

Earnings management during financial crisis: The case of Greece

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Abstract

Research Question: Did Greek listed firms engage in earnings management practices during the initial phase of the 2010's economic crisis?

Motivation: Impact of structural attributes of a country along with firms' characteristics on economic entities' accounting policy decisions.

Idea: Firms' accounting policy decisions are conditioned upon their characteristics and the conditions prevailing in the broader economic and business environment. We investigate whether these factors affect firms' propensity to engage in earnings management within a context of financial distress.

Data: The sample consists of all Greek listed firms which were active for the period 2009-2014.

Tools: We employ the Kothari *et al* (2005) model to estimate discretionary accruals of Greek listed firms.

Findings: The family-controlled Greek firms that are audited by Big-4 Auditing firms are likely to use discretionary accruals in order to affect accounting figures. This finding may be attributable to the family control of the firms, along with the weak legal enforcement and investor protection that prevail in Greece. In addition, discretionary

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accruals show a positive relation with firm's ability to cover its current liabilities using current assets while they are negatively associated with cash-flow from operations.

Contribution: This study contributes to the existing literature on earnings management. Our research has been conducted in the initial phase of financial crisis and within an economic environment which is characterized by family-controlled firms, dependency on debt financing and low investor and creditor protection.

Keywords: Earnings management, economic crisis, Big-4 auditor, cash-flows, leverage.

JEL codes: M41, M42

1. Introduction

Previous research provides mixed evidence regarding the impact that financial crises might have upon firms' tendency to implement earnings management practices (Lisboa, 2016; Papadaki & Tzovas, 2017). Greek firms had been seriously affected by the financial crisis that hit Greek economy in the early 2010's. We investigate whether Greek firms adopted earnings management techniques at early stages of financial crisis (period 2009-2011) and control for the sustainability of the results during the post-crisis period (2012-2014). Our sample consists of all companies listed in the Athens Stock Exchange excluding firms from financial and real estate sectors.

Our research has been conducted within the Greek business environment which has certain structural characteristics. In Greece, similar to other European countries (e.g., France, Italy) many listed firms are characterized by a high degree of ownership concentration (Nobes & Parker, 2016), while debt financing constitutes a major source of financing for most Greek firms (Bellás & Tzovas, 2008). Furthermore, a considerable proportion of listed firms can be categorized as family controlled (Hope *et al.*, 2008; Ballas & Tzovas, 2010). Despite the supposed modernization of broader social environment of Greece, certain aspects of Greek economics, politics and culture continue to be affected by Eastern and Western influences (Caramanis, 2005; Tsiouridou & Spathis, 2012). Greece is considered as low investor and creditor protection country (Chalevas & Tzovas 2010; Tsalavoutas *et al.*, 2012). In the early 2010's Greece along with other European countries experienced a severe economic crisis. Austerity programs were implemented in many European countries, including Greece.

Past evidence shows that Greek companies appeared to engage in some of the most extreme earnings management practices in the world (Bhattacharya *et al.*, 2003; Leuz *et al.*, 2003). Recent evidence indicates that despite the introduction of IFRS Greek firms continue to adopt earnings management practices (Tsipouridou & Spathis, 2012; Tsipouridou & Spathis, 2014; Kapoutsou *et al.*, 2015; Gasteratos *et al.*, 2016; Papadaki & Tzovas, 2017). It should be noted that Ferentinou and Anagnostopoulou (2016) found a significant decrease in accruals earnings management after the adoption of IFRS in 2005.

It appears that cash flows from operations have a negative relation with discretionary accruals. Firms that have high cash flows from operating activities seem to have less incentives to use discretionary accruals for earnings management. The level of current ratio may affect the use of discretionary accruals since it appears that when the value of this ratio increases, firms report higher levels of accruals. We found that during the crisis-period the Big-4 Auditing firms did not restrain corporations from engaging in earnings management. This appear to be particular the case for the family-controlled firms. In the post-crisis period, the association between accruals management and type of auditor ceases to be statistically significant.

