main objective of the Code was to educate and guide board of directors of Greek companies on governance best practice. Another crucial aim of the Code was to improve shareholder information and provide an easily available reference system for listed companies, which, as of 2011, are required by Law 3873/2010, as mentioned earlier, to disclose annually information about their corporate governance, in a statement as a specific and clearly identifiable section of the annual report. The Code also provided a guide for Greek board of directors on CG best practices. Additionally, this Code was the first CG code that explicitly stated that Greek firm should apply the 'comply or explain' concept, a concept that other EU members had already practiced.

In 2012, the Hellenic Exchanges in a joint collaboration with the Hellenic Federation of Industries formed the Hellenic Corporate Governance Council (HCG Council). The HCG Council encourages, supports and monitors the implementation of a CG code by Greek firms. The Code implemented, could either be the existing CG Code or one that a firm creates based on its needs. HCG Council as a distinct body that certifies the relevance and implementation of a CG code, indicates the recognition of the importance of corporate governance in sustaining the competitiveness of Greek firms and

enhancing their credibility in the eyes of Greek and foreign investors (Grose et al., 2014).

A first review of the Greek CG code created at the initiative of the Hellenic Federation of Industries in 2010, as previously stated, was conducted on June 28, 2013 by the Hellenic Corporate Governance Council. The revised code, created in 2013, is now called the *Hellenic Corporate Governance Code*, which continues to promote the enhancement of the Greek corporate institutional framework.

1.4 Literature Review and Hypothesis Development

The relationship between corporate governance and earnings management is extensively examined in the literature. This literature review focuses on a composite measure of corporate governance, in the form of a corporate governance index, and its effect on earnings management practices to form the hypothesis that is tested and discussed in the following sections. The use of an overall corporate governance index captures the multidimensional character of corporate governance and provides a more holistic indication of corporate governance quality. Larcker and Richardson (2004) state that looking at each individual CG variable by itself limits the ability to measure the entire magnitude of CG and provides an incomplete analysis of the determinants of EM.

In line with this, Larcker et al. (2007) use 39 individual measures of CG grouped into seven categories: characteristics of the board of directors; stock ownership by executives and board members; stock ownership by institutions; stock ownership by activist shareholders; debt and preferred stock holdings; compensation mix variables; and anti-takeover devices. These 39 individual governance items result in the creation of 14 multi-indicator CG indices based on exploratory principal component analysis

(Larcker et al., 2007). The authors examine 2,106 firms in 2003 and find that the 14 CG indices⁴ are associated with EM. Their research reveals an association between some governance indices and EM, such as stock ownership by activist holders, board size, antitakeover devices and old directors. However, the majority of governance factors indicate unexpected associations with EM.

Shen and Chih (2007) also examine the relationship between CG and EM. They use a CG index created using CG data found in the Credit Lyonnais Security Asia (CLSA) report for nine⁵ Asian countries. The CLSA report includes CG information about 495 firms in 25 Asian countries for April 2001 and February 2002, covering seven categories: management discipline; transparency; independence; accountability; responsibility; fairness; and social awareness. Shen and Chih (2007) find that firms with poor CG, based on these measures, conduct more EM.

Similarly, Bowen et al. (2008) test a CG score, based on the Gompers et al. (2003) G-index, and associate this CG score with EM. Their CG index is based on 3,154 US firm-year observations for the period 1992-1995. They find no significant relationship between CG and EM.

Jiang et al. (2008) used the Gov-Score based on the research by Brown and Taylor (2006), to examine the relationship between CG and earnings quality. They use US data for 4,311 firm-year observations for the period 2002- 2004 and examine the effect

⁴ CG data for the sample was generated from two comprehensive datasets: Equilar Inc. and TrueCourse Inc and covered 70% of the Russell 3000 market capitalization in the US. Equilar Inc. provides complete data on board, board committees (audit and compensation) and equity ownership by executives and board members. TrueCourse Inc. is a dataset that consists of anti-takeover provisions for US firms that are incorporated in major indices such as the Fortune 500, Standard & Poor's Super 1500 and others.

⁵ The nine Asian countries used in the study are Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand.

of the CG index on earnings quality. Their study concludes that higher levels of CG are associated with lower levels of EM, thus higher earnings quality.

Bekiris and Doukakis (2011) examine the association between CG and EM for firms listed in the Athens, Milan and Madrid Stock Exchanges for 2008. Their CG index consists of 55 individual CG items, categorized into five areas: board of directors; audit; remuneration; shareholder rights; and transparency. Variables included in their CG index were taken from the existing literature⁶, two basic CG rating firms⁷, as well as the Standard and Poor's Disclosure and Transparency Index. Their sample consists of 185 firms listed on the Athens Stock Exchange, 155 firms listed on the Milan stock exchange and 87 firms on the Madrid Stock Exchange, resulting in a total sample of 427 firms. Their research concludes that an inverse relationship between CG and EM exists, both overall as well as in each market separately.

Shan (2015) examines whether good governance practices are more likely to constrain EM for firms listed on the Shanghai SSE 180 and Shenzhen SSE 100. His final sample consists of 1,012 firm-year observations for the period 2001-2005. Corporate governance quality is proxied through the creation of a CG index. His CG index consists of eight corporate governance mechanisms; state & foreign ownership concentration, board size, board independence, supervisory board, professional supervisor, audit committee independence and Big 4 auditor. His research suggests that firms with good governance practices mitigate EM.

In a Greek context, the effect of a CG index on EM has been examined by Bekiris and Doukakis (2011), where they report a significant negative relationship between the two variables. This study also examines the relationship between a CG index created for

⁶ See Florou and Galarniotis (2007).

⁷ Risk Metrics, former ISS and GMI Ratings.

Greek listed firms and EM. The difference between this study and Bekiris and Doukakis (2011) work is that this study examines a single country setting, only Greece, while Bekiris and Doukakis (2011) study Greek, Italian and Spanish firms. Additionally, Bekiris and Doukakis (2011) sample consists of 185 firms for only the year 2008, while this sample includes 788 firm-year observations for the period 2006-2012. Finally, Bekiris and Doukakis (2011) study the year 2008, whereby the only governance law that existed was Law 3016/2002, while this study examines the period 2006-2012, where apart from Law 3016/2002, additional governance-related laws are enacted, such as Law 3016/2008, Law 3873/2010 and Law 3884/2010 that affect the governance mechanisms of Greek listed firms.

Based on the overall view in the literature the following hypothesis is tested:

H1. A negative relationship exists between the CG index created for Greek firms and EM is expected.

The implementation of Greek law 3693/2008 is expected to create a stronger negative association between the CG index created for Greek firms and EM, and accordingly the following hypothesis is also tested:

H1'. A stronger negative relationship between the CG index created for Greek firms and EM is expected.

1.5 Research Design

Empirical models used in this study

The aim of this research is to examine the influence of corporate governance mechanisms on EM before and after the implementation of Law 3693/2008 concerning the audit of annual and consolidated financial statements by an independent external

auditor and the mandatory existence of an audit committee for all Greek listed firms.

The following regression model will be used:

$$EM = \beta_0 + \beta_1(\text{governance quality})_{it} + \beta_2(\text{controls})_{it} + \varepsilon_{it}$$

This regression is tested for periods before and after the implementation of Law 3693/2008.

Earnings Management models applied in this study

Measurement of the discretionary accruals models used in the study are the cross-sectional version of the modified Jones model by Dechow et al. (1995) and the DeFond and Park (2001) model. Absolute values are used to measure EM, regardless of whether EM is used to increase or decrease income, thus capturing the combined effect of both types of EM (Ianniello, 2015; Maijoor and Vanstraelen, 2006; Katmon and Farooque, 2017). This approach is also used in previous studies and is deemed appropriate in countries with tax-oriented reporting systems, as is the case in Greece, where managers are motivated to manage their earnings in both directions (Prencipe and Bar-Yosef, 2011; Klein, 2002a). Likewise, Baralexis (2004) states that Greek firms engage in both income-increasing and income-decreasing EM due to different motives directly related to their size. Large Greek firms tend to engage in income-increasing EM since their primary motive is external financing, while small firms understate profit since their primary incentive is the reduction of income taxes (Baralexis, 2004). Therefore, this study examines the magnitude of EM and not its direction.

Modified Jones model

This study uses the cross-sectional version of the modified Jones model as the first EM accruals-based method by Dechow et al. (1995). Research conducted by Dechow et al.

(1995) concludes that the modified Jones model performs the best in detecting sales-based abnormal accruals. Guay et al. (1996) also state that this model is the most powerful in detecting EM in cases where managers use their discretion in revenue recognition, thus increasing the precision of the model compared to the original Jones model (Tsipouridou and Spathis, 2014). Additionally, the cross-sectional modified Jones model is also chosen so that changes in economic conditions in specific years affecting specific accruals will be filtered out since the model is re-estimated every year (Tsipouridou and Spathis, 2012). Furthermore, according to the research conducted by Larcker and Richardson (2004), the time series model assumes temporary stationarity of parameter estimates whereas the cross-sectional version assumes homogeneity across companies in the same industry (Tsipouridou and Spathis, 2012). Finally, in similar research such as Cornett et al. (2008), Jiang et al (2008), and Jaggi and Leung (2007), all of which examine the effect of CG on EM, the use of the modified Jones model is also implemented for determining discretionary accruals.

In contrast to previous studies that have used total operating accruals to measure EM, this study focuses on the working capital component, since current accruals are easier for managers to manipulate (Xie et al., 2003). Total operating accruals in previous studies has been defined as working capital accruals plus an important long-term accrual, depreciation (Peasnell et al., 2005). As per Beneish (1998), this long-term component provides a limited way to detect EM, since changes in depreciation methods are not easily accomplished and attract attention from auditors and investors (Peasnell et al., 2005). Other long-term accruals, such as defined benefit pension obligations and certain environmental liabilities are suitable for detecting EM, but due to their complexity are not used as a proxy for EM by previous studies (Peasnell et al., 2005). Due to the absence of a model describing what drives these other long-term accruals, it

is difficult to distinguish between discretionary and non-discretionary accruals when total accruals are used, and the power of the tests will be negatively affected if these components are not used (Peasnell et al., 2005). Therefore, the focus in this study is on discretionary current accruals to measure EM.

Current accruals are defined as the change in non-cash current assets (non-cash current assets = current assets - cash & short-term investments) less the change in non-debt current liabilities (non-debt current liabilities = current liabilities - short-term debt & current portion of long-term debt). Total current accruals are assumed to be the sum of both discretionary and non-discretionary accruals. To find the non-discretionary component of accruals for a given firm-year observation, current accruals are first regressed on the change in sales from the previous year for all non-sample companies in the same industry. The industry classification is based on the Industry Classification Benchmark (ICB), which is used globally to divide the market into specific categories, allowing investors to compare industry trends between well-defined subsectors.⁸ In order to avoid heteroskedasticity, consistent with Teoh et al. (1998a), each variable is deflated by lagged total assets:

$$\frac{CA_{it}}{TA_{it-1}} = \alpha \left(\frac{1}{TA_{it-1}} \right) + \beta_1 \left(\frac{\Delta REV_{it}}{TA_{it-1}} \right)$$

where

CA_{it} =total current accruals of firm i in year t

TA_{it-1} =book value of total assets of firm i at the end of year $t-1$

$\Delta REV_{it} / TA_{it-1}$ =the change of sales of firm i in year t scaled by TA_{it-1}

The estimation of regression coefficients is carried out for each industry year and for each Greek firm in the sample. A separate regression is run for each firm, including all

⁸The Industry Classification Benchmark (ICB) is a definitive system categorizing over 70,000 companies and 75,000 securities worldwide, enabling the comparison of companies across four levels of classification and national boundaries. The ICB system is supported by the ICB Database, a data source for global sector analysis, which is maintained by FTSE Group. For further information, see <http://www.icbenchmark.com/>.

firms in the same industry, but excluding the sample firm each time from the regression. As per Klein (2002a), industries with less than eight observations should be excluded from the analysis, so as to control for industry-wide changes in economic conditions that influence the accrual process. Having followed this approach in this study, the industries that should have been excluded would include firms with large capitalization, whose data are important for this study. For this reason, all firms were incorporated in the study and similar industries were combined.⁹ The regression coefficients of the previous equation are the parameters of interest in estimating changes in non-discretionary accruals. Using these coefficients, each sample firm's non-discretionary current accruals are calculated. It should also be noted that the change in accounts receivable is not included in estimating the coefficients, although it is used in the estimation of non-discretionary accruals (Ashbaugh et al., 2003; Jaggi and Leung, 2007). The non-discretionary current accruals are the portion of current accruals that are considered independent of managerial control and are created due to the company's sales growth (Xie et al., 2003).

