

# THE IMPACT OF CORPORATE GOVERNANCE ON EARNINGS MANAGEMENT: EVIDENCE FROM GREEK LISTED FIRMS

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## Abstract

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In this paper, we investigate whether the characteristics of boards of directors are associated with earnings management. By employing a sample of listed firms in the Athens Stock Exchange during the period from 2008 to 2016 and applying two different earnings management models (Dechow's '96 and DeAngelo's '86) to explore, via the discretionary accruals, for the presence of earnings management, we surprisingly found no evidence of almost any effect of the investigated board characteristics, except CEO duality. Besides, we also found significant variation over time. This finding confirms the unrepresented effect of the sovereign debt crisis on Greek firms. The corporate governance legal framework has been improved since the mandatory adoption of the International Accounting Standards, at least from the listed firms in the Athens Stock Exchange in 2005. Under the new rules, more detailed corporate governance information is included in the firms' financial reports during the last decade.

**Keywords:** Corporate Governance, Earnings Management, Greek Listed Firms

**Authors' individual contribution:** Conceptualization - P.K. and S.S.; Methodology - P.K. and S.S.; Writing - S.S. and C.K.; Investigation - P.K. and S.S.; Resources - P.K., S.S., and C.K.; Supervision - P.K.

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## 1. INTRODUCTION

Earnings management (EM hereafter) can influence shareholders who use financial information to make decisions and can also affect the credibility of financial information, which could lead to major financial scandals and potential capital market collapse. The audit role of boards has been mentioned by policymakers, regulators, and researchers. After all, according to Sarbanes-Oxley Act (SOX), 2002, the independent, informed, and proactive boards should be the key in protecting the interests of investors.

Almost two decades ago, Greek stock market faced an unprecedented crisis. Many individuals, non-institutional investors, depending on their investment approach on rumours, hints, and their personal instinct, experienced massive capital losses (Maditinos, Šević, & Theriou, 2007). It was easily proved that this crisis grew within an environment of lack of transparency and diffusion of non-credible and misleading information on the one hand and the shortcomings of the existed legal framework, on the other. As a result, the Hellenic Capital Market Commission (HCMC) established a committee for the corporate governance (CG) values diffusion and

issued the “Principles of the CG values in Greece” which was a voluntary code for listed companies (Mertzanis, 2001). Due to the low compliance of firms with the voluntary code (Spanos 2005), the Greek Government issued a fully harmonised Law (3016/2002) with the European Union directives for the mandatory adoption of CG rules (Florou & Galarniotis, 2007). According to this law, a higher proportion of non-executive independent board members is required in order to protect the stakeholders’ interest and improve their confidence in the firms’ management and reported information.

The aim of the paper is to observationally investigate the association between corporate governance attributes and earnings management during a period in which the Greek economy and, as a result, the Greek enterprises were massively hit by the economic crisis. The CG effect on EM of Greek listed firms has already been investigated in prior literature. Bekiris and Doukakis (2011) examined the association between corporate governance and accruals EM using a CG index based on a sample of firms listed on the Athens, Milan, and Madrid stock exchanges and found an inverse relationship between CG and EM. Their findings suggest that firms that apply high levels of corporate governance standards are less likely to manage their earnings, thus resulting in higher earnings quality. Smaraidos, Thanasas, and Filiou (2018) examined the impact of CG on Greek firms’ decision whether to adopt earnings management practices or not. For a sample of non-financial listed on ASE firms for the period 2011-2015, they report that companies with a strong and independent board of directors are deterred from practices related to earnings management, ensuring by this way their reputation and credibility in the market. Constantatos (2018) advocates that the previously negative relationship between CG quality and EM turned to a positive one, once the law amendments were implemented. The same stands prior to the Greek sovereign debt crisis period regarding the positive relationship between CG and firm performance which turned to become negative.

The impact of CG practices on EM has been widely studied, not only in Greece but globally, as CG attributes help investors by aligning the interests of managers with the interests of shareholders and by enhancing the reliability of financial information and the integrity of the financial reporting process (Watts & Zimmerman, 1986). Generally, the results of these studies are mixed and, therefore, the research on the structure of these relationships generally remains inconclusive. In particular, Krishnan and Parsons (2008), for a sample of firms from Fortune 500 identified by Catalyst (2004) found higher earnings quality for firms with more female directors and argued that women are more ethical in their behaviour and judgement compared to men. Arun, Almahrog, and Aribi (2015), for a sample of U.K. firms, provide evidence that more female directors and more independent female directors on boards have a negative effect on EM. In addition, Ramachandran, Ngete, and Subramanian (2015) examined the relationship between board characteristics and EM through discretionary accruals by using the modified Jones model for listed companies in Singapore for 2010 and 2011 and concluded that a positive relationship between board size and changes of recording discretionary

accruals exists. Besides, Alareeni (2018) examined the influence of a set of CG characteristics on EM practices in 20 Bahraini listed companies during the period 2011-2015 within a modified Jones model (1995). The findings showed that EM is negatively related to board size, board independence is positively related to EM, CEO duality does not have any effect on EM in Bahrain. On a parallel note, the findings indicate that the listed companies in Bahrain are relatively engaged in practicing EM through income-increasing discretionary accruals and emphasize that the relationships between variables must be tested separately for each country, particularly when countries have different environmental factors.

