ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ ΤΜΗΜΑ
ΛΟΓΙΣΤΙΚΗΣ & ΧΡΗΜΑΤΟΟΙΚΟΝΟΜΙΚΗΣ
ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ

THE IMPACT OF IFRS ADOPTION ON THE FORM OF EARNINGS MANAGEMENT: THE CASE OF GREECE

ΦΕΡΕΝΤΙΝΟΥ ΑΙΚΑΤΕΡΙΝΗ

Εργασία υποβληθείσα στο τμήμα
Λογιστικής & Χρηματοοικονομικής του
Οικονομικού Πανεπιστημίου Αθηνών
ως μέρος των απαιτήσεων για την απόκτηση
Μεταπτυχιακού Διπλώματος Ειδίκευσης

Αθήνα

Οκτώβριος 2013

Εγκρίνουμε την εργασία της

Φερεντίνου Αικατερίνης, του Χαραλάμπους

Υποτρόφου Ιδρύματος Αλέξανδρου Ωνάση, Ιδρύματος Α.Γ. Λεβέντη και Ιδρύματος Γεωργίου και Μάρης Βεργωτή

[ΟΝΟΜΑ ΕΠΙΒΛΕΠΟΥΣΑΣ ΚΑΘΗΓΗΤΡΙΑΣ] [ΥΠΟΓΡΑΦΗ]

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ΤΖΟΒΑΣ ΧΡΗΣΤΟΣ

ΟΚΤΩΒΡΙΟΣ 2013

ΒΕΒΑΙΩΣΗ ΕΚΠΟΝΗΣΗΣ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

«Δηλώνω υπεύθυνα ότι η συγκεκριμένη πτυχιακή εργασία για τη λήψη του Μεταπτυχιακού Διπλώματος Ειδίκευσης στη Λογιστική και Χρηματοοικονομική έχει συγγραφεί από εμένα προσωπικά και δεν έχει υποβληθεί ούτε έχει εγκριθεί στο πλαίσιο κάποιου άλλου μεταπτυχιακού ή προπτυχιακού τίτλου σπουδών, στην Ελλάδα ή στο εξωτερικό. Η εργασία αυτή έχοντας εκπονηθεί από εμένα, αντιπροσωπεύει τις προσωπικές μου απόψεις επί του θέματος. Οι πηγές στις οποίες ανέτρεξα για την εκπόνηση της συγκεκριμένης διπλωματικής αναφέρονται στο σύνολό τους, δίνοντας πλήρεις αναφορές στους συγγραφείς, συμπεριλαμβανομένων και των πηγών που ενδεχομένως χρησιμοποιήθηκαν από το διαδίκτυο».

ΦΕΡΕΝΤΙΝΟΥ ΑΙΚΑΤΕΡΙΝΗ

ΕΥΧΑΡΙΣΤΙΕΣ

Ευχαριστώ θερμά την επίκουρο καθηγήτρια κα Αναγνωστοπούλου Σεραΐνα για την πολύτιμη βοήθεια, την κατανόησή της και τις καίριες παρατηρήσεις της . Επίσης, ευχαριστώ θερμά τον επίκουρο καθηγητή κ. Τζόβα Χρήστο και τον καθηγητή κ. Χέβα Δημοσθένη. Ιδιαίτερα ευχαριστώ την υπεύθυνη του Εργαστηρίου Χρηματοοικονομικών Εφαρμογών κα Αλεξανδρή Χαρά για την προθυμία και την βοήθεια της καθώς και τις γραμματείς κα Χολή Κασσιανή και κα Θεολόγου Μαρία.

Επιπλέον, θέλω να εκφράσω την ευγνωμοσύνη μου στα ιδρύματα «Αλεξάνδρος Ωνάσης», «Α.Γ. Λεβέντης» και «Γεωργίου και Μάρης Βεργωτή» χωρίς την χρηματική στήριξη των οποίων δεν θα ήταν δυνατόν να παρακολουθήσω το μεταπτυχιακό πρόγραμμα. Ευχαριστώ επίσης τον κύριο Αθανάσιο Μουϊκη, πρόεδρο του ιδρύματος «Γεωργίος και Μάρη Βεργωτή» για τη στήριξη καθώς και τις κυρίες Αικατερίνη Ρουσάκη, υπεύθυνη της ακαδημαϊκής μου πορείας και Φανή Παπαθάνου, προϊσταμένη τμήματος υποτροφιών εσωτερικού από το ίδρυμα «Αλέξανδρος Ωνάσης», για την άψογη συνεργασία κατά τη διάρκεια της υποτροφίας.