Non-discretionary current accruals ($NDCA_{it}$) are estimated as follows:

$$NDCA_{it} = \hat{\alpha} \left(\frac{1}{TA_{it} - 1} \right) + \hat{\beta} \left(\frac{(\Delta REV_{it} - \Delta REC_{it})}{TA_{it} - 1} \right)$$

where

$NDCA_{it}$ =non-discretionary current accruals of firm i in year t

TA_{it-1} =book value of total assets of firm i at the end of year t-1

$\Delta REV_{it} - \Delta REC_{it} / TA_{it-1}$ =the change of sales of firm i in year t less the change of receivables scaled by TA_{t-1}

Discretionary current accruals, DCA_{it} are then defined as the remaining portion of the current accruals:

⁹ See the sample selection procedure section for more details.

$$DCA_{it} = \left(\frac{CA_{it}}{TA_{it} - 1} \right) - NDCA_{it}$$

where

DCA_{it} =discretionary current accruals of firm i in year t

CA_{it} =total current accruals of firm i in year t

TA_{it-1} =book value of total assets of firm i at the end of year t-1

$NDCA_{it}$ =non-discretionary current accruals of firm i in year t

DeFond and Park (2001) model

This research also uses the DeFond and Park (2001) model to measure EM. As observed in the research of Peek et al. (2013), for studies that include a limited number of observations per year/industry, the estimation of discretionary accruals based on Jones type models can result in estimations that may be unrealistic (Wysocki, 2004; Marra and Mazzola, 2014). Therefore, given the sample size and the number of firms listed on ASE and included in this study, the DeFond and Park (2001) model is also implemented. This model is also used in the research of Marra et al. (2011) and Prencipe and Bar-Yosef (2011), whose samples are also similar in size and who also examine the effect of CG on EM.¹⁰

For similar reasons to those proposed for the modified Jones model, working capital accruals are used as the second proxy for EM, instead of total accruals. In the DeFond and Park (2001) model AWCA is estimated separately for each company, as follows:

$$AWCA_t = WC_t - \left(\frac{WC_t - 1}{S_t - 1} \right) * S_t$$

where

$AWCA_t$ =abnormal working capital accrual in year t;

WC_t =non-cash working capital accruals in year t;

WC_{t-1} =working capital at the end of year t-1;

S_t =sales in year t; and

S_{t-1} =sales in year t-1.

¹⁰ Marra et al. (2011) have a sample of 222 firms per year from 2003-2006, while Prencipe and Bar-Yosef (2011) have a sample of 122 firms in 2003 and 127 firms in 2004. This study's sample is 227 in 2006, 222 in 2008 and 199 in 2010.

Non-cash working capital accruals are computed as non-cash current assets (current assets-cash and short-term investments) - non-cash current liabilities (current liabilities-short-term debt).

Working capital accruals are calculated by scaling sales instead of total assets, as is the case in the modified Jones model, since sales is considered a more appropriate scalar because it is directly related to earnings (Ianniello, 2015).

The positive element of the DeFond and Park (2001) model compared to the modified Jones model is that normal accruals are measured for each firm separately, and so are tailored to each observation of the sample. The modified Jones model measures normal accruals based on a coefficient from a pooled cross-sectional regression, including firms that are in the same industry. Therefore, the modified Jones model uses industry-wide estimates, while the DeFond and Park (2001) model uses firm-specific measures. For example, although within an industry each firm's specific characteristics affect normal capital accruals, this is only truly captured through the DeFond and Park (2001) model, since the modified Jones model uses the average effects of firms in the same industry to measure normal accruals (Defond and Park, 2001). Thus, it is important to also use this model, since it complements the Modified Jones model.

Governance quality measures applied in this study

Governance quality is measured through the use of a CG index. The process of developing reliable and valid measures of CG is of utmost importance. According to Larcker et al. (2007), accounting is basically interested in measurement issues. They state that although research has been conducted on measuring constraints of accrual EM, such as Dechow et al. (1996), little attention has been given to the measurement

of CG. Therefore, the construction of a CG index, as a measure of governance quality, is of utmost importance, to assess its ability to constrain earnings management processes. The model also includes control variables that could potentially affect earnings management.

Construction of CG Index

The corporate governance index developed for the purpose of this study is based on Greek CG laws and particular features of the Greek CG code created by the Hellenic Federation of Industries in 2010, and examines its relationship to EM.

The CG index draws upon three sets of regulations/best practice guidance and thus is separated into: (a) requirements drawn from Greek law (No.3016/2002), which obliges Greek firms to apply a set of governance standards, such as the participation of non-executives and independent non-executives on Greek companies' boards, the establishment of an internal control function and the adoption of internal charters; (b) the Greek law on audit committees (No.3693/2008, Article 37), which requires the creation of audit committees; and (c) voluntary best practice items that are included in the *Greek CG Code* created by the Hellenic Federation of Industries in 2010, as an effort to promote the continuous enhancement of the Greek corporate institutional framework and the broader business environment. This approach is in accordance with other studies that also use national corporate governance regulations and codes (e.g. Alves and Mendes (2004), Drobetz et al. (2004), and Florou and Galarniotis (2007)).¹¹

¹¹ Florou and Galarniotis (2007) incorporate in their index the *Greek Corporate Governance Code* developed by the Committee on Corporate Governance in 1999, as well as additional international best practices. Therefore some items included in the Florou and Galarniotis (2007) index are optional and considered best practice, whereby in the CG index constructed for this study they are compulsory.

The CG index created for this study consists of 40 items of which 13 items are based on the first Greek CG Law (Law 3016/2002), three are based on the CG law requiring the existence of an audit committee (Law 3693/2008, Article 37) and 24 are based on the voluntary items based on the Greek CG Code. Therefore the CG index consists of 16 “compliance” items that are mandatory because of the CG laws and 24 “voluntary” items that are optional and are based on best practices.¹² The 40 items of the CG index are placed in the following four broad CG categories: (i) Board of directors, (ii) Internal Auditing and Corporate Services, (iii) Board Committees, and (iv) Disclosure and Transparency. Each category includes items based on Greek CG Laws and voluntary items based on the recommendations of the Greek CG Code. More specifically, ‘Board of directors’ includes three items from the first Greek CG Law (Law 3016/2002) and seven items from the recommendations of the Greek CG Code; ‘Internal Auditing & Corporate Services’ includes eight items from the first Greek CG Law (Law 3016/2002); ‘Board Committees’ includes three items from the Greek CG Law concerning audit committees (Law 3693/2008, Article 37) and 11 items from the recommendations of the Greek CG Code; ‘Disclosures and Transparency’ includes two items from the first Greek CG Law (Law 3016/2002) and six items from the recommendations of the Greek CG Code. Table 1 lists the items in each category of the CG index.

¹² The three items concerning the audit committee law are also considered as voluntary items for the data collected for 2006, therefore there are 13 “mandatory” items and 27 “voluntary” items for 2006.

Table 1 Items in each category of the CG index

<u>Board of Directors</u>	
1.	Board of directors consists of both executives and non-executives (<i>mandatory item</i>)
2.	Non-executive directors are $\geq 1/3$ of the total board size (<i>mandatory item</i>)
3.	Board of directors includes at least two independent non-executives (<i>mandatory item</i>)
4.	Board size should be between 7 and 15 (<i>best practice / optional item</i>)
5.	Board should consist of a majority of non-executives (<i>best practice / optional item</i>)
6.	Board should consist of at least 2 executive members (<i>best practice / optional item</i>)
7.	Independent members are at least 1/3 of the members of the board (<i>best practice/optional item</i>)
8.	Split between the chairman and the CEO roles (<i>best practice / optional item</i>)
9.	If CEO duality does not exist, an independent vice-chairman exists (<i>best practice / optional item</i>)
10.	A financial chief executive officer is appointed to the management team (<i>best practice / optional item</i>)
<u>Internal Auditing & Corporate Services</u>	
11.	Internal auditors are independent (<i>mandatory item</i>)
12.	Internal auditors are supervised by the board (<i>mandatory item</i>)
13.	Internal auditors are appointed by the board (<i>mandatory item</i>)
14.	Internal auditors are full-time employees of the company(<i>mandatory item</i>)
15.	Internal auditors are not members of the board (<i>mandatory item</i>)
16.	The company has an internal audit function (<i>mandatory item</i>)
17.	The company has an investor relations function (<i>mandatory item</i>)
18.	The company has a corporate announcements function (<i>mandatory item</i>)
<u>Board Committees</u>	
19.	Existence of an audit committee (<i>mandatory item after 2006</i>)
20.	Audit committee consists of 3 non-executives, of which 1 is an independent non-executive (<i>mandatory item after 2006</i>)
21.	The independent non-executive member of the audit committee has financial/accounting expertise (<i>mandatory item after 2006</i>)
22.	The company has a nomination committee (<i>best practice / optional item</i>)
23.	The nomination committee has at least 3 members (<i>best practice / optional item</i>)
24.	The majority of the nomination committee should be non-executive (<i>best practice / optional item</i>)
25.	The nomination committee should be chaired by an independent non-executive member (<i>best practice / optional item</i>)
26.	The audit committee should be composed exclusively of non-executive board members (<i>best practice / optional item</i>)
27.	The audit committee is chaired by an independent non-executive member (<i>best practice / optional item</i>)
28.	The company has a remuneration committee (<i>best practice / optional item</i>)
29.	The remuneration committee should be composed of entirely non-executive members (<i>best practice / optional item</i>)
30.	The majority of the remuneration committee should be independent (<i>best practice / optional item</i>)
31.	The members of the remuneration committee should be at least 3 (<i>best practice / optional item</i>)

32. The chair of the remuneration committee should be an independent- non-executive member
(best practice / optional item)

Disclosures and Transparency

33. Separate disclosure of the remuneration of non-executive directors in the account notes
(mandatory item)
34. Disclosure of the ownership structure (from Law2190/1920) *(mandatory item)*
35. Disclosure of corporate targets and prospects *(best practice / optional item)*
36. The corporate governance statement discloses the term of appointment of each board member and contains their brief biographies *(best practice / optional item)*
37. The work of the nomination committee and the number of meeting is described in the corporate governance statement *(best practice / optional item)*
38. The annual corporate governance statement illustrates how the performance evaluation of the board and its committees has been conducted *(best practice / optional item)*
39. The annual corporate governance statement describes the work of the audit committee and the number of meetings held during the year *(best practice / optional item)*
40. The annual corporate governance statement summarizes the work of the remuneration committee and the number of meetings held during the year *(best practice / optional item)*

Scoring Approach

CG indices can be estimated using a *Scoring by item* method, a *Scoring by category* method or a *Scoring by expert* method (Nerantzidis, 2017). In the *Scoring by item* method, an equal weight is assigned to each item in the index. In the *Scoring by category* method, an equal weight is assigned to each category in the index, independent of the number of items included in that category. In the *Scoring by expert* method, each item and/or category is assigned a specific weight, in an attempt to capture the relative importance of each governance item and/or category.