Our paper highlights the consequences of CG aspects on EM in order to achieve a better understanding of the impact of CG on business decision making. The paper’s novelty is that we study the effect of governance on EM, by observing four distinctive board characteristics, on EM, after the implementation of the 2008 governance law for all Greek listed firms. We also contribute to the literature by applying two different approaches – thus, two EM models – to assess the significance of the board’s characteristics, since the EM models are claimed to be well specified but they have low power (Dechow, Sloan, & Sweeney, 1996). We chose to apply Dechow’s ’96 model, the so-called “modified Jones’ model” which is more appropriate to detect the EM and until today remains the most popular approach for accruals estimation. However, we also apply DeAngelo’s ’86 model because the assumptions inherent in this model are less restrictive. Moreover, current accruals between the two models are calculated in different ways according to the literature.

As the bulk of studies on EM have shown that firms with stronger CG are able to better restrain EM (Beasley, 1996; Klein, 2002), it is expected that the effect of CG variables on EM will be negative. Contrary to what is expected, the analysis in this paper suggests that EM through the use of discretionary accruals, thus the accruals that do not result from the normal course of business activity and are also known as abnormal accruals, does not respond to management incentives. Only the lack of CEO duality seems to negatively affect EM.

The remainder of the paper is structured as follows. In Section 2, we explore the research literature and state the research hypothesis. In Section 3, we describe the research methodology. In the fourth section, we present the results of the data analysis. The discussion of our findings comes next and then, the final section includes the conclusion and future research suggestions.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### 2.1. Corporate governance and board characteristics

CG is designed to pursue stakeholders’ interests by obtaining a reasonable return on capital and reducing misuse of assets (Shleifer & Vishny, 1997). It has been defined as a set of mechanisms, by which outside investors protect themselves against expropriation by insiders (La Porta, Lopez-De-Silanes, Shleifer, & Vishny, 2002). CG mechanisms are

classified into internal, including the board of directors' structure and characteristics, and external, including country legal systems and takeover rules (Denis & McConnell, 2003). Then, justified, CG is also defined as an internal system encompassing policies, processes, and people that serve the needs of shareholders and other stakeholders by directing and controlling management activities with good business practices, objectivity, and integrity (O'Donovan, 2003).

CG evaluation is provided by forming an opinion of the board of directors, as it is an effective CG mechanism. Shareholders elect members of the board to act on their behalf and the board,

in turn, delegates power to top management while still monitoring management performance and confirming any decision that demonstrates a lack of good faith for shareholders. If board members cannot effectively monitor managers' behaviour, shareholders can ask for their replacement via a voting mechanism. Since CG is typically present in countries having adopted such common laws (Zhou & Chen, 2004) this paper focuses on board composition characteristics. We explore the board of director characteristics described below and with references to previous literature, we attempt to justify why these elements are important in our investigation.

**Table 1.** Control variables definition

<i>Label</i>	<i>Variable</i>	<i>Measurement</i>
<i>IND</i>	Independent members	The percentage of independent, outside, non-executive members on the board of directors of a firm.
<i>BGD</i>	Board gender diversity	The percentage of the female members on the board of directors of a firm.
<i>CEOD</i>	CEO duality	Dummy variable taking the value of 1 if the role of CEO chairman is combined and 0 otherwise.
<i>BS</i>	Board size	The number of directors being appointed on a firm's board.

The independent members make boards more effective in monitoring managers and exercising control on behalf of shareholders (Fama & Jensen, 1983; Dunn, 1987). Outside directors being independent of the firm's managers bring a greater breadth of experience to the firm (Firstenberg & Malkiel, 1980; Vance, 1983). A higher number of outside directors sitting on the board leads a) to stronger CG (Weisbach, 1988); b) to higher threat for a CEO to be dismissed especially during poor performance periods (Conyon & Peck, 1998); c) to reduced cost of debt (Anderson, Mansi, & Reeb, 2004), and d) to the stronger ability to control top management (Bliss, Muniandy, & Majid, 2007). On the other hand, the effectiveness of independent directors is under question, as the board governance mechanism is still unclear, especially in a country where the firm controlling shareholders will use their power to select members of the entire board of directors (Allen, Larson, & Sloan, 2010).

It is argued that the increased participation of women in a company's board a) leads to more innovative decisions and contributes to the organisation's reputation (Miller & Triana, 2009); b) affects the quality of the controlling role, as it is associated with better monitoring (Campbell & Mínguez-Vera, 2008); c) has a positive impact on corporate performance (Carter, Simkins, & Simpson, 2003; Krishnan & Park, 2005). However, other researchers failed to demonstrate the existence of a direct and statistically significant relationship (Dimovski & Brooks, 2006).

The CEO/chairperson duality concentrates power in the CEO's position, potentially allowing for more management discretion and permitting the CEO to effectively control information available to other board members and thus impedes effective monitoring (Jensen, 1993). Nevertheless, there is no empirical evidence, to support this theory since most authors have not found any significant relation (Bugshan, 2005; Davidson, Goodwin-Stewart, & Kent, 2005), as information asymmetries between the CEO and the board, communication issues and decision-making problems generally occur.

Larger boards are less susceptible to managerial domination (Zahra & Pearce, 1989) and more likely to be sharp-eyed in monitoring management (Firstenberg & Malkiel, 1994). On the other hand, it is supported that boards can become less effective in controlling management as board size increases, due to problems of coordination and communication (Jensen, 1993; Bozec & Dia, 2007). Based on the above literature, we can conclude that the board composition might affect positively the benefit of shareholders and probably enhance the agency problems.