Contents

Abstract

The purpose of this thesis is to examine the use of accrual-based vs real earnings management by Greek firms after the application of International Financial Reporting Standards. We receive explicit motivation for the examination of this research topic for Greece as past research has indicated that Greece has one of the highest levels of earnings management throughout the world (Leuz et al., 2003). Earnings management has been a major field of research in recent years. Since the mandatory application of IFRS in 2005, there has been developed an interest towards observing whether IFRS has contributed towards a shift from AEM to REM (Ipino and Parbonetti, 2011; Doukakis 2013). The question that this thesis tries to answer, is whether the firms in Greece have switched from accrual to real earnings management, once the IFRS have become mandatory for almost all firms of public interest in Europe. Moreover, the factors that may affect earnings management are also examined. The sample consists of 1,248 firm-year observations which refer to the firms that are listed in the Athens Stock Exchange during 2001-2008.

In order to determine the effect of accrual-based earnings management, the performance-adjusted Modified Jones model (Kothari et al., 2005) is used. This model measures the fraction of accrual revenues and expenses that can be affected by the desires of management. Following Roychowdhury (2006), real earnings management is defined in terms of abnormal production costs, as well as abnormally low discretionary expenses, and cash flow from operations. Under these models the fraction of cash flows, discretionary expenses and production costs, which are affected by the management, are measured. Estimating the significant level of medians and means of discretionary accruals as well as abnormal cash flows, abnormal production costs and abnormal discretionary expenses, we find evidence on the existence of downward accrual-based earnings management and upward real earnings management. In addition, according to the results, there is a statistically significant shift from accrual to real earnings management after the IFRS adoption, indicating the replacement of the form of earnings management through accounting choices with another form, which is related to real business decisions. Finally, we test

for factors that affect either positively or negatively accrual-based and real earnings management and we find evidence that a number of factors such as leverage, market-to-book value and profitability, affect the quality of the publicized accounting information.

1. Introduction

Starting in 2005, all listed firms based in EU countries have the obligation to prepare their financial statements under the IFRS. The rationale for this mandatory adoption has been to facilitate the flow of capital and increase comparability. In order to accomplish this target the firms should produce financial reporting of higher quality, which would respond to stakeholders' demand for credible financial information Therefore, under IFRS there is greater aggressiveness in the recognition of bad news than in the recognition of good news, which is considered a key qualitative characteristic of financial reporting (Watts, 2003a; Francis et al., 2004; Ball et al., 2008; Dechow et al., 2010; Kothari et al., 2010). This implies that potential economic losses should be reported, whereas potential economic gains should be delayed. Greek Generally Accepted Accounting Principles (GAAP), which were mandated by a Greek law (Presidential Decree 1123/1980), were replaced by a set of accounting standards which were uniform for all firms based in European Union (EU) countries. This adoption has meant that a number of accounting policies and methods, permitted under local GAAP, were no longer acceptable by IFRS, as the IASC has issued principle-based standards and has taken steps to both remove allowable accounting alternatives and require accounting measurements that better reflect a firm's economic position and performance (IASC 1989).

At the same time, past research has shown an improvement in the accounting quality through the use of IFRS, under the presumption that the enforcement of accounting standards is not lax and that there are no changes in the firms' incentives or any temporary economic changes (Barth et al., 2008). Although a much closer connection between earnings management and earnings quality can be drawn ceteris paribus (it is logical that firms with managed earnings have earnings of low quality), the lack of earnings management is not sufficient to guarantee high-quality earnings, because not only earnings management but other factors as well contribute to the quality of

earnings (Lo, 2008). Earnings management can take a number of forms, including the manipulation of accruals (Teoh et al., 1998; Erickson and Wang, 1999; Holthausen et al., 1995; Cahan, 1992; Louis, 2004) as well as real business decisions undertaken with the mere scope to affect earnings (Zhang, 2008; Graham et al., 2005; Cook et al., 2009).

A very recent body of research (Cohen et al., 2008; Cohen and Zarowin, 2010; Zang, 2012) has recently indicated a tendency on the part of firms to replace accrual-based earnings management (hereafter, AEM) with real earnings management (hereafter, REM), in an effort to influence their earnings to achieve management goals.