The most commonly used approach in studies employing CG indices is the *Scoring by item* method (e.g. Gompers et al. (2003), Alves and Mendes (2004) and Ammann et al. (2011)) and thus, this study estimates the CG indices using the *Scoring by item* method. The *Scoring by expert* method was not chosen so as to avoid inconsistency and subjectivity when weights are applied. Although the disadvantage of not reflecting the relative importance of each governance item or category exists, the advantage of being transparent and relatively objective outweighs the disadvantage of not reflecting accurately the relative importance of each governance item or category (Florou and Galarniotis, 2007; Van den Berghe and Levrau, 2003; Jiang et al., 2008; Bekiris and Doukakis, 2011; Alves and Mendes, 2004).

The CG index for this study is constructed by manually recording each CG item as disclosed in the annual reports of Greek listed firms. The rating procedure is consistent with previous work on CG indices. The recording process applied a binary classification to all items, whereby a point of one is awarded when the governance item is present and zero otherwise. Non-disclosed or missing items are documented as n/d and non-applicable variables are disclosed as n/a. This led to the creation of two ratings for the CG index. In the first rating approach (*cg_pen index*), non-disclosed or missing

values are considered to be absent from the annual reports of the companies analyzed. Therefore firms are penalized during the rating procedure. In the second rating approach, (*cg_nonpen index*), the missing values are excluded from the analysis. In both ratings, non-applicable items are excluded from the analysis. This dual rating procedure is consistent with previous work of Florou and Galarniotis (2007) and Ammann et al. (2011).

Some items that comprise the CG index are recorded differently. Items concerning the nomination¹³ and remuneration committees in the CG index due to their dependency on previous items in the category were recorded as zero only in the first item in the category and not applicable (n/a) in all the remaining dependent items. This was applied because of the “comply or explain” principle underlying the CG Code. If the first item was recorded as not disclosed (n/d), all others were also classified as not disclosed (n/d),¹⁴ while in cases where the first item was classified as one (i.e. the governance variable was met), all other items were either classified as non-disclosed (n/d) or non-existing (zero). The same reasoning is applied to the items concerning the audit committee for the year 2006, since there was no law at that time for the mandatory existence of an audit committee. However, after 2006 all items were recorded as zero, where applicable, since the existence of an audit committee was mandatory.

When applying the *Scoring by item* scoring procedure, under both rating schemes (penalized and non-penalized), apart from calculating the total index which incorporates all CG items, there was an index created for each rating that included mandatory and voluntary variables separately. Therefore six indices are constructed,

¹³ The nomination committee items are 22, 23, 24, 25, 37, the remuneration items are 28, 29, 30, 31, 32, 40, and the audit committee items are 19, 20, 21, 26, 27, and 39.

¹⁴ If an item is n/d in “disclosures and transparency” (36, 37, 38, 39, 40) and no dependency exists it is recorded as zero not n/d.

where either non-disclosed and or missing items are recorded as zero and the sum divided by the total governance items, or non-disclosed items are excluded from the analysis, and the sum divided by the maximum expected. More specifically, the following indices are constructed when applying the *Scoring by item* method: (1) *cg_pen_total*, all items are included in the calculation of the index (2) *cg_pen_mand*, only mandatory items are included in the calculation of the index (3) *cg_pen_bp*, optional/best practice items are included in the calculation of the index (4) *cg_non_total*, all items are included in the calculation of the index (5) *cg_non_mand*, only mandatory items are included in the calculation of the index and (6) *cg_non_bp*, optional/best practice items are included in the calculation of the index.

Measurement of Control Variables

In addition to the main variables tested in the study, the use of variables that prior studies have found to be associated with EM are also controlled for so as to avoid the effect of possible puzzling factors (Bartov et al., 2001). This study examines the effect of corporate governance on EM, therefore it is necessary to control for other factors that influence EM, so as to achieve this goal.

The study uses five control variables consistent with previous studies, namely: concentrated ownership, leverage, firm performance, firm size and growth opportunities (Marra et al., 2011; Davidson et al., 2005; Peasnell et al., 2005; Park and Shin, 2004; Klein, 2002a).

Concentrated Ownership

The first control variable used is ownership concentration (ownconc) which is measured as the percentage of shares owned by the largest shareholder of the firm. Studies show that in firms with concentrated ownership, major shareholders may have the interest and the ability to persuade managers to influence EM so as to achieve gains at the expense of minority shareholders (Marra et al., 2011). On the other hand, studies indicate that concentrated shareholders might improve the monitoring process and therefore minimize EM (Davidson et al., 2005; Peasnell et al., 2005; Agrawal and Knoeber, 1996). Therefore, although ownership concentration appears frequently to have an effect on EM, the sign of this effect is not consistent.

Leverage

Another control variable used is leverage (lev), measured as total debt over total assets (Davidson et al., 2005; Beasley and Salterio, 2001; Klein, 2002a).

Leveraged firms are likely to increase EM when they are close to the violation of binding debt agreements (Marra et al., 2011; Park and Shin, 2004; Davidson et al., 2005). Therefore, highly leveraged firms may be highly motivated to manage their earnings. However on the other hand, the opposite might also exist, whereby highly leveraged companies might be less able to perform EM because of close scrutiny by creditors (Park and Shin, 2004). Therefore, the overall effect of leverage on EM is not consistent.

Firm Performance

Previous research shows that it is necessary to control for firm performance. Similar to the research of Klein (2002a) and Davidson et al. (2005), two measures are used. The first control variable is the absolute change in net income (absearn), calculated as the absolute change in net income between the current and prior periods scaled by total assets. Additionally, absolute current earnings (absni), calculated as the absolute value of net income before extraordinary items scaled by total assets, is also another control variable included in the study. Absolute values of earnings as control variables are used since the use of these variables is to control for the firm's inherent accruals or earnings process, not its direction. This is consistent with the approach of Kothari et al. (2005) that the period's abnormal accruals are associated with the company's earnings process (Klein, 2002a). For both indicators of firm performance a positive relationship with EM is expected.

Firm Size

Firms have the ability to choose among various corporate governance practices so as to implement structures that are more suitable for their business. The effect of firm size is controlled for through the use of the log of total assets (ta) (Bartov et al., 2001; Davidson et al., 2005).

Different sized firms need different corporate governance structures to meet their different needs (Peasnell et al., 2005). As firms change in size, diversity, and complexity, research shows that these changes influence corporate governance variables and EM. It is expected that larger firms have more difficulty in conducting EM, due to the fact that they are monitored more carefully by the market and other stakeholders (Bedard et al., 2004; Klein, 2002a; Park and Shin, 2004; Marra et al., 2011). On the other hand, Lobo and Zhou (2006) argue that larger firms find it easier to conduct EM due to the fact that the complexity of their operations makes it difficult to detect EM (Bekiris and Doukakis, 2011). Therefore the relationship between firm size and EM is not consistent.

Firm Growth

Prior studies indicate that it is necessary to control for a firm's growth by using sales growth (salesgrowth) measured as the change in sales compared to sales of the previous year, as in the research of Saenz Gonzalez and Garcia-Meca (2014).

Companies might be pressured to increase, maintain or exceed anticipated growth rates. This need creates an incentive to conduct EM (McNichols, 2000; Klein, 2002a). Firms with high growth opportunities may increase their current assets temporarily due to the anticipation of future sales growth. This practice might lead to a positive relationship between growth opportunities and EM (Park and Shin, 2004). In addition to this, fast-growing firms can conduct EM easier than slow-growing or stagnant firms, due to the fact that it is more difficult to trace EM in fast-growing firms and see through their business activities (Park and Shin, 2004). It is expected that there is a positive relationship between the extent of EM and a company's growth opportunities.

Empirical Research Models

This study examines the effect of governance on earnings management before and after the implementation of the 2008 governance law concerning the mandatory audit of annual and consolidated financial statements by an independent external auditor and the mandatory existence of audit committees for all Greek listed firms. This law requires an audit of annual and consolidated financial statements of all listed firms by a certified external auditor and the mandatory existence of an audit committee. The audit committee is responsible for all financial reporting processes of the firm and supervises the work of the external auditors. All processes and relationships with the external auditors need to be disclosed so as to ensure an objective and independent audit. These mandatory disclosures oblige firms to explicitly discuss corporate governance issues and thus are forced to examine and improve key CG issues. As such, corporate governance as a whole is influenced and positive changes are expected. Changes in CG mechanisms as a result of this law are examined through holistic governance scores in the form of CG indices.

Initially the relationship between governance quality and earnings management is tested, where a negative relationship between the two variables is expected. In order to highlight the role of corporate governance after the implementation of the 2008 CG law, the governance-earnings management relationship is tested through the use of a dummy year variable. The data is broken into two sub-samples, the pre-law sample before the implementation of the 2008 CG law (2006 and 2008) and the post-sample after the implementation of the 2008 CG law (2010 and 2012) through the use of a dummy year variable equaling one if the sample is in 2010 and 2012, or zero otherwise. It is expected that firms with stronger corporate governance are able to better restrain earnings management. Each regression is run separately for the pre-law period, the post-law period and the pooled sample. The potential change in the coefficients between the pre-law and post-law period tests whether there is a difference (structural change)

in the model between the two periods. This is tested by using pre-law and post-law data for each sample firm and utilizing a dummy year variable in the regression of the pooled sample.

To reduce the impact of extreme values on the results, all continuous variables are winsorized at the top and bottom 1% of the distribution (Chung et al., 2002; Tsipouridou and Spathis, 2012; Cheng et al., 2016).

It should be noted that all regressions are run twice: once with EM captured with the modified Jones model and once with the DeFond and Park (2001) model.

Statistical Properties and Econometric Issues

The relationship between earnings management and governance is tested applying the following model:

$$\begin{aligned} EM = & c(1) + c(2) * \textit{governance quality} + c(3) * \textit{ownconc} + c(4) * \textit{ta} + c(5) * \textit{lev} + c(6) \\ & * \textit{absni} + c(7) * \textit{absearn} + c(8) * \textit{salesgrowth} + c(9) * \textit{dummy year} + c(10) \\ & * \textit{governance quality} * \textit{dummy year} \\ & + \varepsilon \end{aligned}$$

Multicollinearity diagnostics are conducted in two ways. Firstly, bivariate correlations using Pearson and Spearman's rank correlation coefficients are examined. All values of any pairs of independent variables should be well below the critical range of 0.8, above which multicollinearity could cause a threat to the regression results (Gujarati, 2003: 359). Second, Variance Inflation Factor (VIF) tests are also used to test for multicollinearity, since it may still exist even if the correlation value is low. In order to ascertain that the regression model has no evidence of multicollinearity, VIF's of all independent variables should be below the critical value of 10 (Asteriou and Hall, 2007: 91).

Another important issue considered in the analysis is that of controlling for the possible endogeneity of the variables that could bias the results obtained (Campbell and Mínguez-Vera, 2008). According to Hermalin and Weisbach (2003) and Carcello et al. (2011), an OLS regression analysis in governance research can lead to endogeneity between corporate governance variables and other variables of interest, in this case earnings management. The existence of at least one source of endogeneity will cause the estimates to be biased and could potentially lead to spurious results (Schultz et al., 2010).

To deal with potential endogeneity, a system of simultaneous equations is used in this study to examine the hypotheses. Two equations are chosen so as to account for the effect of governance on earnings management, as well as the reverse effect.

The Generalized Methods of Moments (GMM) specification is utilized in this study which accounts for dynamic endogeneity, simultaneous endogeneity and unobserved heterogeneity in panel data models (Duru et al., 2016; Wintoki et al., 2012). GMM includes fixed effects so as to account for unobservable firm heterogeneity and thus is considered a better choice than traditional OLS estimation. Additionally, GMM is robust to firm-specific patterns of heteroscedasticity, serial correlation and gaps in the sample of unbalanced panels (Duru et al., 2016).

The basic concern is to be certain that a given variable is a proper instrument. Such an instrument is a variable that is correlated with the regressors and uncorrelated with the error terms (Tsionas et al., 2012). The exogenous variables chosen are prior year performance, powerful CEO and audit firm.