## 2.2. The impact of CG theories on EM

The agency theory, rooting from Alchian and Demsetz (1972) who supported that the creation of the agency problem results from the separation of ownership and control, is the dominant theory, among several theoretical perspectives (e.g., stewardship theory, stakeholder theory, resource dependency theory, managerial hegemony theory, or institutional theory) available in exploring the issues of CG. The agency problem is concerned with the consumption of perquisites by managers (Jensen & Meckling, 1976). As managers have more inside information than the financial providers, the latter face agency costs to monitor managers' behaviour. The managers might pursue their self-interests to maximize their own wealth, perhaps at the expense of other parties' wealth and interests (Jensen, 1986). Due to agency theory, CG would reduce the agency problem between financial providers and managers and increase the efficiency of contracts (Gompers, Ishii, & Metrick, 2003).

EM can be defined as the alteration of a firms' reported economic performance by insiders either to mislead some stakeholders or to influence contractual outcomes (Healy & Wahlen, 1999; Leuz, Nanda, & Wysocki, 2003). Accounting earnings are more reliable and more informative when managers' opportunistic behaviour is controlled through a variety of monitoring systems (Dechow et al., 1996). Discretionary or abnormal accruals equal

the difference between actual and “normal” accruals. Large values of discretionary accruals are conventionally interpreted as indicative of EM. Because discretionary accruals can be used to both increase or decrease earnings, in some contexts the absolute value of discretionary accruals is the appropriate measure to use to determine whether EM occurs (Klein, 2002; Cohen, Dey, & Lys, 2008).

There are many theories that try to explain the relationship between EM and CG. The basis of these theories is the separation of ownership and control. Managers are often driven by their own interests, rather than by shareholders'. This interest conflict is costly and there are difficulties in verifying that managers are trying to maximize shareholder wealth (Jensen & Meckling, 1976; Fama & Jensen, 1983). The managers' personal interests could drive them to exercise discretion on accruals, which could reduce the relevance and reliability of reported earnings, by which EM becomes a type of agency cost. As a consequence, managers cannot be reliable and close supervision is required. The board plays an important role in overseeing top management, to ensure that directors act in the best interests of shareholders. The CG literature emphasizes this role in solving agency problems (Peasnell, Pope, & Young, 2005). Taking into account agency the assumptions, the strengthening of CG mechanisms should result in the reduction of EM practices.

Finally, CG attributes help investors by aligning the interests of managers with the interests of shareholders and by enhancing the reliability of financial information and the integrity of the financial reporting process (Watts & Zimmerman, 1986). Striking differences exist across countries in CG systems for reasons, such as laws, capital market characteristics, culture, history, and industrial organization (La Porta, Lopez-De-Silanes, & Shleifer, 1999; López-de-Foronda, López-Iturriaga, & Santamaría-Mariscal, 2007). In this study, we test the significance of CG variables and more specifically, their effect on EM methods, in order to develop research hypotheses for further analysis. The literature offers plenty of theoretical explanations, with each suggesting a relationship between CG variables and dependent variables.

### 2.3. Research hypotheses development

Considerable literature exists on how CG variables relate to EM. Empirical support has been found for the effective role of independent directors in constraining EM (Peasnell, Pope, & Young, 2000; Agrawal & Knoeber, 2001; Xie, Davidson, & DaDalt, 2003; Klein, 2002; Davidson et al., 2005). On the contrary, it has been observed that the independence of the board of directors and its expertise have a negative relationship with EM (Lin & Hwang, 2010). Moreover, it has been documented that, boards with more independent outside directors engage less frequently in EM through abnormal accruals (Klein, 2002) and are associated with lower use of discretionary accruals (Benkel, Mather, & Ramsay, 2006). Therefore, we test the following research hypothesis:

*H1: There is a relationship between the percentage of the independent members on the board of directors of a firm and the firm's EM.*

Female representation on the board can actually reduce EM as female directors think more independently, monitor CEO behaviour more effectively (Carter et al., 2003), are more likely to be less tolerant of opportunistic activities and behaviour (Krishnan & Parsons, 2008; Thorne, Massey, & Magnan, 2003; Adams & Ferreira, 2009) and more risk-averse in their decision-making (Powell & Ansic, 1997; Sunden & Surette, 1998). On the other, it has been argued that female directors are similarly risk-averse to male directors in their decision-making (Bajtelsmit & VanDerhei, 1997; Hinz, McCarthy, & Turner, 1997). Additionally, a significantly positive correlation has been found between the proportion of female non-executive directors and opportunistic EM (Srinidhi, Gul, & Tsui, 2011). Therefore, we test the following research hypothesis:

*H2: There is a relationship between the percentage of female members on the board of directors of a firm and the firm's EM.*

The CEO/chairperson duality situation, concentrates power in the CEO's position, potentially allowing for more management discretion. Evidence has been provided that firms engaging in EM are less likely to have an external blockholder monitoring management and are more likely to have a CEO who is the company founder and/or the chairman of the board (Dechow et al., 1996). Consequently, as this situation impedes effective monitoring, it would also be associated with greater use of discretionary accruals. Therefore, we test the following research hypothesis:

*H3: The fact that the role of the chairman and the CEO are vested in the same person affects the firm's EM.*