When IFRS were adopted, AEM could not be as readily undertaken, given the changes between accounting standards. This happens because, the IFRS define the estimation of expected lives and salvage values of long-term assets by independent evaluators, the record of further provisions and of additional obligations for pension benefits and other employee benefits for all employees, the requirement to test for impairment goodwill and for asset impairments and also reduce the number of acceptable accounting methods for the same economic transactions such as depreciation methods or inventory evaluation methods thus limiting the managers' opportunistic discretion in determining accounting numbers. Tsalavoutas and Evans (2008) prove that the previous creative accounting practices, which were served by the Greek GAAP, were restricted after the implementation of certain accounting standards. Specifically, IAS 2 and IAS 36 have a negative impact on previous earnings management practices in all firms, IAS 37 and IAS 38 in virtually all firms, IAS 18, IAS 19 and IAS 32/39 in a large majority of the firms (Tsalavoutas and Evans, 2008).

At the same time, REM can be more easily masked in the form of everyday business transactions as it is related to decisions about changes in the timing or in the structuring of a transaction (Healy and Wahlen (1999), Fudenberg and Tirole (1995),and Dechow and Skinner (2000) point out the acceleration of sales, alterations in shipment schedules, and delaying of research and development (R&D) and maintenance expenditures as earnings management methods available to the managers earnings management through operational decisions, whereas Roychowdhury (2006) finds evidence consistent with "firms trying to avoid losses by offering price

discounts to temporarily increasing sales, offering more lenient credit terms, engaging in overproduction to lower cost of goods sold (COGS), and reducing discretionary expenditures aggressively to improve margins"), representing, at the same time, deviations from possibly optimal business practices with the scope to affect earnings.

We, therefore, examine the existence and possible switch from AEM to REM before and after the adoption of IFRS for a country for which past research has indicated a high tendency among firms to engage in EM activities (Leuz et al., 2003). This country is Greece, and we explicitly aim at examining whether 1) AEM has been reduced following the mandatory adoption of IFRS in Greece, taking into account the fact that this new legislation targeted at improving the quality of reported accounting information (IASC 1989), for a country with testified high levels of EM before the IFRS adoption, and 2) a possible replacement AEM to REM, in case firms do not face the same degree of easiness with respect to affecting their earnings using AEM under IFRS, and therefore result in doing so, through other forms of EM, that is through business decisions.

To test for existence of accrual-based earnings management, we examine discretionary accruals estimated under the performance-adjusted-Modified Jones model (Kothari et al., 2005). The reason why we use the performance-adjusted version, is to make sure that the estimation of accruals is not mechanically influenced by particularly bad performance of firms during our sample period. When it comes to real earnings management, the model of Roychowdhury (2006) is used. Estimating abnormally high or low levels of cash flows from operations, discretionary expenses and production costs, along with a composite measure of the three above gives evidence of real earnings management.

The results verify that Greek firms not only decrease accrual-based earnings management after the IFRS adoption but they increase real earnings management, as well. There is also evidence of downward earnings management before the IFRS introduction, probably due to high taxation until 2005. On the other hand, there is upward earnings management after the IFRS adoption, during which there were lower tax rates. Moreover, there were incentives for presenting higher profits in order to meet the expectations of both shareholders (management's targets) and stakeholders (e.g. investors, debtors etc). Our evidence shows that although IFRS restrict the

accrual-based earnings management, at the same time they are helpless in reducing real earnings management. This means that maybe measures should be taken to reduce the manipulation through real activities.

The structure of this thesis is the following: Section 2 reports a short literature review on EM, as well as the motivation of the study in more detail, Section 3 reports the study methodological approach. Section 4 presents the empirical findings, and finally, the study concludes with Section 5.

2. Related literature and motivation

2.1 Definition of earnings management

There are a lot of definitions about earnings management. Here, three definitions are presented. Watts and Zimmerman describe that earnings management occurs when the discretion of managers is exercised over accounting numbers with or without restriction. The discretion could be either opportunistic or firm value adding. Managers are engaged in earnings management, only if expected benefits exist (Watts and Zimmerman 1990). Another definition is the one of Schipper (1990), who defines earnings management as "implementation that impairs an element of decision usefulness or implementation that is inconsistent with the intent of the standard''. Finally, Healy and Wahlen (1999) suggest the following definition: "managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers".