A major advancement in GMM is provided by Lewbel (1997), who illustrated that valid instruments are not only predetermined instruments, but also the cross-products of each instrument with the dependent variables. The cross-products of such variables can be

considered valid instruments so as to at least satisfy the order condition for identification (Tsionas et al., 2012). Lewbel (1997) development is based on the assumption that all variables are ‘potentially’ endogenous and no ‘outside’ variables can be determined to act as an instrument (Tsionas et al., 2012). As such, the entire set of instruments consists of the predetermined variables and the cross-products of all with the dependent variables. Additionally, all instruments implemented in this study will be deviations from their means.

It is also essential to examine if the instruments are ‘weak’, leading to biased results under GMM, even in large samples, where the distribution can be far from normal. This issue has been examined by Stock et al. (2002), who propose various tests to examine the issue of ‘relevant’ instruments (Tsionas et al., 2012). More specifically, Stock and Watson (2003: 350) state that running a first-stage regression and examining the F-statistic, is a perfect guide to determining if instruments are weak. If F is greater than 10, the choice of instrument is fine and GMM results are accurate (as also stated in Verbeek, 2008: 157).

The analysis is carried out using GMM as follows:

$$\begin{aligned}
 \mathbf{EM} = & c(1) + c(2) * \mathit{governance\ quality} + c(3) * \mathit{ownconc} + c(4) * \mathit{ta} + c(5) * \mathit{lev} + c(6) * \\
 & \mathit{absni} + c(7) * \mathit{absearn} + c(8) * \mathit{salesgrowth} + \mathbf{c(9) * \mathit{auditfirm}} + \mathbf{c(10) * \mathit{nip}} + c(11) * \\
 & \mathit{dummy\ year} + c(12) * \mathit{dummy\ year} * \mathit{governance\ quality} + \\
 & \varepsilon
 \end{aligned}
 \tag{Eq 1}$$

$$\begin{aligned}
 \mathbf{governancy\ quality} = & c(1) + c(2) * \mathit{em} + c(3) * \mathit{ownconc} + c(4) * \mathit{ta} + c(5) * \mathit{lev} + c(6) * \\
 & \mathit{absni} + c(7) * \mathit{absearn} + c(8) * \mathit{salesgrowth} + \mathbf{c(9) * \mathit{pshare}} + c(10) * \mathit{dummy\ year} + \\
 & \varepsilon
 \end{aligned}
 \tag{Eq 2}$$

Table 2 presents the measurement of the variables used in the analysis of this project.

Table 2 – Measurement of the variables used in the analysis

<u>Earnings Management</u>			WorldScope identifiers
Modified Jones model (<i>EM</i>)	discretionary accruals using the modified Jones model (Dechow et al. 2005)	Data sourced from Datastream	WC02201 WC02001 WC03101 WC03051 WC01001 WC02999 WC02051
DeFond and Park (2001) model (<i>AWCA</i>)	Absolute value of abnormal working capital accruals using the DeFond and Park (2001) model	Data sourced from Datastream	WC02201 WC02001 WC03101 WC03051 WC01001
<u>Governance Quality</u>			
<i>cg_pen_total</i>	CG index (all items included in calculation of index), whereby the non-disclosed values were considered as non-existent, therefore firms were penalized in the rating procedure. The <i>Scoring by item</i> rating approach is utilized.	Data hand-collected from annual reports	
<i>cg_pen_mand</i>	CG index (mandatory CG items included in calculation of index), whereby the non-disclosed values were considered as non-existent, therefore firms were penalized in the rating procedure. The <i>Scoring by item</i> rating approach is utilized.	Data hand-collected from annual reports	
<i>cg_pen_bp</i>	CG index (best practice CG items included in calculation of index), whereby the non-disclosed values were considered as non-existent, therefore firms were penalized in the rating procedure. The <i>Scoring by item</i> rating approach is utilized.	Data hand-collected from annual reports	
<i>cg_non_total</i>	CG index (all items included in calculation of index), whereby the non-disclosed values were excluded in the rating procedure. The <i>Scoring by item</i> rating approach is utilized.	Data hand-collected from annual reports	
<i>cg_non_mand</i>	CG index (mandatory CG items included in calculation of index), whereby the non-disclosed values were excluded in the rating procedure. The <i>Scoring by item</i> rating approach is utilized.	Data hand-collected from annual reports	
<i>cg_non_bp</i>	CG index (best practice CG items included in calculation of index), whereby the non-disclosed values were excluded in the rating procedure. The <i>Scoring by item</i> rating approach is utilized.	Data hand-collected from annual reports	
<u>Control Variables</u>			
<i>ownconc</i>	the percentage owned by the largest shareholder of the firm	Data hand-collected from annual reports	
<i>ta</i>	natural log of total assets	Data sourced from Datastream	WC02999
<i>lev</i>	total debt over total assets	Data sourced from Datastream	WC03255 WC02999

<i>absni</i>	absolute current earnings, calculated as the absolute value of net income before extraordinary items scaled by total assets	Data sourced from Datastream	WC01551 WC02999
<i>absearn</i>	absolute change in earnings, calculated as the absolute change in net income before extraordinary items between current and prior periods, scaled by total assets	Data sourced from Datastream	WC01551 WC02999
<i>salesgrowth</i>	change in sales from the prior year	Data sourced from Datastream	WC01001
<u>Exogenous Variables</u>			
<i>nip</i>	prior year performance calculated as the prior year's return on assets	Data sourced from Datastream	WC01551 WC02999
<i>pshare</i>	powerful CEO, measured as the percentage of ownership held by the CEO	Data hand-collected from annual reports	
<i>auditfirm</i>	external auditor is one of the Big Four audit firms	Data hand-collected from annual reports	
<u>Dummy Variable</u>			
<i>year</i>	an indicator variable taking the value of 0 for 2006 and 2008 and 1 for 2010 and 2012		

Sample Selection and Data Collection Procedures

This study covers all non-financial Greek listed companies for the fiscal years 2006, 2008, 2010 and 2012. Financial, real estate and insurance firms are excluded from the sample since their accrual processes are fundamentally different from firms in other industries and the incentives and opportunities for EM are therefore altered. Additionally, according to Davidson et al. (2005), the exclusion of financial firms is required because they have unique working capital structures, as well as an additional layer of governance regulations compared to non-financial firms. This is consistent with the work of Peasnell et al. (2000b), Klein (2002a) and Bekiris and Doukakis (2011).

These specific years are intentionally chosen so that all firms used in the study apply International Financial Reporting Standards (IFRS), since IFRS became mandatory for all Greek listed firms in 2005 and research indicates that significant changes in companies' statements were introduced as a result (Tsalavoutas and Evans, 2010). Furthermore, the choice of these four years allows all firms included in the study to comply with the first law concerning corporate governance, Law 3016/2002 "On Corporate Governance, board remuneration and other issues", which was implemented in 2002. Additionally, as of 2008, following the introduction of Law 3693/2008, "Mandatory audit of annual and consolidated financial reports", all Greek listed firms are required to have an audit committee responsible for the monitoring process of financial reporting. This law concerning the mandatory existence of audit committees is of utmost importance in effecting the quality of financial reporting, whereby one would assume that firms' financial reporting has improved after its implementation. Finally, 2010 is the year the Hellenic Federation of Industries prepared an updated CG code for Greek listed firms. The main objective of this Code is to inform and guide firms on governance best practice, as well as to improve shareholder information. For

this reason, the years 2006 (two years before the implementation of the audit committee law), 2008 (the year the law was created), 2010 (two years after the implementation of the law) and 2012 (four years after the implementation of the law) are chosen. The study examines the change of any potential effect of corporate governance on earnings management before and after the implementation of Law 3693/2008. Finally, due to the fact that a large amount of data had to be hand-collected for the corporate governance variables, limiting the study to four years makes the task feasible within the time available.

Data for corporate governance characteristics is hand-collected from annual reports found on the ASE website, while EM is calculated based on data sourced from DataStream. Firms' websites are not used to collect corporate governance data because the sample includes data from 2006, 2008, 2010 and 2012, while the firms' websites includes contemporary corporate governance information of the current year. Companies for which no financial data and no annual reports are available for the collection of corporate governance data are also excluded. Moreover, firms for which data is not available in all four years are included in the analysis, resulting in a different number of observations for each of the four years (i.e. unbalanced panel). This procedure resulted in a final sample of 788 firm year observations with complete data, ranging from 65% (204/316) of ASE firms in 2006 to 73% (187/256) of ASE firms in 2012. Table 3 illustrates the sample selection procedure.

Table 3 – Sample Selection Procedure

	2006	2008	2010	2012	Total
No. of firms listed on the ASE	316	290	273	256	1,135
Firms in financial, real estate and insurance industries	(47)	(42)	(41)	(34)	(164)
Firms with missing values (financial or corporate governance)	(65)	(43)	(40)	(35)	(183)
Total	204	205	192	187	788

The final sample is disaggregated across industries based on the ICB classification scheme. More specifically, firms in the sample are classified as belonging to: Basic Materials (12% of the sample); Consumer Goods (32% of the sample); Consumer Services (18% of the sample); Healthcare (5% of the sample); Industrials (26% of the sample); Oil & Gas (1% of the sample); Technology (4% of the sample); Telecommunications (1% of the sample); and Utilities (2% of the sample) as shown in Table 4. When estimating EM using the Jones-type models, according to Klein (2002a), industries with less than eight observations should be excluded from analysis. Therefore, firms in the Healthcare, Utilities, Oil and Gas, and Telecommunications industries should be excluded from the study. However, the industries that should have been excluded contain firms with large market capitalization that are important in the Greek economy and, if excluded, would likely alter the results. In order to incorporate all firms in the sample and avoid having industries with less than eight firms, some industries are combined. More specifically, Oil and Gas is combined with Industrials. Utilities and Telecommunications is combined with Consumer Services. Finally, Healthcare is combined with Consumer Services and Consumer Goods. This created the Combined Industries classification, as shown in Table 4, whereby Basic Materials now comprise 11%, Consumer Goods 31%, Consumer Services 22%, and Industrials 26% and Technology 10%.

Table 4 – Distribution of sample firms across industries

Industry Classification	Based on ICB					Combined Industries				
	2006	2008	2010	2012	Total	2006	2008	2010	2012	Total
Basic materials (6)	22	22	23	22	89	22	22	23	22	89
Consumer goods (4)	61	63	58	52	234	63	65	60	53	241
Consumer services (2)	34	37	32	29	132	46	49	42	40	177
Healthcare (3)	9	9	7	7	32	-	-	-	-	
Industrials (1)	52	48	46	50	196	54	50	48	52	204
Oil & Gas (7)	2	2	2	2	8	-	-	-	-	
Technology (8)	19	19	19	20	77	19	19	19	20	77
Telecommunications (9)	2	1	1	1	5	-	-	-	-	
Utilities (5)	3	4	4	4	15	-	-	-	-	
Total	204	205	192	187	788	204	205	192	187	788
Industry classification was initially based on DataStream & ICB. However, in order to incorporate all firms in the sample, each firm classified in an industry that did not include at least eight firms was examined separately and was placed in the another appropriate industry so that all industries have at least eight firms.										

1.6 Data Analysis and Discussion

The univariate analysis begins with descriptive statistics for each variable for the pre-law, post-law and pooled sample. The pooled sample consists of 763 firm-year observations, with 392 firm-year observations for the pre-law period (2006/2008) and 371 firm-year observations for the post-law period (2010/2012). The descriptive statistics for each variable are presented in Table 5.