Regarding a firm's board size, it should be inversely related to EM and associated with less use of discretionary accruals as small boards are more effective in monitoring the CEO's activities (Jensen, 1993) and better able to make timely decisions (Yermack, 1996). Even so, larger boards with diverse knowledge are proved to be more effective for constraining EM (Xie et al., 2003; Rahman & Ali, 2006; Peasnell et al., 2005; Ching, Firth, & Rui, 2006). Therefore, we test the following research hypothesis:

*H4: There is a relationship between the board size of a firm and the firm's EM.*

## 3. RESEARCH DESIGN

### 3.1. Aims and scope

This paper investigates the association between board characteristics and EM. Our study is motivated by conflicting results in the literature. Agency theory suggests that a better-governed firm should have better performance and higher valuation due to lower agency costs (Gompers et al., 2003). However, resource dependency theory argues that corporate directors bring information and expertise to the firm, create channels of communication with the firm's important external constituents, obtain commitments of support from outsiders and work to create legitimacy for the firm in its external environment (Pfeffer & Salancik, 1978). Our study

investigates such board-EM relationship in the Greek economy, where both monitoring and advisory roles of boards might be important to firms.

Besides, we explore the effect of the independent directors and female members' proportion of the board, the CEO duality, and the board size on the level of EM. This study aims at contributing to the discussion on the relationship between CG and EM by taking into account 4 different CG aspects and using them to explore this relationship for Greece. We analyse our sample using two different linear regressions.

### 3.2. Sample selection

The sample consists of listed firms in the Athens Stock Exchange for the period of 2008-2016, as already from 2008 the application of CG CODE had been adopted in Greece. We focus on publicly-listed firms due to data availability and due to mandatory disclosures obligation for the listed firms. There are 151 firms listed in the securities market for all the years included in our sample period. Removing firms belonging in sectors banking, financial, assurance, real estate as accruals are difficult to define for firms in these sectors (Zhao & Chen, 2008), we narrowed down the total number to 125 firms. Due to the fact that the sample is limited to firms with December fiscal year-ends, 4 more firms were excluded. Further, due to the requirement of data availability and a balanced panel of firms, the final number of firms of our sample counts 113 firms and 1089 observations. A full list of our sample of companies is presented in Table A.1 (Appendix). Accounting and CG data have been collected from firms' annual balance sheets, financial statements, and corporate web pages. We do not use data from rating agencies or questionnaires.

### 3.3. Methodological approach

Following the overview of the empirical literature, we use multi-dimensional measures of CG practices and apply them to evaluate the relationship between CG and EM in Greece. The use of different aspects of CG helps to resolve the issue of multicollinearity. The high correlation among CG variables is evident in many CG studies (Klein, 2002; Xie et al., 2003). We also control for the possible endogeneity problem. Endogeneity could bias the results obtained (Campbell & Mínguez-Vera, 2008). OLS regression analysis in governance research can lead to endogeneity between CG variables and other variables of interest (Hermalin & Weisbach, 2003; Carcello, Hermanson, & Ye, 2011). The existence of at least one source of endogeneity will cause the estimates to be biased and could potentially lead to spurious results (Schultz, Tan, & Walsh, 2010).

Balanced panel data estimation is used in this study to analyse the data by applying linear, multivariate regression. Panel data analysis has a number of advantages because it not only provides efficient and unbiased estimators but also provides a larger number of degrees of freedom available for the estimation and allows the researcher to overcome the restrictive assumptions of the linear regression model.

EM can occur by structuring transactions towards achieving a desired financial statement output (Roychowdhury, 2006) or through the management of firm accruals, which arise upon discrepancies "between the timing of cash flows and the timing of the accounting recognition of income" (Ronen & Yaari, 2008). Following previous literature (Anilowski, Macias, & Sanchez, 2009; Erickson & Wang, 1999; Zhao & Chen, 2008), we test for possible EM by examining the statistical significance of firm discretionary accruals.

Discretionary or abnormal accruals equal the difference between actual and "normal" accruals, using a regression formula to estimate normal accruals. The literature has established that prevailing techniques for the detection of EM through the isolation of the discretionary component of accruals are often biased (Kothari, Loutskina, & Nikolaev, 2005) or suffer from misspecification errors and lack statistical power (Dechow, Hutton, Kim, & Sloan, 2012; Dechow et al., 1996; Peasnell et al., 2000). At the same time, our sample of firms is by construction non-random in nature, given that it consists of Greek firms during the period of a severe economic crisis and could thus have the motivation to alter their level of accruals, which is, in turn, used for EM detection. Thus, in line with most EM literature, EM is examined through accrual-based EM study. To account for these issues, we make use of two different model specifications in order to assess. Abnormal accrual-based proxy, which reflects EM, is the most extensively used proxy of earnings quality in empirical accounting research (Dechow, Ge, & Schrand, 2010). As such in line with most EM literature and data constraints accrual-based EM studies are examined in this study.

#### 3.3.1. Model 1: Dechow's '96

According to Dechow et al. (1996), all the EM models are well specified but have low power. Comparing several models of accrual management, they proved that the so-called "modified Jones' model" provides the most power for detecting EM. Despite concerns about its power (Kothari et al., 2005), it remains the most popular model for estimating accrual behaviour (Bartov, Gul, & Tsui, 2000; Benkel et al., 2006). In order to test the *H1*, *H2*, *H3*, and *H4* we apply Dechow's '96 model in the way it has been used by Anagnostopoulou and Tsekrekos (2015).