This means that the asymmetric access in the information between the insiders and the outsiders, so that earnings management is unlikely to be transparent to outsiders, and the belief of managers that stakeholders do not undo earnings management offer the appropriate conditions for earnings management. It is clear that the role of judgment is vital in financial reporting. Healy and Wahlen (1999) point that managers should estimate numerous future economic events such as expected lives, salvage values of long-term assets, obligations for pension and other employee benefits, differed taxes, losses from bad debts and asset impairments. They should also choose among acceptable accounting methods the one that best presents the financial

statement of the firm. For example there are for the same economic transactions different accounting methods such as straight line or accelerated depreciation methods and FIFO, LIFO or weighted average inventory evaluation methods. The judgment that is required for the estimation of different economic events and the choice among acceptable accounting methods belong to accrual accounting choices. Judgment is also essential for real activities including the inventory levels, the timing of inventory shipments or purchases, receivable policies and the decision to make expenditure such as R&D, advertising or maintenance. In addition, they must decide how to structure the various corporate transactions: lease contracts can be structured so that lease obligations are included or excluded from the balance sheet, business combinations can be structured to qualify for pooling or purchase accounting and equity investments can be structured in a way that either avoid or require consolidation (Healy and Wahlen, 1999).

In Financial Accounting Concepts Statement No.5 states, "Financial statements are a central feature of financial reporting—a principal means of communicating financial information to those outside an entity" (FASB 1984, paragraph 5). This means that managers use financial statements to communicate with stakeholders. Healy and Wahlen (1999) argue that accounting standards could be a credible means of low cost in order that corporate managers inform the external users about the performance of the firm and also to help better-performing firms to distinguish from the poorer-performing ones. If the purpose of the financial reports is to make public managers' information on their firms' performance, accounting standards must permit managers to exercise their judgment in the publicized information and give them the opportunity to choose among reporting methods, estimates, and disclosures the ones that best represent the firms' economics. However, the imperfect auditing also gives the opportunity to the management to use judgment for earnings management purposes (“managers choose reporting methods and estimates that do not accurately reflect their firms' actual economics”) (Healy and Wahlen, 1999). In other words, accounting choice may be beneficial because there are alternative accounting methods that may not have the same effects on earnings (Holthausen and Leftwich, 1983) and the one that is chosen doesn’t fairly represent the firm’s financial statement.

There are two kinds of earnings management accrual (by manipulation of accounting estimations and policies with no direct cash flow consequences) and real

earnings management (by manipulation of real activities e.g. cash flows, R&D or investment activities). Managers use the discretionary accruals, accruals created to manipulate changes in reported earnings, in order to meet different goals (e.g. Dye, 1988). From a managerial perspective, accruals are likely to represent a favored instrument for manipulating reported earnings, especially when the goal is to manage earnings temporarily, because they have relative low cost compared to the potential reduction of shareholder value attributable to non-optimal operating decisions (Peasnell, 1998). Furthermore, due to their non-transparent nature, accruals are often less possible to be observed directly. On the other hand, accounting procedure changes and highly visible transactions are more likely to be 'undone' through adjustments by external parties, once the financial statements are publicly available (Young, 1999). Even if accrual manipulation is suspected, it's harder for external users to adjust its effect right away, because the information needed to undo the accrual changes may be limited or even unavailable (Botsari and Meeks, 2008).

Real activities manipulation is defined as actions undertaken by managers, which deviate from normal practices of the firm and are the means for managers to meet certain earnings targets (Roychowdhury, 2006). Managers' attempts to alter real activities in order to achieve various financial reporting objectives or so as to gain private benefits has become a very active area of accounting research (Roychowdhury, 2006). Graham et al. (2005) report that surveyed managers indicated a willingness to alter discretionary expenditures as well as other real decisions to achieve financial reporting objectives and to reserve their own reputation. Healy and Wahlen (1999), Fudenberg and Tirole (1995),and Dechow and Skinner (2000) point out the acceleration of sales, the changes in shipment schedules, and delay of expenses such as research and development (R&D) and maintenance expenditures as earnings management methods, which are available to managers (earnings management through operational decisions). Roychowdhury (2006) finds evidence consistent with firms engaging in earnings management through the offer of price discounts that leads to temporarily increased sales, the extension of credit terms, the existence of overproduction to lower the cost of goods sold, and the restriction of discretionary expenditures to improve earnings level. This means that the real earnings management departs from normal operational practices and is motivated by managers' desire to make a good impression on stakeholders, as certain financial

reporting goals have been met in the normal course of operations. It is not necessarily the case that just because these departures enable managers to meet reporting goals, they will also add to the firm's value.