Descriptive Statistics for *CG Indices*

Examining the descriptive statistics for the CG indices in Table 5, the mean (median) of the penalized CG index for the pooled sample is 49% (48%), with a minimum value of 0% and a maximum value of 91%. More specifically the pre-law period has a mean (median) of 31% (25%), while the post-law sample has a mean (median) of 67% (69%). Bekiris and Doukakis (2011) also use a CG index as a proxy of governance quality and examine Greek listed firms for the year 2008, and find a mean score of 32%, while Nerantzidis (2015) finds a mean score of 35.27% for the year 2011 and Nerantzidis and Tsamis (2017) find a mean (median) score of 40.74% (40.38%) for the year 2011 for their Greek samples.¹⁵

The non-penalized CG index of the pooled sample ranges from 29% to 94%, with a mean (median) of 66% (69%). The mean (median) of the pre and post-law periods are 56% (57%) and 77% (78%) respectively. The trend is for more firms to comply with disclosure of corporate governance items, reflected in the value of the CG index in 2010, for both rating schemes, being much higher than in 2006. One reason for this increase is the implementation of Law 3296/2008, which requires all listed firms to have their annual and consolidated financial statements audited by an external auditor and to have an audit committee. Additionally, in 2010, Law 3873/2010 obliged listed firms to disclose annual information about

¹⁵ Nerantzidis (2015) and Nerantzidis and Tsamis (2017) both utilize Greek data for 2011 but Nerantzidis (2015) has a sample of 144 firms, while Nerantzidis and Tsamis (2017) have a sample of 156 firms.

their corporate governance in a statement that is in a specific and clearly identifiable section of the annual report; this resulted in more firms disclosing more CG information, and thus higher values for CG indices. This is also evident from the mandatory CG indices. More specifically, the mean (median) of the mandatory penalized CG index rose from 51% (44%) in the pre-law period to 80% (88%) in the post-law period, while the mean (median) of the mandatory non-penalized CG index rose from 69% (78%) in the pre-law period to 84% (93%) in the post-law period.

As for the best practice indices, the mean (median) of the best practice penalized CG index is 18% (17%) in the pre-law period and 53% (53%) in the post-law period. The best practice non-penalized CG index has a mean (median) of 38% (38%) and 62% (64%) in the pre and post-law periods respectively. More sample firms disclose that they comply with best practice corporate governance items in 2010/2012 compared to 2006/2008 as a result of implementing the voluntary, best practice corporate governance items suggested by the Greek CG Code created by the Hellenic Federation of Industries in 2010.

The differences in the scores of the all the CG indices between the pre-law and post-law periods are reported in Table 5, where it is evident that the differences in the mean and median scores between the two periods are significantly different at the 1% level, in all CG index categories.

Descriptive Statistics for *Earnings management*

Table 5 also shows the descriptive statistics for earnings management as calculated by the Modified Jones model and the DeFond and Park models, which comprise the dependent variables of the study.

Discretionary accruals – Modified Jones Model

Discretionary accruals estimated using the Modified Jones Model has a mean (median) of 0.07 (0.04) in the pooled sample, with a minimum value of 0.00 and a maximum value of 0.50. More specifically, in the pre-law period the mean (median) is 0.08 (0.05) and in the post-law period it is 0.07 (0.04).

Examining the differences among the pre and post-law periods, there are insignificant differences in the mean values between the two periods and a significant difference at the 10% level between the median values of the two periods.

Tsipouridou and Spathis (2012) use the modified Jones model with cash flow from operations, per Larcker and Richardson (2004), and the modified Jones model with prior-year ROA, per Kothari et al. (2005), for Greek listed firms from 2005-2009, and find means of 0.001 and 0.000 respectively for discretionary accruals, while Tsipouridou and Spathis (2014) also use the modified Jones model for Greek listed firms for 2005-2009 find a mean score of 0.010 for discretionary accruals. Bekiris and Doukakis (2011) employ the modified Jones model with cash flow from operations and find a mean (median) score of 0.072 (0.039) for discretionary accruals for Greek listed firms for 2008, while Dimitropoulos et al. (2013) find a mean score of -0.000 for discretionary accruals for 2001-2008 when using the cross-sectional Jones model, as modified by Kothari et al. (2005).

Abnormal working capital accruals – DeFond and Park Model

The mean (median) values of abnormal working capital accruals, using the DeFond and Park model, are 0.07 (0.04) for the pooled sample, ranging from 0.00 to a maximum value of 0.45. The mean (median) values in the pre and post-law periods are 0.07 (0.04) and 0.07 (0.04) respectively, indicating almost no changes in abnormal working capital accruals between the two periods.

There no significant differences in the mean and median values between the years, as seen in Table 5.

Descriptive Statistics for *Control Variables*

This study employs six control variables consisting of ownership concentration, total assets, leverage, the absolute current net income, the absolute change in earnings and sales growth.

Ownership Concentration

The mean (median) of ownership concentration is 40% (36%) in the pre-law period and 41% (36%) in the post-law period. This indicates that the dispersion of ownership has not changed significantly between the two periods, which is also evident from the insignificant differences observed in the mean and median values of ownership concentration between the pre and post law periods. Nerantzidis and Tsamis (2017) find that the mean ownership concentration for Greek listed firms for 2011 is 59.57%. The high levels of ownership concentration illustrates the fact that a few large shareholders control management and competition for control is relatively low (La Porta et al., 1999; Spanos et al., 2008; Nerantzidis and Tsamis, 2017).

Total Assets

Total assets, as an indicator of size, and measured as the natural logarithm of total assets, has a mean (median) score of 11.57 (11.66) in the pooled sample. In the pre-law period the mean (median) is 11.80 (11.71) and in the post-law period 11.71 (11.60). No significant differences are observed between the mean and median scores of the pre and post-law period samples. Tsipouridou and Spathis (2012) find a mean score of 18.226 for Greek listed firms from 2005-2009. Bekiris and Doukakis (2011) find a mean (median) of 11.828 (11.705) for Greek listed firms for the year 2008, while Dimitropoulos et al. (2013) find a mean (median) of 5.242 (4.874) for Greek firms for the period 2001-2008.

Leverage

As for leverage, it greatly increased from a mean (median) of 31% (32%) in the pre-law period to 40% (40%) in the post-law period, while the pooled sample shows a mean (median) of 36% (36%). More Greek firms covered their financing needs through the use of debt, as observed by the significant differences in the both the mean and median, at the 1% level, between the pre and post-law periods. Tsipouridou and Spathis (2012) find a mean score of 53% for leverage for Greek listed firms from 2005-2009. Bekiris and Doukakis (2011) find a mean (median) of 35.9% (35.2%) for Greek listed firms for the year 2008, while Nerantzidis and Tsamis (2017) find a mean (median) of 24.6% (13.3%) for the year 2011.

Absolute current net income

The mean (median) absolute current net income of the pooled sample is 0.07 (0.04) with a minimum value of 0.00 and a maximum value of 0.61. The pre-law period has a mean (median) of 0.06 (0.03) and the post-law period has a mean (median) of 0.08 (0.04), with significant differences, at the 1% level, in the mean and median scores between the two periods. Bekiris and Doukakis (2011) find a mean (median) of 0.03 (0.01) for Greek listed firms for 2008, while Bekiris (2013) reports a mean (median) of 0.05 (0.04) for Greek listed firms for 2000-2006. Tsipouridou and Spathis (2014) find a mean (median) of 0.01 (0.09) for Greek listed firms from 2005-2011.

Absolute change in earnings

The mean (median) score of changes in net income, in absolute terms, for the pooled sample is 0.04 (0.02), with a minimum value of 0.00 and a maximum value of 0.60. In the pre-law period the mean (median) is 0.04 (0.02) and in the post-law period it is 0.05 (0.02), indicating greater fluctuations of net income between 2009 and 2012 than between 2005 and 2008. This is also

observed in the significant differences in the mean (at the 5% level) and the median (at the 1% level) between the pre and post-law periods.

Sales Growth

The mean (median) score of sales growth for the pooled sample is 1% (1%), with a minimum value of -73% and a maximum value of 106%. Sales growth decreased significantly from a mean (median) of 12% (8%) in the pre-law period to -8% (-8%) in the post-law period. This large decrease in sales is the result of the sovereign debt crisis in Greece at the time. Significant differences, at the 1% level, in the mean and median scores are evident between both periods. Dimitropoulos et al. (2013) find a mean (median) of 32% (5%) for sales growth of Greek firms for the period 2001-2008.

Descriptive Statistics for *Instruments*

Prior year net income

The mean (median) score of prior year's net income for the pooled sample is -0.01 (0.01), ranging from a minimum score of -0.26 to a maximum score of 0.17. More specifically the mean (median) scores for the pre-law period is 0.02 (0.02) and for the post-law period is -0.03 (-0.01). The decrease in net income between the two periods is the result of the sovereign debt crisis in the country during the period under study. This can also be observed from the significant differences in both the mean and median scores, at the 1% level, between the two periods.

Powerful CEO

Powerful CEO is estimated as the percentage share ownership held by the CEO. The percentage of CEO ownership did not change significantly from 2006 to 2012, as is evident

from the insignificant differences in the mean and median scores. More specifically, the mean (median) of CEO share ownership is 17% (8%) and 17% (7%) for the pre and post-law periods respectively, while the mean (median) scores for the pooled sample is 17% (7%), as observed in Table 5. Bekiris (2013) reports a mean (median) of 20.58% (15.67%) for CEO ownership for Greek listed firms for the period 2000-2006.

Audit firm

The proportion of Greek listed firm in the pooled sample employing an auditor from a Big Four auditing firm is 21% on average. More specifically in the pre-law period, the mean (median) scores are 0.20 (0.00), while in the post-law period it is 0.22 (0.00). Insignificant differences are observed between the mean and median scores between the two periods. Dimitropoulos et al. (2013) report a mean (median) of 0.46 (0.00) for Greek firms audited by a Big Four auditing firm from for 2001-2008 and Nerantzidis and Tsamis (2017) report a mean (median) of 0.26 (0.00) for Greek listed firms for the year 2011.

Table 5 – Descriptive Statistics

	Pooled sample					Pre-law period (2006 / 2008)					Post-law period (2010 / 2012)					Pre law period / Post-law period	
	mean	median	min	max	sd	mean	median	min	max	sd	mean	median	min	max	sd	t-test	Mann-Whitney
EM	0.07	0.04	0.00	0.50	0.09	0.08	0.05	0.00	0.47	0.09	0.07	0.04	0.00	0.61	0.09	1.44	1.95*
AWCA	0.07	0.04	0.00	0.45	0.08	0.07	0.04	0.00	0.46	0.08	0.07	0.04	0.00	0.45	0.08	0.32	0.67
cgpentotal	0.49	0.48	0.00	0.91	0.23	0.31	0.25	0.00	0.62	0.13	0.67	0.69	0.00	0.95	0.15	-35.37***	22.01***
cgpenmand	0.65	0.81	0.00	0.94	0.29	0.51	0.44	0.00	0.92	0.26	0.80	0.88	0.00	0.94	0.20	-17.52***	14.35***
cgpenbp	0.35	0.27	0.04	0.86	0.23	0.18	0.17	0.00	0.50	0.08	0.53	0.53	0.00	0.95	0.19	-32.32***	21.62***
cgnottotal	0.66	0.69	0.29	0.94	0.15	0.56	0.57	0.29	0.81	0.12	0.77	0.78	0.00	0.95	0.11	-26.26***	20.05***
cgnonmand	0.76	0.88	0.00	0.94	0.28	0.69	0.78	0.00	0.93	0.31	0.84	0.93	0.00	0.94	0.23	-7.63***	14.72***
cgnonbp	0.50	0.50	0.11	0.90	0.19	0.38	0.38	0.11	0.72	0.13	0.62	0.64	0.00	0.95	0.16	-25.03***	19.13***
ownconc	0.40	0.36	0.00	0.89	0.19	0.40	0.36	0.08	0.89	0.18	0.41	0.36	0.00	0.90	0.19	-0.53	0.26
ta	11.75	11.66	8.48	15.88	1.47	11.80	11.71	8.98	16.00	1.42	11.71	11.60	8.35	15.88	1.51	0.28	0.39
lev	0.36	0.35	0.00	1.00	0.21	0.31	0.32	0.00	0.68	0.16	0.40	0.40	0.00	1.54	0.25	-5.43***	4.58***
absni	0.07	0.04	0.00	0.61	0.10	0.06	0.03	0.00	0.61	0.09	0.08	0.04	0.00	0.62	0.10	-3.45***	3.18***
absearn	0.04	0.02	0.00	0.60	0.08	0.04	0.02	0.00	0.59	0.07	0.05	0.02	0.00	0.60	0.08	-2.26**	3.00***
salesgrowth	0.01	0.01	-0.73	1.06	0.28	0.12	0.08	-0.63	1.34	0.28	-0.08	-0.08	-0.81	0.66	0.24	10.12***	11.46***
nip	-0.01	0.01	-0.26	0.17	0.07	0.02	0.02	-0.16	0.18	0.05	-0.03	-0.01	-0.32	0.14	0.08	10.24***	9.94***
pshare	0.17	0.07	0.00	0.77	0.21	0.17	0.08	0.00	0.72	0.20	0.17	0.07	0.00	0.78	0.21	-0.40	0.26
auditfirm	0.21	0.00	0.00	1.00	0.41	0.20	0.00	0.00	1.00	0.40	0.22	0.00	0.00	1.00	0.42	-1.32	0.92