This study contributes to the existing literature on earnings management. The findings of this study can be of some interest for academic researchers investigating similar issues in countries which possess structural characteristics comparable with those prevailing in Greece. Regulators may find the results of this study useful in designing policies aiming to improve the employed monitoring mechanisms.

The rest of the paper proceeds as follows: the second section provides a short literature review, as well as the motivation of the study. The third section refers to the sample description and to the adopted methodology. The fourth section presents and discusses the findings of this study. The results of the robustness tests referring to the post-crisis period are presented in the fifth section while the sixth section concludes the paper.

2. Literature review and motivation

Earnings management occurs when managers affect accounting numbers by exercising their discretion concerning financial-reporting issues (Watts & Zimmerman, 1990). Managers may choose among alternative reporting methods or estimation bases and disclosures in order to affect reported figures (Shipper,

1989). As mentioned in the introductory section of the study, earnings management has been recognized as a persistent attribute of the Greek financial reporting environment. This study examines whether Greek companies managed their earnings in the initial stages of the financial crisis that hit Greece in early 2010's. The financial crisis had affected businesses operations. The liquidity and credit problems that many Greek corporations had faced, might have reinforced their tendency to adopt earnings management techniques (Tsipouridou & Spathis, 2014).

Previous studies indicated that firms had the intention to manipulate their earnings in periods of economic downturn in order to meet debt covenants or investors' expectations (Kim & Yi, 2006; Chia *et al.*, 2007; Bertomue & Magee, 2011). Persakis and Iatridis (2016) showed that the quality of earnings decreases during periods of recession. On the other hand, evidence has been provided that firms are less inclined to engage in earnings management practices during recession periods (Jenkins *et al.*, 2009; Filip & Raffournier, 2014; Papadaki & Tzovas, 2017). Dimitras *et al.* (2015) found that Greek companies reduce earnings manipulation during recession, while Cimini (2015) found a decrease of misreporting in most European countries after the end of financial crisis.

Previous studies have shown that when a firm is audited by a Big-4 audit firm is less likely to implement earnings-management techniques (Becker *et al.*, 1998; Chia *et al.*, 2007; Papadaki & Tzovas, 2017). According to Iatridis and Dimitras (2013) Big-4 auditors aim to sustain a good reputation and offer high quality of financial statements. Although, Persakis and Iatridis (2016) pointed that higher audit quality leads to higher earnings quality irrespective of the financial crisis, questions have been raised regarding the quality of audit during the financial crisis period. Despite the fact that auditors may have had an incentive to remain independent, their eagerness to report accounting defects may be less pronounced during the period of economic distress (Tsipouridou & Spathis, 2014). Tsipouridou and Spathis (2012) found that in the period 2005-2009 auditing firms - irrespective of their size - had a weak incentive to prevent earnings management. For the period 2005-2011 – which includes the initial phase of the financial crisis – Tsipouridou and Spathis (2014) found that auditors' opinions are not affected by the extent to which their clients adopt earnings management techniques.

Dechow *et al.* (1995), DeFond and Jiambalvo (1994) have shown that firms that have high cash flows from operations have less incentives to manage their earnings through accruals. Moreover, DeFond and Jiambalvo (1994) assert that firms which are highly leveraged try to increase their earnings in order to meet debt covenants while Papadaki and Tzovas (2017) recognizes firm's leverage as

a factor that affects firm's decisions to engage in earnings management practices. However, other studies (Stulz, 1990; Siregar & Utama, 2008) present leverage as a mechanism that restrains managers eagerness for earnings manipulation either because managers are more closely monitored by lenders or because of the need for debt repayment. In the absence of the above mechanism someone could also anticipate that firms' ability to cover current liabilities with current assets is positively associated with discretionary accruals because managers are more flexible to manipulate earnings to improve the accounting results and achieve higher compensation (Iatridis & Kadorinis, 2009).

By summing up the relevant literature we test the following hypotheses:

H1: Earnings managements are negatively associated with operating cash flows.

H2: Discretionary accruals are affected by firms leverage (no prediction is made).

H3: Discretionary accruals are positively affected by firms' ability to cover the current liabilities using current assets.

H4: The use of discretionary accruals to meet earnings targets is associated with the size of the auditor firm (no prediction is made).