**Table 2.** Variables' definition of Dechow's '96 model

Label	Variable	Measurement
TAC	Total accruals	Net income before extraordinary items (NIBE) minus cash flow from operations (CFO)
TA	Total assets	Total assets of the firm
ΔREV	Change in revenues	Change in firm's revenues between year <i>t-1</i> and year <i>t</i>
ΔAR	Change in accounts receivable	Change in firm's accounts receivable between year <i>t-1</i> and year <i>t</i>
NCA	Non-current assets	Non-current assets of the firm
NDAC	Non-discretionary accruals	Non-discretionary accruals of the firm
DAC	Discretionary accruals	Discretionary accruals of the firm
LNSALES	Sales	Natural logarithm of sales
LNTA	Total assets	Natural logarithm of total assets
LEV	Leverage	Debt to total assets

*First step:* we estimate cross-sectionally the following regression for all years according to ATHEX discrimination of listed firms in categories, as stated by their main activity, thus the activity which generates the most revenues.

$$TAC_t/TA_{t-1} = a_0 + a_1LN(1/TA_{t-1}) + a_2(\Delta REV_t/TA_{t-1}) + a_3(NCA/TA_{t-1}) + u_{it} \quad (1)$$

where, the index *i* refers to the company, the index *t* in the year and  $u_{it} = v_{it} + e_{it}$ , with  $v_i$  - the individual effects and  $e_{it}$  - the disruptive term.

*Second step:* we use the ATHEX classification and year-specific parameter estimates  $a_0, a_1, a_2$ , and  $a_3$  to infer discretionary accruals (DAC) with an equation similar to the one above. In this model, we subtract the change in accounts receivable from the change in revenues before estimation (Kothari et al., 2005; DeFond & Park, 1997; Subramanyam, 1996).

$$NDAC_t = a_0 + a_1LN(1/TA_{t-1}) + a_2(\Delta REV_t - \Delta AR_t/TA_{t-1}) + a_3(NCA/TA_{t-1}) \quad (2)$$

*Third step:* we estimate the discretionary accruals for the year *t* with the following equation:

$$DAC_t = (TCA_t/TA_t) - NDAC_t \quad (3)$$

*Fourth step:* we estimate cross-sectionally the following regression for all years.

$$DAC_{it} = a_0 + a_1LNSALES_{it} + a_2LNTA_{it} + a_3LEV_{it} + a_4IND_{it} + a_5BGD_{it} + a_6CEOD_{it} + a_7BS_{it} + u_{it} \quad (4)$$

where, the index *i* refers to the company, the index *t* in the year, and  $u_{it} = v_{it} + e_{it}$ , with  $v_i$  - the individual effects and  $e_{it}$  - the disruptive term.

### 3.3.2. Model 2: DeAngelo's '86

We also use DeAngelo's (1986) model in estimating discretionary accruals for the reason that the assumptions inherent in this model are less restrictive and it requires less data than the other models (Godfrey, Mather, & Ramsay, 2003).

**Table 3.** Variables definition of DeAngelo's '86 model

Label	Variable	Measurement
DAC	Discretionary accruals (measured in millions)	The level of DAC is measured as the difference between current accruals (CAC <sub><i>t</i></sub> ) and current accruals from a prior period (CAC <sub><i>t-1</i></sub> )
LEV	Leverage	Debt to total assets
DCFO	Deflated cash flow from operations	Cash flow from operations divided by total assets <i>t-1</i>

Current accruals are defined as the difference between earnings before interest and tax and cash flow from operations, deflated by beginning-of-period total assets in order to allow for interfirm comparisons and to reduce heteroskedasticity (Eddey & Taylor, 1999; Godfrey et al., 2003).

$$CAC_{it} = (EBIT_{it}/TA_{it-1}) - (CFO_{it}/TA_{it-1}) \quad (5)$$

The level of discretionary accruals is measured as the difference between current accruals and nondiscretionary accruals. This model uses current accruals from a prior period as the measure of nondiscretionary accruals for the current period.

$$DAC_{it} = CAC_{it} - NDAC_{it} = CAC_{it} - CAC_{it-1} \quad (6)$$

It also uses each firm as its own control and relies on the assumption that the average change in nondiscretionary accruals is zero so that a change in accruals reflects a change in discretionary accruals. The model has its limitations. Firstly, if NDAC vary

across periods, the model will measure discretionary accruals with an error. Secondly, the model does not take account of the impact of changes in economic circumstances on nondiscretionary accruals (Dechow et al., 1996). Thirdly, as the power of the model is low, it may not detect all instances of EM (Godfrey et al., 2003).

In order to test the *H1*, *H2*, *H3*, and *H4* the following equation has been formed:

$$DAC_{it} = a_0 + a_1LEV_{it} + a_2DCFO_{it} + a_3IND_{it} + a_4BGD_{it} + a_5CEOD_{it} + a_6BS_{it} + u_{it} \quad (7)$$

where, the index *i* refers to the company, the index *t* in the year, and  $u_{it} = v_{it} + e_{it}$ , with  $v_i$  - the individual effects and  $e_{it}$  - the disruptive term.

### 3.4. Descriptive statistics

We observe that the portion of the independent board members varies from zero to 71.42% with a mean of 25.94% and a median of 28.57%. The portion of the female also varies from zero to

71.42%, with a mean of 14.08% and a median of 11.11%. Almost half of the examined firms (the mean is 43.30%) trust the same person to be the chairman and the CEO simultaneously, while the minimum value of board members is 4 and the maximum is 15.