Variables: *EM* discretionary accruals using the Modified Jones model; *AWCA* abnormal working capital accruals using the DeFond and Park (2001) model; *cgpentotal* penalized total CG index; *cgpenmand* penalized mandatory CG index; *cgpenbp* penalized best practice CG index; *cgnottotal* non-penalized total CG index; *cgnonmand* non-penalized mandatory CG index; *cgnonbp* non-penalized best practice CG index; *ownconc* ownership concentration; *ta* total assets; *lev* leverage; *absni* absolute value of current earnings; *absearn* absolute value of changes in earnings; *salesgrowth* changes in sales from prior year; *nip* prior year's net income; *pshare* powerful CEO; *auditfirm* external auditor is one of the Big Four audit firms

*** significant at level 1%; ** significant at level 5%; *significant at level 10%

Correlation Coefficients

In this section the bivariate correlations among the variables is examined using the Pearson and Spearman rank correlation coefficients.

Table 6 examines the correlation coefficients between discretionary accruals and corporate governance indices. Significant negative correlations exist between discretionary accruals and the corporate governance indices using the Modified Jones model (EM). More specifically, as per the Pearson product moment correlation, a negative correlation of -6.3%, at the 10% level, is seen with the mandatory non-penalized CG index. Additionally, as per the Spearman rank-order correlation a negative correlation of approximately -7% is seen with the total penalized CG index, the best practice penalized CG index, the total non-penalized CG index and the best practice non-penalized CG index, at the 5% and 10% level.

These correlations suggest that high corporate governance index levels may constrain earnings management, in line with H1. Bekiris and Doukakis (2011) who also examine the effect of corporate governance, measured through a CG index, on earnings management find a negative significant bivariate correlation, at the 5% level of significance, between their CG index and discretionary accruals.

Very high correlations, at the 1% significance level, as expected, are evident between all of the CG indices (ranging from 33% to 96%) and the VIF values are also high, so these independent variables will not be used simultaneously in the same regression but will be implemented in separate regressions, so as to avoid multicollinearity issues that may affect the interpretation of the results.

Table 6 - Pearson product moment correlation coefficient (right) Spearman rank-order correlation (left)

	EM	AWCA	cgpentotal	cgpenmand	cgpenbp	cgnottotal	cgnonmand	cgnonbp	ownconc	ta	lev	absni	absearn	salesgrowth	nip	pceo	auditfirm
EM		0.653***	-0.058	-0.003	-0.051	-0.052	-0.063*	-0.043	-0.014	-0.226***	0.042	0.291***	0.336***	-0.014	-0.104***	0.043	-0.098***
AWCA	0.620***		-0.046	0.002	-0.048	-0.039	0.055	-0.046	0.012	-0.228***	0.081**	0.305***	0.377***	-0.034	-0.168***	0.045	-0.068*
cgpentotal	-0.067*	-0.041		0.707***	0.947***	0.930***	0.346***	0.885***	-0.028	0.066*	0.111***	0.045	-0.011	-0.218***	-0.218***	-0.069*	0.066*
cgpenmand	0.011	0.008	0.745***		0.545***	0.700***	0.673***	0.555***	-0.035	-0.039	0.056	0.045	-0.008	-0.166***	-0.158***	-0.008	-0.027
cgpenbp	-0.062*	-0.041	0.960***	0.641***		0.855***	0.257***	0.909***	-0.021	0.103***	0.126***	0.040	-0.011	-0.190***	-0.200***	-0.096***	0.108***
cgnottotal	-0.076**	-0.053	0.942***	0.702***	0.921***		0.330***	0.934***	-0.025	0.096***	0.089**	0.023	-0.036	-0.163***	-0.189***	-0.119***	0.102***
cgnonmand	0.010	0.031	0.668***	0.835***	0.591***	0.633***		0.262***	-0.028	-0.061*	0.029	0.072**	0.021	-0.087**	-0.089**	-0.024	-0.016
cgnonbp	-0.068*	-0.055	0.890***	0.602***	0.943***	0.951***	0.534***		-0.035	0.150***	0.101***	0.027	-0.020	-0.145***	-0.150***	-0.167***	0.147***
ownconc	-0.006	0.035	-0.021	-0.035	-0.003	-0.036	-0.026	-0.033		0.080**	-0.042	-0.012	-0.011	0.068*	0.046	0.131***	0.174***
ta	-0.277***	-0.188***	0.061*	-0.004	0.105***	0.089**	-0.020	0.144***	0.104***		0.091**	-0.088**	-0.103***	0.189***	0.275***	-0.326***	0.436***
lev	-0.001	0.043	0.105***	0.033	0.124***	0.096***	0.064*	0.104***	-0.041	0.155***		0.225***	0.161***	-0.111***	-0.421***	-0.037	0.040
absni	0.148***	0.124***	0.047	0.020	0.046	0.043	0.060*	0.033	-0.14	-0.048	0.075**		0.705***	-0.295***	-0.296***	-0.025	-0.043
absearn	0.207***	0.221***	0.054	0.042	0.053	0.041	0.056	0.040	-0.007	-0.033	0.115***	0.427***		-0.270***	-0.309***	-0.051	-0.022
salesgrowth	-0.032	-0.025	-0.256***	-0.185***	-0.237***	-0.219***	-0.217***	-0.193***	0.077**	0.185***	-0.102***	-0.230***	-0.254***		0.298***	-0.040	0.073**
nip	-0.042	-0.078**	-0.251***	-0.161***	-0.229***	-0.241***	-0.207***	-0.196***	0.094**	0.227***	-0.349***	-0.168***	-0.226***	0.346***		0.017	0.087**
pceo	0.086**	0.059	-0.078**	-0.008	-0.114***	-0.116***	-0.023	-0.159***	0.007	-0.370***	-0.064*	-0.028	-0.082**	-0.032	-0.000		-0.257***
auditfirm	-0.129***	-0.083**	0.070*	-0.002	0.111***	0.100***	0.025	0.146***	0.155***	0.399***	0.056	0.006	0.041	0.067*	0.079**	-0.287***	

Variables: *EM* discretionary accruals using the Modified Jones model; *AWCA* abnormal working capital accruals using the DeFond and Park (2001) model; *cgpentotal* penalized total CG index; *cgpenmand* penalized mandatory CG index; *cgpenbp* penalized best practice CG index; *cgnottotal* non-penalized total CG index; *cgnonmand* non-penalized mandatory CG index; *cgnonbp* non-penalized best practice CG index; *ownconc* ownership concentration; *ta* total assets; *lev* leverage; *absni* absolute value of current earnings; *absearn* absolute value of changes in earnings; *salesgrowth* changes in sales from prior year; *nip* prior year's net income; *pshare* powerful CEO; *auditfirm* external auditor is one of the Big Four audit firms

*** significant at level 1%; ** significant at level 5%; *significant at level 10%;

Results observed in these correlations are also verified from VIF results, where only the CG indices have a VIF above 10, therefore they will not be used in the same regression models.

Multivariate Analysis

This section examines and discusses H1 about the effect of the corporate governance index, a multidimensional indicator of governance quality, on EM before and after the implementation of the 2008 governance law concerning the mandatory existence of audit committees for Greek listed firms. It is expected that firms with higher levels of CG indices will have less EM. The CG index is examined with all items included in the index and it is also examined including only mandatory items included in Greek law, as well as the best practice items suggested by the Hellenic Federation of Industries in 2010. Hence eight regressions are run, four for the penalized CG index and four for the non-penalized index, as shown in Table 7 and Table 8.

Discretionary accruals – Modified Jones model

Penalized CG indices

Table 8 reports the results of the regression model, which examines the impact of penalized CG indices on EM, and therefore tests H1. The J statistic of this study ranges from 7.19% in the post-law period sample of total CG index to 14.26% in the post-law period sample of mandatory/best practice CG indices.

Examining the effect of the total CG index on EM, a significant negative relationship, at the 1% level is seen in the pre-law period (-0.194) and for the pooled sample (-0.523), in line with H1, whereby higher CG index scores result in less EM. However, in the post-law sample, a significant positive relationship (+0.285), at the 1% level, exists between the total CG index and EM. This is contrary to H1, whereby in the sample period after the implementation of the law concerning the mandatory existence of an audit committee, higher CG scores are expected to result in lower EM. This contradictory result is also seen when examining the total CG index

with the interaction year dummy variable and its effect on EM. These two variables have a significant positive relationship (+0.325), at the 10% level.

When examining the CG indices that include mandatory and best practice items, the following results are observed. When examining the effect of the mandatory CG index, similar results are seen as those with the CG total index. More specifically, a significant negative relationship, at the 1% level, is seen in the pre-law period (-0.146) and for the pooled sample (-0.127), in line with H1, whereby higher mandatory CG index scores result in less EM. However, in the post-law sample, a significant positive relationship (+0.085), at the 1% level, exists between the mandatory CG index and EM. This is contrary to H1, whereby in the post-law period sample a higher CG scores is expected to result in lower EM. This positive relationship also exists when examining the effect of the mandatory CG index with the interaction year dummy variable on EM (+0.187).

As for the best practice CG index and its effect on EM, a positive relationship at the 1% and 5% levels is seen in the pre-law period (+0.102), the post-law period (+0.049) and for the pooled sample (+0.663). Conversely, when examining the best practice CG index with the interaction year dummy variable and its effect on EM, a significant negative relationship (-0.682), at the 1% level, is observed. This result is in line with H1, whereby firms, in the years after the implementation of the 2008 governance law, that have higher CG scores concerning best practice governance items have less EM.

Control Variables

A significant positive relationship, at the 5% level, in the post-law period sample (+0.036) is observed between ownership concentration and EM, in the regression with the total CG index. This result suggests that firms that have higher ownership concentration conduct higher levels of EM.

A significant negative relationship, at the 1% level, is seen between EM and firm size for the pre-law (-0.010 / -0.015), and post-law periods (-0.014 / -0.012) and for the pooled sample (-0.008 / -0.016), in both regressions involving penalized indices (the total CG index and the mandatory/best practice CG indices), thus suggesting that larger firms have less EM.

A significant positive relationship, at the 10% level, exists between the leverage and EM in the pre-law period sample (+0.025) in the regression with the mandatory/best practice CG indices.

A significant positive relationship at the 1% and 10% levels, is evident between both the absolute level of current earnings and the absolute value of changes in earnings and EM, for the pre-law period (+0.072/+0.101), for the post-law period (+0.244/+0.067) and for the pooled sample (+0.167/+0.102), in both regressions involving penalized CG indices.

Finally, a significant positive relationship at the 1% and 5% levels is evident between sales growth and EM, for the pre-law period (+0.048 / +0.047), for the post-law period (+0.027) and for the pooled sample (+0.032 / +0.026), in both regressions involving penalized CG indices.