3. Sample description and estimation of earnings management

Data was derived from Datastream, and firms' annual reports covering the period 2009-2014. We focus on the period 2009-2011 since the first signs of the European Sovereign Debt crisis became discernible in Greece in 2009 (Tsipouridou & Spathis, 2012; Tsipouridou & Spathis, 2014). In 2009 the yield of the 10-year Greek bond widened, while the public deficit exceeded the 15 % of GDP. In 2011 the initial phase of the financial crisis had been completed. By 2011 financial distress became a constant of the Greek business environment and Greek corporations had adapted their accounting policies accordingly (Papapadaki & Tzovas, 2017). The sample is consisted of all companies listed in the Athens Stock Exchange during the period 2009-2014 excluding financial services and real estate firms. Furthermore, our sample does not contain firms for which we do not have the complete dataset needed for the estimation of our

models. Table 1 presents the total number of sample firms per year. Table 2 presents the sector classification of sample firms.

Table 1: Total number of companies per year

Year:	2009	2010	2011
Total Number of listed firms	258	280	272
Number of firms of financial sector (banks, financial services, real estate and insurance)	21	25	24
Number of companies with no data for any of the selected variables	129	148	140
Total number of companies:	108	107	108

Table 2: Sample distribution among industries

Industry	2009	2010	2011
Basic Resources	14	13	13
Construction and Materials	14	14	14
Consumer Products and Services	11	11	11
Energy	1	1	1
Food, Beverage and Tobacco	12	13	13
Health Care	1	1	1
Industrial Goods and Services	21	21	21
Personal Care, Drug and Grocery Stores	4	3	4
Retail	8	8	8
Technology	13	13	13
Telecommunications	2	2	2
Travel and Leisure	7	7	7
Total	108	107	108

Two methods of earnings management are commonly identified: the accrual-based earnings management and the real-activities earnings management. Earnings management through accounting accruals does not have direct cash consequences, while earnings management through real activities affects cash flows (Cohen & Zarowin, 2010). Accounting accruals are used as a tool of earnings management because they are not easily detected and do not directly affect cash flows (Zang, 2012). The accruals that are at the discretion of management and are affected by its accounting choices are called discretionary accruals in contrast to the non-discretionary accruals that are not at the discretion of management (Jones, 1991). Earnings management through real business transactions refer to management practices that diverge from usual business practices and have as main objective to mislead interested third parties in believing that earnings were achieved during the usual course of activities (Roychowdhury, 2006).

In this study accounting accruals were used as a tool to identify earnings management. Various models have proposed in order to measure earnings management through accruals (see, Botsari & Meeks, 2008). In this study we use the Kothari *et al.* (2005) approach. Kothari *et al.* (2005) proposed a model similar to that of Jones (1991) and Dechow *et al.* (1995) while they added the term ROA in their model to adjust for the return of total assets. They argued that discretionary accounting accruals are affected by the company's current or past performance. More specifically, the model is:

$$TA_{it}/ASSETS_{it-1} = \delta_0 + \delta_1(1/ASSETS_{it-1}) + \delta_2(\Delta SALES_{it}/ASSETS_{it-1}) + \delta_3(PPE_{it}/ASSETS_{it-1}) + \delta_4(ROA_{it} \text{ (or }_{it-1}) /ASSETS_{it-1}) + u_{it} \quad (1),$$

where:

TA_{it} : total accruals in year t for the company i deflated by the total assets in year t-1 for company i

$ASSETS_{it-1}$: total assets in year t-1 for company i

$\Delta SALES_{it}$: sales in year t minus sales in year t-1 for company i

PPE_{it} : total fixed assets in year t for company i

ROA_{it} (or $_{it-1}$): the return on assets in year t or t-1 for company i

$\delta_0, \delta_1, \delta_2, \delta_3, \delta_4$: parameters for each company

The model of Kothari *et al.* (2005) increases the reliability of the results when the hypothesis does not entail that companies under investigation are not expected to use earnings manipulation practices or that earnings management will vary according to the performance.