**Table 4.** Descriptive statistics of Dechow's '95 model

Variable	Mean	Median	Min	Max	Std. deviation
DAC	-0.003	0.003	-0.714	0.372	0.054
LNSALES	17.812	17.529	12.245	23.072	1.8178
LNTA	18.434	18.066	14.44	23.161	1.519
LEV	0.376	0.358	0	2.662	0.256
IND	0.251	0.286	0	0.714	0.162
BGD	0.141	0.111	0	0.714	0.161
CEOD	0.433	0	0	1	0.496
BS	7.712	7	4	15	2.171

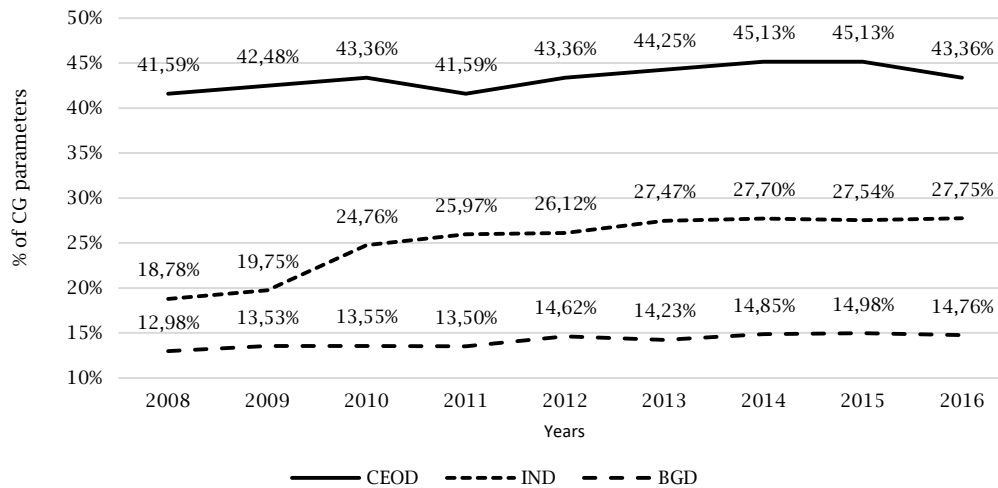
**Table 5.** Descriptive statistics of DeAngelo's '86 model

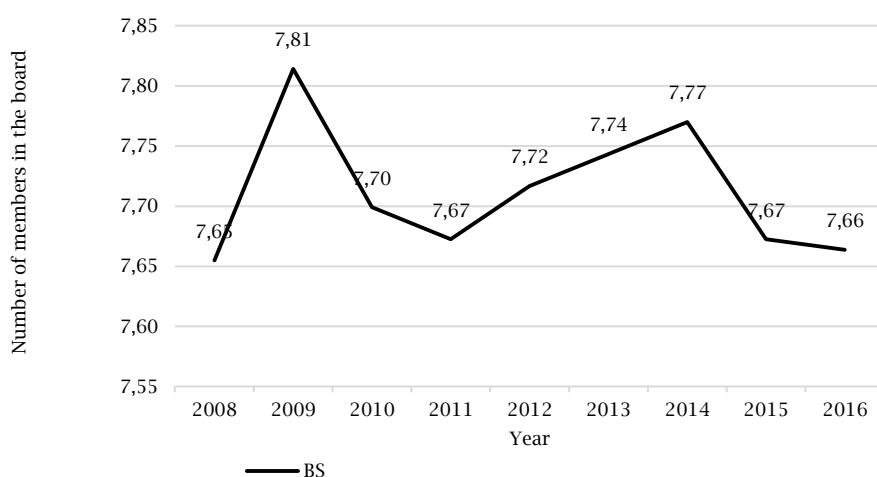
Variable	Mean	Median	Min	Max	Std. deviation
DAC	-6.101e5	-277	-7.439e8	5.682e8	5.688e7
LEV	0.376	0.358	0	2.662	0.255
CFO	0.004	0.025	-23.074	0.784	0.728
IND	0.251	0.286	0	0.714	0.162
BGD	0.141	0.111	0	0.714	0.161
CEOD	0.433	0	0	1	0.496
BS	7.712	7	4	15	2.171

Observing our data, we also find out that the portion of the independent board members and that of the female members are increasing, although 84 out of the 113 firms, which consist our sample, had no woman in their board during the whole

observing period. We also observe a generally increasing tendency in variable *CEOD*, while the board size seems almost unchanged as on average it varies each year from a minimum of 7.65 to a maximum of 7.81.

**Figure 1.** Histogramic depiction of CG parameters over time (Part 1)



**Figure 2.** Histogramic depiction of CG parameters over time (Part 2)

### 3.5. Correlation analysis

Multicollinearity diagnostics are conducted using Pearson and Spearman's rank correlation coefficients. 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, 2004). We observe that we do not confront with multicollinearity problem.