The difference between real and accrual-based earnings management is the fact that real activities manipulation can reduce firm value, because actions taken in the current period to increase earnings could have a negative effect on cash flows in the future. For instance, aggressive price discounts to increase sales volumes and meet some short-term earnings target can give the customers the impression that they could expect such discounts in future periods as well. This could imply lower margins on future sales. Overproduction generates excess inventories that have to be sold in subsequent periods and imposes greater inventory holding costs on the company (Roychowdhury, 2006)-which restricts a firm's short-term investments choices. This means that in these cases the cost is real. Moreover, the value of the firm can be reduced, if the economic circumstances differ from the ones that have been predicted. Despite such circumstances in the surveys conducted by Bruns and Merchant (1990) and Graham et al. (2005), financial executives expressed a willingness to manipulate earnings through real activities rather than accruals, possibly because these alterations to operational activities, though more costly for the firm, are less costly for managers, as they can be harder to detect. According to Roychowdhury (2006), this makes sense for two reasons. First, accrual manipulation is more likely to draw the auditor's attention than real decisions about pricing and production. Second, relying on accrual manipulation alone is surely more risky. "The realized year-end shortfall between unmanipulated earnings and the desired threshold can exceed the amount by which it is possible to manipulate accruals. If that happens, and reported income falls below the threshold, real activities cannot be manipulated at year-end" (Roychowdhury, 2006).

Sloan defines "high-quality" earnings as the earnings that consist mainly of operating cash flows and "low-quality" earnings as those that are composed primarily of accruals. Sloan (1996) finds that in firms where accruals are large and positive: earnings tend to decline over the next three years due to reversals of accounting accruals, the largest accrual reversals are to be attributed to current accruals and the stock prices of these firms reduce over the three-year period, due to decline in earnings. Sloan concludes from the above results that investors overestimate the

permanent existence of low-quality current earnings and underestimate the permanent existence of high-quality current period earnings (Sloan 1996). Xie (2001) shows evidence of a relation between Sloan's measure of earnings quality and measures of earnings management. These findings indicate that market participants are "fooled" by management practices, which are relatively simple and transparent earnings (Dechow et al., 2000).

On the other hand, evidence on the capital market consequences of earnings management shows that investors are not "fooled" by manipulation of earnings (Stein 1989), which implies that financial statements provide useful information to investors. Current earnings compared to current cash flows have been found to be value-relevant and are typically better indicators of future cash flow performance. Stock return evidence also suggests that investors distinguish between abnormal accruals and normal accruals, which means that they understand, when there is earnings management. However, there are studies, which indicate that earnings management does affect resource allocation for some firms (Healy & Wahlen, 1999). All these lead to the conclusion that not all stakeholders are able to be misled, especially when it comes to the participants in the capital markets. This implies that earnings management partially misses its target.

2.2 Earnings management and regulatory regime

The starting point of this thesis is the idea that stricter regulatory regimes should lead firms to substitute accrual-based with real earnings management. The accrual-based earnings management entails less cost for the firms than real earnings management does (Bhojraj et al., 2009). As a result of this, it is generally assumed that managers prefer the accruals manipulation to the manipulation of real transactions, which makes real earnings management the residual form of manipulation. Recent literature, though, suggest that conditional conservatism through the imposition of timely recognition of losses and the delay of the recognition of economic gains, limits the opportunities for successful accrual based earnings management (Watts 2003a, LaFond and Watts, 2008). Furthermore, LaFond and Watts (2008) argue that conservatism decreases management’s ability to benefit themselves while

shareholders are damaged, especially in firms, where there are large information asymmetries between managers and investors.

There is plenty of indirect evidence about the relation conservatism to reduced accrual-based earnings management, but only Chen et al. (2007) study the direct relation of conservatism with managerial incentives for accrual-based earnings management. Chen et al. (2007) suggest that conservatism offsets opportunistic biases which impose explicit constraints and reduce opportunities to introduce biases. They also demonstrate that conservatism reduces firm insiders' incentives to manage earnings.