Using the above estimated parameters $\delta_0, \delta_1, \delta_2, \delta_3, \delta_4$ in conjunction with the data of each company and every year we define discretionary accruals as the difference between the estimated and the published total accruals (TA) calculating the following equation:

$$DA_{it} = TA_{it} / A_{it} - [\hat{\delta}_0 + \hat{\delta}_1 (1/ASSETS_{it-1}) + \hat{\delta}_2 (\Delta SALES_{it}/ASSETS_{it-1}) + \hat{\delta}_3 (PPE_{it} /ASSETS_{it-1}) + \hat{\delta}_4 (ROA_{it}/ASSETS_{it-1})] \quad (2)$$

Where: $\hat{\delta}_0, \hat{\delta}_1, \hat{\delta}_2, \hat{\delta}_3, \hat{\delta}_4$ are the estimators $\delta_0, \delta_1, \delta_2, \delta_3, \delta_4$ calculated from model 1

In equation (2) all variables are deflated by the total assets of the previous year in order to decrease heteroscedasticity (Botsari & Meeks, 2008). Kothari *et al.* (2005) support the inclusion of the constant term because it helps to control for

heteroscedasticity and argue that models without constant term are less symmetric.

Total accruals were calculated as the change in current assets minus the change in cash minus the change in current liabilities and minus depreciation and amortization expenses: $(\Delta CA - \Delta Cash) - \Delta CL - D\&A$. If we had not used total accruals, we should have excluded the variable PPE from our model. In order to calculate total accruals, we derived the following data from Datastream database:

- Total Current Assets (WC02201)
- Cash & Short-term investments (WC02001)
- Total current liabilities (WC03101)
- Depreciation, depletion & amortization (WC04051)
- Total assets (WC02999)
- Net sales or revenue (WC01001)
- Property, plant and equipment (WC02301)
- Net income (WC01706)

Discretionary accruals are calculated if we subtract non-discretionary accruals from total accruals.

In order to examine research hypotheses, the following regression was estimated for the crisis period 2009-2011, controlling for both the different years and the different sectors. We do not apply the regression for each year separately since we assume that the first years of the crisis present similar attributes.

$$DA_{it} = \alpha_0 + \alpha_1 * CFO_{it} + \alpha_2 * LEV_{it} + \alpha_3 * PBV_{it} + \alpha_4 * PERFORMANCE_{it} + \alpha_5 * SIZE_{it} + \alpha_6 * BIG4_{it} + \alpha_7 * INVEST_{it} + \alpha_8 * CUR_RATIO_{it} + \alpha_9 * FAMCEO_{it} + \alpha_{10} * FAMCEO_{it} * BIG4_{it} + \alpha_{10} * IND_{it} + \alpha_{11} * YEARS_{it} + \varepsilon_{it}, (3)$$

where:

DA_{it} : discretionary accruals for company i in year t as estimated applying the equation (2).

CFO_{it} : cash flows from operating activities scaled by lagged total assets for firm i in year t

LEV_{it} : leverage, calculated as total debt to total assets for firm i in year t

PBV_{it} : price to book value per share ratio for firm i in year t

$PERFORMANCE_{it}$: return on assets, calculated as net income to total assets for firm i in year t

$SIZE_{it}$: the natural logarithm of total assets for firm i in year t

BIG4_{it}: dummy variable that takes value 1 if the firm is audited by the Big 4 audit companies (Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise.

INVEST_{it}: the amount of increase or decrease in tangible fixed assets scaled by lagged total assets for firm *i* in year *t*.

CUR_RATIO_{it}: current liabilities to current assets (current ratio) for firm *i* in year *t*

FAMCEO_{it}: dummy variable that takes value 1 if the firm's CEO is a member of the founding family

IND_{it}: dummy variable that takes value 1 for the industry in which the company belongs to and zero otherwise.

YEAR_{it}: dummy variable that takes value 1 for the year that the observation is referred and zero otherwise.