**Table 6.** Correlation analysis of Model 1/EM model (Dechow '95)

Variable	LNSALES	LNTA	LEV	IND	BGD	CEOD	BS
LNSALES	1	0.093	0.009	-0.115	-0.191	-0.135	0.483
LNTA		1	0.045	-0.125	-0.186	-0.159	0.558
LEV			1	0.093	-0.089	-0.059	-0.031
IND				1	-0.014	0.131	-0.260
BGD					1	0.194	-0.181
CEOD						1	-0.248
BS							1

**Table 7.** Correlation matrix of Model 2/EM model (DeAngelo '86)

Variable	LEV	CFO	IND	BGD	CEOD	BS
LEV	1	-0.075	0.093	-0.088	-0.059	-0.031
CFO		1	-0.007	0.003	0.037	-0.001
IND			1	-0.013	0.131	-0.260
BGD				1	0.193	-0.182
CEOD					1	-0.248
BS						1

## 4. RESULTS AND DISCUSSION

We used a linear regression model for panel data in order to investigate the determinants of the impact of CG on a firm's EM.

### 4.1. Dechow's '96 EM model

The Breusch-Pagan test cannot reject the null hypothesis. The Hausman test cannot reject the null hypothesis and, therefore, a random-effects model was adopted. Consequently, we used on RE regression model to investigate the determinants of the CG on the profitability of a firm. Table 8 shows in detail the results of the regression model.

The results reported in Table 8 suggest that only the impact of the CEO duality (*CEOD*) has a negative and statistically significant effect on *DAC* [ $a = 0.00688311$ ,  $p < 0.0471$ ]. The percentage of independent board members (*IND*), the percentage of female board members (*BGD*), and the board size (*BS*) are statistically insignificant. Referring to the control variables, only one (*LEV*) out of the three included in the regression model, had a positive and statistically significant relation with *DAC*. The other two (*LNSALES* and *LNTA*) are statistically insignificant. "Within" variance, which is greater than "between" variance demonstrates that the variation over time is much more powerful than the variation across individuals.



**Table 8.** Random effects (GLS) using 1017 observations included 113 cross-sectional units for a time-series length of 9 years and dependent variable DAC

Independent variables	Coefficient	St. error	z	p-value	Sign. level
Const	0.0109	0.02234	0.4900	0.6242	
LNSALES	5.3107e-05	0.0021	0.0251	0.9799	
LNTA	-0.0002	0.0027	-0.0864	0.9311	
LEV	-0.0548	0.00649	-8.4330	< 0.0001	***
IND	-0.0032	0.0105	-0.3045	0.7608	
BGD	0.0163	0.0106	1.5430	0.1229	
CEOD	-0.0069	0.0035	-1.9860	0.0471	**
BS	0.0015	0.0010	1.5910	0.1116	
Akaike criterion	-3114				
Schwarz criterion	-3075				
Hannan-Quinn	-3099				
Durbin-Watson stat	1.9061				
Between variance	0				
Within variance	0.0027				
$\theta$	0				
rho	-0.088998				
Hausman test	X2(7) = 10.2259 with p-value = 736846				
Breusch-Pagan test	X2(1) = 0.1112918 with p-value = 0.5760				

Note: \*\*\* 1% significance level, \*\* 5% significance level and \* 10% significance level.

#### 4.2. DeAngelo's '85 EM model

The Breusch-Pagan test cannot reject the null hypothesis. The Hausman test cannot reject the null hypothesis and, therefore, a random-effects model

was adopted. Consequently, we used on RE regression model to investigate the determinants of the CG on the profitability of a firm. Table 9 shows in detail the results of the regression model.

**Table 9.** Random effects (GLS) using 1017 observations included 113 cross-sectional units for a time-series length of 9 years and dependent variable DAC

Variable	Coefficient	St. error	z	p-value	Sign. level
Const	4.4961	9.1053	0.4938	0.6215	
LEV	2.9708	6.8587	0.4331	0.6649	
CFO	19.6894	2.3841	8.2590	< 0.0001	***
IND	-3.3243	11.1684	-0.2977	0.7660	
BGD	-3.2571	11.1219	-0.2929	0.7696	
CEOD	-1.4282	3.6858	-0.3875	0.6984	
BS	-0.5710	0.8576	-0.6658	0.5055	
Akaike criterion	11051				
Schwarz criterion	11086				
Hannan-Quinn	11064				
Durbin - Watson stat	2.1236				
Between variance	40.769				
Within variance	3019.3				
$\theta$	0.0557				
rho	-0.1113				
Hausman test	X2(6) = 2.43964 with p-value = 0.8751				
Breusch-Pagan test	X2(1) = 0.31265 with p-value = 0.5760				

Note: \*\*\* 1% significance level, \*\* 5% significance level and \* 10% significance level.

The results reported in Table 9 suggest that none of the CG variables is statistically significant. Referring to the control variables, only one (CFO) out of the two included in the regression model had a positive and statistically significant relation with DAC. The other one (LEV) is statistically insignificant. "Within" variance, which is greater than "between" variance demonstrates that the variation over time is much more powerful than the variation across individuals.

#### 5. CONCLUSION

Contrary to previous literature the analysis in this paper suggests that EM through the use of discretionary accruals does not respond to management inducement. EA seems to have a diverse relationship only with CEO duality. This means that the fact that when the chairman of a firm and the CEO is the same person affects the EM of the firm negatively. We conclude that

the more powerful CEOs were reluctant to apply EM methods in a period of severe economic crisis for Greece.

Generally, the CG variables are proved to be statistically not significant. Additionally, we observe that time variation is much more powerful than variation across individuals. Possibly this finding complies with the fact that Greek listed companies had to confront a really severe economic crisis during the examining period. It likely indicates that other possible externalities had a greater impact than the researched CG factors. Among them, we can mention the fluctuating political environment, the tight fiscal adjustment policies, or even legal influence factors.