In summary, using the Modified Jones model to measure EM, a statistically significant positive relationship is seen between EM and the total CG index, the mandatory CG index, ownership concentration, leverage, the absolute level of current earnings, the absolute value of changes in earnings and sales growth, while a statistically significant negative relationship is seen between EM and the best practice CG index and firm size.

Non-Penalized CG indices

Table 8 reports the results of the regression model which examines the impact of non-penalized CG indices on EM, and therefore tests H1. The J statistic of this study ranges from 8.50% in the pre-law period sample for the total CG index to 13.74% in the post-law period sample for the mandatory/best practice CG indices.

Examining the effect of the total CG index on EM, a significantly positive relationship, at the 1% level, is seen in the post-law sample (+0.220). This result is contrary to H1, since higher CG scores are expected to result in lower EM.

Similar positive results also exist between the CG scores of the mandatory CG index and the best practice CG index and EM, in the post-law period (+0.036 /+0.129) and for the pooled sample (+0.230). However, when examining the best practice CG index with the interaction year dummy variable and its effect on EM, a significant negative relationship, at the 10% level, is observed (-0.161). This result is in line with H1 whereby firms, in the years after the implementation of the 2008 governance law, that have higher CG scores concerning best practice governance items perform less EM.

Control Variables

A significant negative relationship, at the 1% level, is seen between EM and firm size for the pre-law (-0.013/-0.014) and post-law periods (-0.011/-0.014) and for the pooled sample (-0.013/-0.015), in both regressions involving non-penalized indices (the total CG index and the mandatory/best practice CG indices), thus suggesting that larger firms have less EM.

A significant positive relationship, at the 1% and 5% levels, exists between leverage and EM in the pre-law period sample (+0.037/+0.041) in all regressions involving non-penalized CG indices.

A significant positive relationship, at the 1% level, is observed between both the absolute level of current earnings and the absolute value of changes in earnings and EM, for the pre-law period (+0.402 / +0.035 / +0.091 / +0.324), for the post-law period (+0.242 / +0.137 / +0.058 / +0.223) and for the pooled sample (+0.122 / +0.287 / +0.110 / +0.306), in all non-penalized CG index regressions.

Finally, a significant positive relationship at the 1% level is evident between sales growth and EM, for the pre-law period (+0.035/+0.036), for the post-law period (+0.028) and for the pooled sample (+0.029/+0.036), in both regressions.

Insignificant results are observed between ownership concentration and EM.

In summary, using the Modified Jones model to measure EM and non-penalized CG indices, as a proxy for governance quality, a statistically significant positive relationship is seen between EM and the total CG index, the mandatory CG index, leverage, the absolute level of current earnings, the absolute value of changes in earnings and sales growth. However, a statistically significant negative relationship is seen between EM and the best practice CG index and firm size.

Abnormal working capital accruals – DeFond and Park (2001) model

Penalized CG index

Table 7 reports the results of the regression model which examines the impact of penalized CG indices on AWCA, and therefore tests H1. The J statistic of this study ranges from 6.74% in the post-law period sample of the total CG index to 14.47% in the pooled sample of mandatory/best practice CG indices.

In the pre-law period (-0.124) and for the pooled sample (-0.436) a significant negative relationship, at the 1% level, exists between the total CG index and AWCA, in line with H1, whereby higher CG index scores result in less AWCA. However, when examining the total CG index with the interaction year dummy variable and its effect on AWCA, a significant positive relationship (+0.339), at the 5% level, is observed between the two variables.

CG indices that include mandatory and best practice items have a similar effect on AWCA as the CG total index. More specifically, a significant negative relationship, at the 1% level, is seen in the pre-law period (-0.017), post-law period (-0.053) and for the pooled sample (-0.111), between the mandatory CG index and AWCA, in line with H1, whereby higher mandatory CG index scores are expected to result in less AWCA. Similarly, in the post-law period sample (-0.120), the best practice CG index and AWCA display a negative relationship, significant at the 1% level. However, as in the total CG index, when examining the effect of the mandatory CG index with the interaction dummy year variable on AWCA, a significant positive relationship (+0.137), at the 1% level, is seen.

Control Variables

A significant negative relationship, at the 1% level, is seen between AWCA and firm size for the pre-law (-0.009/-0.011) and post-law periods (-0.008/-0.008) and for the pooled sample (-0.008/-0.011), in both regressions involving penalized indices (the total CG index and the mandatory/best practice CG indices), thus suggesting that larger firms have less AWCA.

A significant positive relationship, at the 1% level, exists between leverage and AWCA in the pre-law period (+0.036) and the post-law period (+0.021) in the regression with the mandatory/best practice CG indices. In the total CG index regression, leverage and AWCA have a significant positive relationship, at the 5% level, in the pre-law period (+0.038).

A significant positive relationship, at the 1%, 5% and 10% levels, is evident between both the absolute level of current earnings and the absolute value of changes in earnings and AWCA, for the pre-law period (+0.093 / +0.311 / +0.181 / +0.237), for the post-law period (+0.058 / +0.149 / +0.302) and for the pooled sample (+0.105 / +0.253 / 0.070 / +0.308), in both regressions involving penalized CG indices.

Finally, a significant positive relationship at the 1% and 5% levels is evident between sales growth and AWCA, for the pre-law period (+0.048/+0.049), for the post-law period (+0.015) and for the pooled sample (+0.028/+0.030), in both regressions involving penalized CG indices.

Insignificant results are observed between ownership concentration and AWCA.

In summary, using the DeFond and Park (2001) model to calculate AWCA, a statistically significant negative relationship is seen between AWCA and the total CG index, the mandatory CG index, the best practice CG index and firm size. On the other hand, a statistically significant positive relationship is seen between AWCA and leverage, the absolute level of current earnings, the absolute value of changes in earnings and sales growth.

Non-Penalized CG index

Table 8 reports the results of the regression model which examines the impact of non-penalized CG indices on AWCA, and therefore tests H1. The J statistic of this study ranges from 7.92% in the pre-law period for the total CG index to 13.95% in the post-law period for mandatory/best practice CG indices.

Examining the effect of the total CG index on AWCA, a significant positive relationship, at the 5% level, is seen in the post-law sample (+0.053). This result is contrary to H1, since higher CG scores are expected to result in lower AWCA. Similarly, when examining the effect of the total CG index with the interaction year dummy variable on AWCA, a statistically significant positive relationship (+0.370), at the 1% level is seen.

Similar positive results also exist between the CG scores of the mandatory CG index and the best practice CG index and AWCA, in the pre-law period (+0.016) and in the pooled sample (+0.216) respectively. However, when examining the best practice CG index with AWCA in

the post-law period, a significant negative relationship (-0.030), at the 5% level, is observed. This result is in line with H1, whereby firms in the years after the implementation of the 2008 governance law, that have higher CG scores concerning best practice governance items are expected to have less AWCA. This statistically significant negative relationship is also seen when examining the effect of the best practice CG index with the interaction year dummy variable on AWCA (-0.161), in line with H1.

Control Variables

For both regressions involving non-penalized CG indices (the total and the mandatory/best practice indices), there is a significant positive relationship, at the 1% and 5% levels, between ownership concentration and AWCA, in the pre-law period (+0.024) and for the pooled sample (+0.032/+0.020).

A significant negative relationship, at the 1% level, is seen between AWCA and firm size for the pre-law (-0.011/-0.010) and post-law periods (-0.009 /-0.010) and for the pooled sample (-0.014/-0.013), in both regressions involving non-penalized indices (the total CG index and the mandatory/best practice CG indices), thus suggesting that larger firms have less AWCA.

A significant positive relationship, at the 1% level, exists between leverage and AWCA in the pre-law period sample (+0.055/+0.051) in both regressions involving the non-penalized CG indices, and in the post-law period sample (+0.024) in the regressions involving the mandatory/best practice CG indices.

A significant positive relationship, at the 1%, 5% and 10% levels, is observed between both the absolute level of current earnings and the absolute value of changes in earnings and AWCA, for the pre-law period (+0.076 / +0.314 / +0.164 / +0.247), for the post-law period (+0.069 /

+0.132 / +0.369) and for the pooled sample (+0.060 / +0.377 / +0.063 / +0.343), in both non-penalized CG index regressions.

Finally, a significant positive relationship, at the 1%, 5% and 10% level, is evident between sales growth and AWCA, for the pre-law period (+0.033 / +0.035), for the post-law period (+0.015) and for the pooled sample (+0.027 / +0.029), in both regressions.

In summary, using the DeFond and Park model (2001) to measure AWCA and non-penalized CG indices, a statistically significant positive relationship is seen between AWCA and the total CG index, the mandatory CG index, ownership concentration, leverage, the absolute level of current earnings, the absolute value of changes in earnings and sales growth. However, a statistically significant negative relationship is seen between AWCA and the best practice CG index and firm size.

Table 7 Penalized CG Indices and Earnings Management

	Modified Jones model			DeFond and Park (2001) model				Modified Jones model			DeFond and Park (2001) model		
	Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample	Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample		Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample	Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample
variables	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	variables	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)
cgpentotal	-0.194 (-4.117)***	0.285 (4.944)***	-0.523 (-2.757)***	-0.124 (-2.491)**	-0.039 (-0.813)	-0.436 (-2.239)**	cgpenmand	-0.146 (-7.139)***	0.085 (10.414)***	-0.127 (-3.875)***	-0.071 (-2.962)***	-0.053 (-5.417)***	-0.111 (-4.577)***
							cgpenbp	0.102 (2.065)**	0.049 (3.492)***	0.663 (2.482)**	-0.025 (-0.407)	-0.120 (-8.872)***	0.146 (0.830)
ownconc	-0.015 (-1.123)	0.036 (2.231)**	-0.021 (-1.209)	0.003 (0.238)	0.010 (0.823)	-0.005 (-0.322)	ownconc	-0.013 (-1.162)	0.004 (0.428)	0.001 (0.076)	0.004 (0.451)	0.003 (0.322)	0.006 (0.709)
ta	-0.010 (-5.139)***	-0.014 (-6.575)***	-0.008 (-3.699)***	-0.009 (-5.197)***	-0.008 (-4.981)***	-0.008 (-3.905)***	ta	-0.015 (-9.082)***	-0.012 (-9.970)***	-0.016 (-7.313)***	-0.011 (-7.300)***	-0.008 (-5.739)***	-0.011 (-6.873)***
lev	0.016 (0.881)	-0.011 (-0.842)	-0.003 (-0.148)	0.038 (2.054)**	0.012 (1.213)	0.003 (0.209)	lev	0.025 (1.789)*	-0.011 (-1.333)	-0.002 (-0.140)	0.036 (2.746)***	0.021 (2.608)***	0.007 (0.706)
absni	0.072 (1.675)*	0.244 (6.888)***	0.167 (3.775)***	0.093 (2.419)**	0.058 (1.804)*	0.105 (2.221)**	absni	0.101 (3.331)***	0.067 (9.123)***	0.102 (2.924)***	0.181 (7.128)***	-0.042 (-9.159)***	0.070 (2.468)**
absearn	0.412 (6.576)***	0.138 (2.971)***	0.202 (3.335)***	0.311 (4.660)***	0.149 (2.402)**	0.253 (3.842)***	absearn	0.340 (6.371)***	0.241 (8.556)***	0.306 (6.098)***	0.237 (4.711)***	0.302 (8.147)***	0.308 (6.681)***
salesgrowth	0.048 (4.813)***	0.010 (0.684)	0.032 (2.224)**	0.048 (4.901)***	0.014 (1.274)	0.028 (2.229)**	salesgrowth	0.047 (5.970)***	0.027 (3.347)***	0.026 (2.850)***	0.049 (6.919)***	0.015 (1.989)**	0.030 (3.808)***
dummy			-0.056 (-0.860)			-0.082 (-1.376)	dummy			0.006 (0.135)			-0.037 (-1.155)
cgpentotal* dummy			0.325 (1.842)*			0.339 (2.139)**	cgpenmand *dummy			0.187 (3.659)***			0.137 (3.628)***
							cgpenbp*d ummy			-0.682 (-2.654)***			-0.182 (-1.073)