As mentioned earlier family-controlled firms is a persistent characteristic of the Greek environment. In order to control for the impact of family ownership on the accounting policy decisions we included the variable FAMCEO in model 3. Comparing to the widely-held firms, closely-held corporations can convey financial information to owners through communication channels other than audited financial statements (Jeong & Rho, 2004; Klassen, 1997). As a consequence, closely-held firms face less pressure from capital markets to provide high-quality accounting information to decision makers. Thus, it can be inferred, that closely held firms may have more latitude in selecting accounting-policies.

In order to apply model 3, we derived the following data from Datastream database:

- Net Cash Flow from Operating Activities (WC04860)
- Total Debt (WC03255)
- Book Value Per Share (WC05476)
- Parent Auditor (WC07800)

Data regarding firms CEO (variable FAMCEO) were collected manually by the firms annual reports.

4. Results

Table 3 presents the descriptive statistics of our sample.

Table 3: Descriptive statistics

	mean	median	Standard Deviation	min	Max
Year: 2009					
DA	-0.0001	0.0006	0.0692	-0.2715	0.1782
CFO	0.0655	0.0454	0.0950	-0.1308	0.5183
LEV	0.2850	0.2763	0.1768	0.0000	0.6735
PBV	1.0031	0.5783	1.1243	0.0000	7.9113
PERFORMANCE	0.0050	0.0057	0.0738	-0.1626	0.4634
SIZE	4.9083	4.7859	0.6115	3.2335	6.6101
INVEST	-0.0090	-0.0037	0.0538	-0.1847	0.1845
CUR_RATIO	1.8948	1.5261	1.3730	0.5536	11.2298
Year: 2010					
DA	0.0716	0.0064	0.3175	-0.6212	2.0044
CFO	0.0337	0.0301	0.0654	-0.1532	0.3719
LEV	0.2933	0.2889	0.1844	0.0000	0.7219
PBV	0.8780	0.4252	1.1169	0.0476	5.9249
PERFORMANCE	-0.0147	-0.0036	0.0766	-0.3069	0.4751
SIZE	4.9222	4.8119	0.6057	3.6393	6.6316
INVEST	-0.0086	-0.0066	0.0767	-0.2358	0.5420
CUR_RATIO	1.7823	1.5450	1.0689	0.2833	6.9877
Year: 2011					
DA	0.0017	0.0020	0.0735	-0.2471	0.2277
CFO	0.0288	0.0263	0.0756	-0.1602	0.3945
LEV	0.3162	0.3157	0.2018	0.0000	0.7922
PBV	0.7772	0.2857	1.1760	-0.2509	7.9928
PERFORMANCE	-0.0303	-0.0225	0.0782	-0.2547	0.3580
SIZE	4.8879	4.7999	0.6339	3.1644	6.6359
INVEST	-0.0336	-0.0260	0.0703	-0.3351	0.1592
CUR_RATIO	1.6581	1.3820	1.2031	0.1337	7.6196

Notes: DA_{it} : discretionary accruals for company i in year t ; CFO_{it} : cash flows from operating activities scaled by lagged total assets for firm i in year t ; LEV_{it} : leverage calculated as total debt to total assets for firm i in year t ; PBV_{it} : price to book value per share ratio for firm i in year t ; $PERFORMANCE_{it}$: return on assets calculated as net income to total assets for firm i in year t ; $SIZE_{it}$: the natural logarithm of total assets for firm i in year t ; $BIG4_{it}$: dummy variable that takes value 1 if the firm is audited by the big 4 audit companies (Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise; $INVEST_{it}$: the amount of increase or decrease in tangible fixed assets scaled by lagged

total assets for firm i in year t ; **CUR_RATIO** $_{it}$: current assets to current liabilities for firm i in year t .

It appears that the level of earnings management increases during the year 2010 while it seems to decrease the year 2011. Nevertheless, the level of earnings management remains higher in comparison with the year 2009. Table 4 sheds light on the drivers that affect discretionary accruals.