We also need to make a note of the limitations of this study. First, the selected control variables had to be computed and confirmed via the firms' annual reports. Certainly, the choice of variables is not exhaustive. Indeed, we did not use alternative variables because of data (e.g., about audit

committees or about the number of board meetings) unavailability. We also had to deal with the lack of data for the period before the implementation of Law 3698/2008 which required all listed firms to have an audit committee. Therefore, we cannot

provide results regarding the CG impact on EM pre and post the Greek economic crisis. Even though this study adds to the very limited research in Greece about CG and EM, future research should focus on how CG aspects interact with firm performance.

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## APPENDIX. THE NAMES OF THE FIRMS AND INDUSTRIES COMPOSING OUR DATASET

Table A.1. List of companies (Part 1)

1	Aegek SA
2	Akritas AE
3	Alpha Grissin Power and Environmental Control Systems SA
4	Alumil Aluminium Industry SA
5	Anonymous Shipping Company of Crete SA
6	AS Company SA
7	Athens Medical Centre Commercial SA
8	Attica Holdings SA
9	Attica Publications SA
10	Autohellas SA
11	Avax SA
12	Ave SA
13	Biokarpet Industrial and Commercial Enterprises SA
14	Bioter SA
15	Byte Computer SA
16	Cars Motorcycles and Marine Engine Trade and Import Company SA
17	Chatzikraniotis and Sons Mills SA
18	Creta Farm SA
19	Crete Plastics SA
20	Daios Plastics SA
21	Dionic Industrial and Trading SA
22	Domiki Kritis SA
23	Dromeas Office Furniture Industry SA
24	Duros SA
25	E Pairis SA
26	El D Mouzakis SA
27	Elastron SA
28	Elgeka SA Trade Distributions Representations Industry
29	Elinoil Hellenic Petroleum Company SA
30	Ellaktor SA
31	Elton SA
32	Elvalhacor Hellenic Copper and Aluminium Industry SA
33	Elve SA
34	Euroconsultants SA
35	Euromedica Provision of Medical Services SA
36	Evrofarma SA
37	Fieratex SA
38	Flexopack SA
39	Flour Mills C Sarantopoulos SA
40	Flour Mills Keponos SA
41	Folli Follie Commercial Manufacturing and Technical SA
42	Forthnet SA
43	Fourlis SA
44	Frigoglass SA
45	GEK TERNA Holdings Real Estate Construction SA
46	GEKE SA
47	General Commercial and Industrial SA
48	Gr Sarantis SA
49	Greek Organisation of Football Prognostics SA
50	Haidemenos SA
51	Hellenic Petroleum SA
52	Hellenic Telecommunications Organization SA
53	House of Agriculture Spirou SA
54	I Kloukinas I Lappas Construction and Commercial Co SA
55	Iaso Private General Obstetric Gynecological & Paediatrics Clinic Diagnostic Therapeutic & Research Center SA
56	Ideal Group SA
57	Iktinos Hellas Greek Marble Industry SA
58	Ilyda SA
59	Inform P Lykos SA
60	Intertech SA
61	Interwood Xylemporia ATENE
62	Intracom Constructions Technical and Steel Constructions SA
63	Intracom Holdings SA
64	Intralot Integrated Lottery Systems & Services SA
65	J Boutaris & Son Holding SA
66	Karamolengos Bakery Industry SA
67	Karelia Tobacco Company Inc SA
68	Kiriacoulis Mediterranean Cruises Shipping SA
69	Kordellos Ch Bros SA
70	Kreka SA
71	Kri Kri Milk Industry SA
72	Ktima Kostas Lazaridis SA
73	Lampsa Hellenic Hotels SA
74	LanaKam SA
75	Livanis Publications SA

**Table A.1.** List of companies (Part 2)

76	Logismos Information Systems SA
77	Loulis Mills SA
78	Mathios Refractory SA
79	Medicon Hellas SA
80	Mevaco SA
81	Minerva Knitwear SA
82	MLS Multimedia SA
83	Motor Oil Hellas Corinth Refineries SA
84	Mytilineos SA
85	N Leventeris SA
86	N Varveris Moda Bagno SA
87	Nafpaktos Textile Industry SA
88	Naftemporiki Publishing SA
89	Newsphone Hellas SA
90	Paperpack Printing Box Manufacturing and Paper Packaging Industrial SA
91	Papoutsanis Industrial and Commercial of Consumer Goods SA
92	Pegasus Publishing SA
93	Perseus Specialty Foods SA
94	Petros Petropoulos SA
95	Pipe Works L Girakian Profil SA
96	Piraeus Port Authority SA
97	Plaisio Computers SA
98	Profile Systems and Software SA
99	Quest Holdings SA
100	Revoil Petroleum Company SA
101	Sato Office and Houseware Supplies SA
102	SidMa Steel Products SA
103	Space Hellas SA
104	Technical Olympic SA
105	Thessaloniki Port Authority SA
106	Thrace Plastics Holding and Commercial SA
107	Unibios Holdings SA
108	Varangis AVEPE SA
109	Varvaessos European Spinning Mills SA
110	VIS Containers Manufacturing SA
111	Vogiatzoglou Systems SA
112	Wool Industry Tria Alfa SA
113	Yalco Constantinou SA