Table 8 Non-penalized CG Indices and Earnings Management

	Modified Jones model			DeFond and Park (2001) model				Modified Jones model			DeFond and Park (2001) model		
	Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample	Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample		Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample	Pre-Law period (2006/2008)	Post-Law period (2010/2012)	Pooled Sample
variables	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	variables	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)	coefficient (t-stat)
cgntotal	0.018 (0.296)	0.220 (10.162)***	0.001 (0.007)	0.054 (0.869)	0.053 (2.379)**	0.184 (1.403)	cgnonmand	-0.003 (-0.252)	0.036 (4.513)***	-0.012 (-0.731)	0.016 (1.964)**	0.010 (1.299)	-0.017 (1.230)
							cgnonbp	-0.003 (-0.092)	0.129 (10.614)***	0.230 (2.548)**	-0.043 (-1.494)	-0.030 (-2.097)**	0.216 (2.882)***
ownconc	0.001 (0.045)	0.007 (0.596)	0.006 (0.612)	0.024 (1.997)**	0.011 (0.920)	0.032 (2.701)***	ownconc	0.009 (0.979)	0.007 (0.740)	0.007 (0.688)	0.019 (2.124)**	0.013 (1.435)	0.020 (2.012)**
ta	-0.013 (-6.347)***	-0.011 (-6.954)***	-0.013 (-7.996)***	-0.011 (-5.666)***	-0.009 (-6.578)***	-0.014 (-7.098)***	ta	-0.014 (-8.748)***	-0.014 (-10.921)***	-0.015 (-8.366)***	-0.010 (-6.893)***	-0.010 (-8.041)***	-0.013 (-7.817)***
lev	0.037 (2.127)**	-0.017 (-1.545)	0.010 (0.949)	0.055 (3.192)***	0.010 (0.969)	0.011 (0.898)	lev	0.041 (3.001)***	-0.005 (-0.604)	0.010 (1.120)	0.051 (4.486)***	0.024 (3.090)***	0.012 (1.506)
absni	0.046 (1.148)	0.242 (6.608)***	0.122 (4.026)***	0.076 (1.888)*	0.069 (2.032)**	0.060 (1.824)*	absni	0.091 (2.969)***	0.058 (8.038)***	0.110 (3.564)***	0.164 (6.761)***	-0.055 (-8.682)***	0.063 (2.304)**
absearn	0.402 (6.722)***	0.137 (3.072)***	0.287 (5.693)***	0.314 (4.883)***	0.132 (2.163)**	0.377 (7.311)***	absearn	0.324 (6.157)***	0.223 (8.155)***	0.306 (7.513)***	0.247 (5.578)***	0.369 (9.434)***	0.343 (8.067)***
salesgrowth	0.035 (3.301)***	0.015 (1.130)	0.029 (2.878)***	0.033 (2.937)***	0.006 (0.522)	0.027 (2.447)**	salesgrowth	0.036 (4.095)***	0.028 (3.154)***	0.036 (3.354)***	0.035 (4.082)***	0.015 (1.852)*	0.029 (3.220)***
dummy			-0.160 (-1.543)			-0.319 (-3.243)***	dummy			0.024 (0.376)			0.054 (1.009)
cgntotal*dummy			0.193 (1.323)			0.370 (2.690)***	cgnonmand*dummy			0.018 (0.404)			-0.007 (-0.195)
							cgnonbp*dummy			-0.162 (-1.837)*			-0.161 (-2.229)**
<i>J-statistic</i>	0.0850	0.0852	0.1257	0.0792	0.0874	0.1290	<i>J-statistic</i>	0.1311	0.1374	0.1343	0.1323	0.1395	0.1375
<i>N</i>	392	371	763	392	371	763	<i>N</i>	392	371	763	392	371	763

Variables: *EM* discretionary accruals using the Modified Jones model; *AWCA* abnormal working capital accruals using the DeFond and Park (2001) model; *cgntotal* non-penalized total CG index; *cgnonmand* non-penalized mandatory CG index; *cgnonbp* non-penalized best practice CG index; *ownconc* ownership concentration; *ta* total assets; *lev* leverage; *absni* absolute value of current earnings; *absearn* absolute value of changes in earnings; *salesgrowth* changes in sales from prior year; *dummy* an indicator variable where 1 is for 2010/2012 and 0 for 2006/2008.
*** significant at level 1%; ** significant at level 5%; *significant at level 10%

Discussion of Results

CG indices and the Modified Jones model

Penalized CG indices

CG pen_total

A significant negative relationship between the total penalized CG index and EM is observed in the pre-law and the pooled sample, a result that is in line with H1. Similar results are observed by Shen and Chih (2007), Jiang et al. (2008), Bowen et al. (2008) and Shan (2015). In a Greek setting for 2008, Bekiris and Doukakis (2011), who also use a penalized CG index, also find a negative relationship between their CG index and EM.

However, in the post-law period sample, a positive relationship is seen between the two variables. This is also seen when examining the CG index with the interaction year dummy variable and its effect on EM. These results are contrary to H1. In the period when the existence of audit committees are mandatory (2010/2012), firms with higher CG scores conducted more EM. This could imply that firms are more concerned with following the letter of the law rather than its spirit. This is a case where form appears to supersede the substance of the law.

CG pen_mand & CG pen_bp

Similar results to the total penalized CG index are also seen for the mandatory penalized CG index. As such, in the pre-law and in the pooled sample, a significant negative relationship is observed between the mandatory penalized CG index and EM, a result in line with H1. However, a positive relationship between the two is seen in the post-law period and when examining the mandatory penalized CG index with the interaction year dummy variable and

its effect on EM. This result is contrary to H1, and indicates that Greek firms appear to follow the form of the law and not its substance.

When looking at the best practice penalized CG index and EM, a significant positive relationship is seen in the pre-law, post-law and in the pooled sample, results that are contrary to H1. Conversely, when examining the best practice penalized CG index with the interaction year dummy variable and its effect on EM, a significant negative relationship is seen. Firms that follow best practice governance attributes, as suggested by the Greek CG Code, in the years after the mandatory existence of an audit committee, constrain EM. This indicates that firms that follow optional, best practice governance items, in contrast to following mandatory CG items, are more successful in mitigating EM. These attributes play a critical role in mitigating EM, since firms appear to voluntarily follow the substance and not the form of the governance attributes.

Non-penalized CG indices

CG non_total

Similar to the penalized total CG index, a significant positive relationship between the non-penalized total CG index and EM is seen in the post-law sample period. This result is contrary to H1, suggesting that firms are not following the substance of governance recommendations. Insignificant relationships are observed between the non-penalized CG index and EM in the pre-law period and in pooled sample and when examining the total non-penalized CG index with the interaction year dummy variable and its effect on EM. Similar insignificant results are reported by Bowen et al. (2008).

CG non_mand & CG non_bp

Similar to the penalized CG index, the mandatory non-penalized CG index and EM have a significant positive relationship in the post-law period sample. Firms that are forced to follow CG recommendations, appear to be following the form of the law and not its substance, and thus firms that have higher CG scores are conducting higher levels of EM. Insignificant relationships between the two variables are seen in the pre-law sample and the pooled sample and when examining the mandatory non-penalized CG index with the interaction year dummy variable.

When looking at the best practice non-penalized CG index and EM, a significant positive relationship is seen in the post-law period and in the pooled sample, a result is contrary to against H1. However, when examining the best practice non-penalized CG index with the interaction year dummy variable and its effect on EM, a significant negative relationship is observed, similar to the best practice penalized CG index. This suggests that firms that follow optional, best practice governance recommendations, appear to follow the substance and not the form of these governance attributes.

CG indices and the DeFond and Park (2001) model

Penalized CG indices

CG pen_total

When looking at the penalized CG index and its effect on AWCA, a significant negative relationship is seen in the pre-law and pooled samples, in line with H1. However, when examining the total penalized CG index with the interaction year dummy variable and its effect on AWCA, a significant positive relationship is observed. As such, this result is contrary to H1, indicating that firms that have higher CG scores appear to have higher levels of AWCA.

CG pen_mand & CG pen_bp

There is a significant negative relationship between the mandatory CG index and AWCA in the pre-law, post-law and pooled samples, in line with H1. However, this relationship becomes positive when examining the mandatory penalized CG index with the interaction year dummy variable and its effect on AWCA. Thus, when firms are forced to follow mandatory attributes of governance, after the implementation of the CG law concerning the mandatory existence of an audit committee, they appear to be following the letter and not the spirit of the law.

A significant negative relationship between the best practice CG index and AWCA is seen in the post-law period sample, in line with H1. Insignificant results are observed in the pre-law period and in pooled sample, and when examining the best practice penalized CG index with the interaction year dummy variable and its effect on AWCA.

Non-penalized CG indices

CG non_total

A significant positive relationship is observed between the total non-penalized CG index and AWCA in the pooled sample and when examining the total non-penalized CG index with the interaction year dummy variable and its effect on AWCA. Thus, firms with higher CG scores have higher levels of AWCA. As such, one can conclude that the governance items included in the index do not appear to assist firms in mitigating AWCA. They are either not appropriate or they are not applied in substance.

CG non_mand & CG non_bp

A significant positive relationship is also observed between the mandatory non-penalized CG index and AWCA in the pre-law period sample. Insignificant relationships are seen between the two variables in the post-law and the pooled sample, as well as when examining the

mandatory non-penalized CG index with the interaction year dummy variable and its effect on AWCA.

A significant positive relationship between the best practice non-penalized CG index and AWCA is also observed in the pooled sample. However, in the post-law period and when examining the best practice non-penalized CG index with the interaction year dummy variable and its effect on AWCA, a significant negative relationship is noticed. This suggests that when firms voluntarily implement best practice governance recommendations, they believe in their value and follow their substance and, as a result, these governance items mitigate EM.

1.7 Conclusion

This paper examines the effect of corporate governance, measured through a CG index, on earnings management practices before and after the implementation of Law 3693/2008, named “Mandatory audit of annual and consolidated financial reports”.

Using a sample of 788 firm-year observations for Greek non-financial listed firms for the period 2006-2012, corporate governance’s effect on EM is examined using both penalized and non-penalized CG indices. EM is measured using the Modified Jones model and the DeFond and Park (2001) model. The data is broken into two periods, the pre-law period sample (2006/2008) and the post-law period sample (2010/2012). It is expected that the negative effect of corporate governance on earnings management, after the implementation of the Law will be stronger.

Mixed results are seen regarding the effect of corporate governance mechanisms in Greece on earnings management practices. Both positive and negative relationships between earnings management and corporate governance indices is observed, for both measures of discretionary

accruals and all CG indices. In most regressions, a significant positive relationship is seen between EM and CG, contrary to H1, signifying that firms with higher CG scores have higher levels of EM. As such one can conclude that the governance items included in the index do not appear to assist firms in mitigating earnings management. They are either not appropriate or they are not applied in substance.

When examining the CG indices with the interaction dummy variable, most regressions report a significant positive relationship between EM and CG for the total and mandatory CG indices, contrary to H1. In the period when the existence of an audit committee is mandatory (after the implementation of Law 3693/2008), firms with higher CG scores conduct more EM. This implies that firms are more concerned with the letter of the law rather than its spirit. This is a typical case where form supersedes the substance of the law.

However, when examining the best practice CG index with the interaction dummy variable, a significant negative relationship between EM and CG is observed, in line with H1. This indicates that firms that follow best practice governance attributes, as suggested by the Greek CG Code, in the years after the implementation of Law 3693/2008 concerning the mandatory existence of an audit committee, constrain EM. As such, firms that follow optional governance practices, in contrast to mandatory CG items, are more successful in mitigating EM. These results suggest that best practice governance attributes play a critical role in constraining EM, since firms appear to voluntarily follow the substance and not the form of these governance attributes.

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