Table 4: Dependent variable: Discretionary accruals

	CRISIS (Years 2009-2011)
CFO	-0.551*** (-3.610)
LEV	-0.074 (-1.142)
PBV	0.009 (0.901)
PERFORMANCE	0.208 (0.984)
SIZE	-0.022 (-1.052)
BIG4	0.081** (1.843)
INVEST	0.298* (1.554)
CUR_RATIO	0.005*** (7.440)
FAMCEO	0.042** (1.774)
FAMCEO*BIG4	0.060*** (2.553)
IND	YES
YEARS	YES
R^2	0.300
Adjusted R^2	0.256
Observations	323

t-values in parentheses calculated from the heteroscedastic corrected standard errors, (White, 1980).

* Significant at the 0.10 level (1-tailed).

** Significant at the 0.05 level (1-tailed).

*** Significant at the 0.01 level (1-tailed).

Notes: **DA** $_{it}$: discretionary accruals for company i in year t ; **CFO** $_{it}$: cash flows from operating activities scaled by lagged total assets for firm i in year t ; **LEV** $_{it}$: leverage calculated as total debt to total assets for firm i in year t ; **PBV** $_{it}$: price to book value per share ratio for firm i in year t ; **PERFORMANCE** $_{it}$: return on assets calculated as net income to total assets for firm i in year t ; **SIZE** $_{it}$: the natural logarithm of total assets for firm i in year t ; **BIG4** $_{it}$: dummy variable that takes value 1 if the firm is audited by the

big 4 audit companies (Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise; **INVEST_{it}**: the amount of increase or decrease in tangible fixed assets scaled by lagged total assets for firm *i* in year *t*; **CUR_RATIO_{it}**: current assets to current liabilities for firm *i* in year *t*. **FAMCEO_{it}**: dummy variable that takes value 1 if the firm's CEO is a member of the founding family; **IND_{it}**: dummy variable that takes value 1 for the industry in which the company belongs to and zero otherwise. **YEAR_{it}**: dummy variable that takes value 1 for the year that the observation is referred and zero otherwise.

According to our first hypothesis, it appears that there is a statistically significant negative association between earnings management and cash flow from operations. Operating cash flow indicates whether operating activities can generate enough cash to repay debt, to maintain operations, to pay dividend and to make new investment without having to rely on debt financing. In order to hide firm's unsatisfactory performance, management manages earnings operating cash flow aiming to cover low operating cash flow and attract providers of equity and debt capital. Our findings are in line with the findings of previous research that found that operating cash flows are negatively related with earnings management. The lower operating cash flow of a firm, the higher possibility for the management to commit discretionary accruals by increasing earnings (Andreas, 2017; Jang & Kim, 2017).

Our results do not seem to support hypothesis 2 since firms' leverage does not significantly affect earnings management. One possible explanation for this finding could be that the leverage for some firms of the sample causes discretionary accruals increase while for others leverage is a mechanism that controls earnings management. Therefore, the overall effect of the leverage on the level of discretionary accruals appears to be statistically not significant. In keeping with the hypothesis 3 firms' ability to cover current liabilities using current assets appears to be positively associated with earnings distortion. It seems that when managers feel that they can fulfill firm's current obligations they engage in earnings management to pursue private benefits even during the period in which Greek firms faced one of the most stringent financial environments.

With regard to hypothesis 4 we found a significant negative association between earnings management and the status of the auditing firm. The Greek firms that were audited by Big-4 auditing firm are more likely to engage in earnings management practices. A possible explanation of the above finding is that most of the previous research has been conducted within an economic environment of a strong investor protection and legal enforcement. Persakis and Iatridis (2016) found that audit quality has a positive relation with earnings quality, but earnings quality is higher in countries with stronger investor protection, implying the

relative significance of stronger investor protection and legal enforcement in establishing higher audit and earnings quality. In the absence of legal enforcement and strong investor protection, the adoption of high quality of audit standards does not necessarily lead to higher earnings quality (Pelucio-Grecco *et al.*; 2014; Alzoubi 2016). In Greece, legal enforcement and investor protection are not supposed to be particularly strong (Tsalavoutas *et al.*, 2012). The impact that audit quality may have on earnings management can be further constrained when corporate ownership is concentrated in a small number of shareholders (Afza & Nazir, 2014). In the case of these firms, any information asymmetries can be resolved through private channels, lowering the demand for high-quality auditing (Filatotchev *et al.*, 2011). Such a state of affairs can be further exasperated in the case of family-controlled firms (Jeong & Rho, 2004). In fact, both the coefficients of the FAMCEO and the interaction term FAMCEO* BIG4 (see table 5) suggests that family-controlled firms are more likely to engage in earnings management. As mentioned earlier, past research did not find substantial evidence to support that the status of auditing firm is associated with Greek firms' disinclination to engage in earnings management (Tsipouridou & Spathis, 2012; Tsipouridou & Spathis, 2014).

Table 5 presents the correlation matrix of the selected variables. The value of the coefficients indicate that multicollinearity does not seem to be an issue in our model since they are smaller than the critical value of 0.70 (Tabachnick & Fidell, 1996).

To control for possible collinearity issues, we estimated for the developed model, the relevant variance inflation factor (VIF), which is 2.16 smaller than the critical value of 10 (Kennedy, 2003).

To check for omitted variable bias, the Ramsey Regression Equation Specification Error Test (RESET) was used. The results (F value = 0.49, $p=0.6907$) indicate that the functional form is correct, and thus the model does not suffer from omitted variables at 5% significance level. Also, to determine if heteroscedasticity is present in the data, the Breusch-Pagan Test was used. The null hypothesis of the test, states that there is constant variance among the residuals. The results ($\chi^2= 8.73$, $p=0.5579$) imply that we cannot reject the null hypothesis and conclude that heteroscedasticity is not present in the data.

Table 5: Correlation matrix of the independent variables

	DA	CFO	LEV	PBV	PERFORMANCE	SIZE	BIG4	INVEST	LIQUIDITY
DA	1.0000								
CFO	-0.1205 (0.0304)	1.0000							
LEV	0.0158 (0.7773)	-0.2292 (0.0000)	1.0000						
PBV	-0.0500 (0.3708)	0.2102 (0.0001)	-0.0046 (0.9343)	1.0000					
PERFORMANCE	-0.0099 (0.8591)	0.6102 (0.0000)	-0.2890 (0.0000)	0.2041 (0.0002)	1.0000				
SIZE	0.0076 (0.8924)	0.0878 (0.1154)	0.2144 (0.0001)	-0.0391 (0.4840)	0.2753 (0.0000)	1.0000			
BIG4	0.1078 (0.0530)	0.0632 (0.2577)	0.1397 (0.0119)	0.2339 (0.0000)	0.0976 (0.0799)	0.3408 (0.0000)	1.0000		
INVEST	0.0516 (0.3556)	0.3335 (0.0000)	-0.1490 (0.0073)	0.0050 (0.9293)	0.6609 (0.0000)	0.2619 (0.0000)	0.0365 (0.5136)	1.0000	
CUR_RATIO	0.1375 (0.0134)	0.0858 (0.1240)	-0.4522 (0.0000)	-0.0733 (0.1887)	0.1475 (0.0079)	-0.2303 (0.0000)	0.0166 (0.7661)	0.1202 (0.0308)	1.0000

Notes:

DA_{it}: discretionary accruals for company i in year t; CFO_{it}: cash flows from operating activities scaled by lagged total assets for firm i in year t; LEV_{it}: leverage calculated as total debt to total assets for firm i in year t; PBV_{it}: price to book value per share ratio for firm i in year t; PERFORMANCE_{it}: return on assets calculated as net income to total assets for firm i in year t; SIZE_{it}: the natural logarithm of total assets for firm i in year t; BIG4_{it}: dummy variable that takes value 1 if the firm is audited by the big 4 audit companies (Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise; INVEST_{it}: the amount of increase or decrease in tangible fixed assets scaled by lagged total assets for firm i in year t; CUR_RATIO_{it}: current assets to current liabilities for firm i in year t. P-values in parentheses.

5. Post-crisis period

To further investigate whether the factors that affect earnings management during the early crisis period sustain for the post crisis period we estimate model 3 for the years 2012-2014ⁱ.

Table 6: Dependent variable: Discretionary accruals

	POST-CRISIS (Years 2012-2014)
CFO	-0.268** (-1.763)
LEV	-0.058** (-1.696)
PBV	0.002 (0.249)
PERFORMANCE	0.170 (0.724)
SIZE	0.003** (1.696)
BIG4	0.012 (0.305)
INVEST	0.078 (0.368)
CUR_RATIO	0.009*** (2.844)
FAMCEO	0.009** (2.267)
FAMCEO*BIG4	0.112 (0.504)
IND	YES
YEARS	YES
R^2	0.160
Adjusted R^2	0.111
Observations	324

t-values in parentheses calculated from the heteroscedastic corrected standard errors, (White, 1980).

* Significant at the 0.10 level (1-tailed).

** Significant at the 0.05 level (1-tailed).

*** Significant at the 0.01 level (1-tailed).

Notes: DA_{it} : discretionary accruals for company i in year t ; CFO_{it} : cash flows from operating activities scaled by lagged total assets for firm i in year t ; LEV_{it} : leverage calculated as total debt to total assets for firm i in year t ; PBV_{it} : price to book value per share ratio for firm i in year t ; $PERFORMANCE_{it}$: return on assets calculated as net income to total assets for firm i in year t ; $SIZE_{it}$: the natural logarithm of total assets for firm i in year t ; $BIG4_{it}$: dummy variable that takes value 1 if the firm is audited by the big 4 audit companies (Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise; $INVEST_{it}$: the amount of increase or decrease in tangible fixed assets scaled by lagged total assets for firm i in year t ; CUR_RATIO_{it} : current assets to current liabilities for firm i in year t. $FAMCEO_{it}$: dummy variable that takes value 1 if the firm's CEO is a member of the founding family; IND_{it} : dummy variable that takes value 1 for the industry in which the company belongs to and zero otherwise. $YEAR_{it}$: dummy variable that takes value 1 for the year that the observation is referred and zero otherwise.

Contrary to the crisis period, in the post-crisis period the level of the discretionary accruals does not appear to be significantly associated with the status of the auditing firms (BIG4). This absence of significant association holds irrespective of firms' ownership characteristics (FAMCEO). It seems that during the crisis period auditors acknowledging the adverse conditions under which most Greek firms operated granted to the audited firms considerable latitude regarding the implementation of accounting policies. This is not the case for the post-crisis period, during which auditing firms provided less space to their clients in exercising their judgment in applying accounting policies.

In addition, firms' size and leverage appear to be associated with earnings management in the post-crisis period. In particular, larger firms report higher accruals, while less leveraged firms report lower accruals. Those factors were not significantly associated with level of accruals, in the crisis-period. Previous studies have provided inconclusive evidence regarding the impact of these factors on earnings management. Size and leverage can have negative or positive association with discretionary accruals (Tsipouridou & Spathis, 2012; Tsipouridou & Spathis, 2014).

6. Conclusions

We investigated whether financial crisis that hit Greek economy in the early 2010's influenced the accounting policies of Greek firms. In particular, we examined if Greek firms engaged in earnings management at the same period. Our findings suggest that Greek firms used accounting accruals in order to manage their financial reported figures. That tendency was more intense for firms that had greater ability to cover their current liabilities by using current assets. Similarly, low operating cash flows make managers of Greek firms to manipulate earnings in an effort to hide their own inefficiencies. Contrary to the evidence provided by previous research, Greek firms that are audited by Big-4 Auditing firms do not appear to report less discretionary accruals comparing to firms that are audited by smaller auditing firms. In fact, family-controlled firms being audited by Big-4 Auditing firms are likely to employ accruals earning management techniques. It appears, that the adverse economic environment that prevailed in early 2010's, coupled with the endemic characteristics of weak legal enforcement and investor protection that prevailed for a long period of time in Greece, had created a context that had not fostered the improvement of reporting quality.

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ⁱ We use the same data set with that of the year 2011. Therefore, the total number of the firm-year observations for the period 2012-2014 is $108 \times 3 = 324$. We have made all the appropriate statistical tests (as those that we estimated for the crisis period) to control for any known statistical issues. The results indicate that the model does not suffer from collinearity issues, omitted variable bias or heteroscedasticity.