Demski (2004) and Ewert and Wagenhofer (2005) support that, when there is strong monitoring (e.g. tighter accounting standards), firms substitute accrual-based to real earnings management. These authors prove that tighter accounting standards decrease accrual-based earnings management and simultaneously increase real earnings management. The explanation for this change is that tighter monitoring increases the benefits of engaging in real earnings management (Ewert and Wagenhofer 2005), or, alternatively stated, it lowers the counter productivity combined with real earnings management (Demski 2004). Consistent with these arguments, Ettredge et al. (2008) make the case that managers use up all the leeway within generally accepted accounting principles and cross the boundary into other forms of manipulation when within-GAAP management is no longer possible (Garcia Lara et al., 2012).

2.3 Earnings management and earnings quality

Earnings management has a lot in common with earnings quality. It is not difficult to understand that firms with managed earnings have earnings of low quality. However, the absence of earnings management is not enough to verify the existence of high-quality earnings, because not only earnings management but other factors as well contribute to the quality of earnings. Nevertheless, a much closer connection between earnings management and earnings quality ceteris paribus can be drawn (Lo, 2008).

The definition of earnings quality is as follows: "Higher quality earnings provide more information about the features of a firm's financial performance that are relevant to a specific decision made by a specific decision-maker" (Dechow et al. 2010). There are three important features about the definition of earnings quality. First, earnings

quality is conditional on the decision-relevance of the information. Thus, earnings quality alone is meaningless, unless is defined in the context of a specific decision model. Second, the quality of a reported earnings number depends on whether or not it is informative about the firm's financial statement, many aspects of which are unobservable. Third, earnings quality is determined by the relevance of firm's financial performance to the decision and also by the ability of the accounting system to measure performance. This definition of earnings quality implies that quality could be evaluated with respect to any underlying decision that depends on a particular representation of financial performance.

Although the quality of a firm's earnings depends on both the firm's financial performance and on the accounting system that measures it, there is little evidence about the fundamental performance (Dechow et al., 2010). There are a lot of papers that have examined the association between country characteristics and earnings attributes and their findings show significant differences in earnings attributes across countries. Some studies include the value relevance of earnings (Ali and Hwang, 2000), accruals quality (Boonlert-U-Thai et al., 2006) earnings timeliness (Ball et al. 2003; Raonic et al. 2004), earnings conservatism (Bushman and Piotroski, 2006) and earnings smoothness (Leuz et al. 2003). The financial scandals in the U.S.A. (e.g., Enron) and in Europe (e.g., Parmalat) underline the fact that firms with poor-quality financial statements can remain unobservable for a long time even in countries with strong legal institutions and well-developed financial markets (Gaio,2009). Furthermore, firms located in countries with poor legal institutions have ways to exclude poor country institutions, thus presenting higher quality of financial reporting (Holthausen, 2003).

There are both country-level and firm-level characteristics that affect earnings quality. The country of the firm, the accounting standards, the level of economic development as well as disclosure regime belong to the country-level characteristics (Hope et al., 2004). What about firm-level earnings quality? The coefficient of quality reflects not only dividend policy and firm-specific characteristics such as ''size, reputation, financial position and prospects,'' but the nature of the firm's operations and macroeconomic factors, as for example ''temper of the general market'' (Graham and Dodd, 1934) as well. As variables to the financial position and prospects researchers use sales volatility, cash flow from operations volatility, length of

operating cycle, and the frequency of negative earnings (e.g., Dechow and Dichev, 2002; Francis et al. 2004) . In addition, the incentives of preparers, enforcement mechanisms, ownership structure (Ball et al. 2003), cross-listing on a U.S.A. exchange (e.g., Doidge et al., 2004) or a high quality auditor (e.g., Fan and Wong, 2002) have effects on earnings quality.

As earnings quality has more than one dimensions, it is difficult to measure, so Gaio (2009) uses a quality measure consists of seven earnings attributes: accruals quality, persistence, predictability, smoothness, value relevance, timeliness, and conservatism. Her main results suggest that firm characteristics do play an important role in the level of earnings quality for each firm across the world. These findings prove that the macro-environment is not the main factor for the level of earnings quality per firm around the world, but rather that firm characteristics apart from country characteristics have also significant increasing explanatory power. She also finds that the size of the firms, the investment opportunities and insider ownership are positively related to earnings quality. Firms with higher sales volatility, greater operating cash flow volatility, longer operating cycles, and a higher incidence of losses have a negative effect on earnings quality. However, in less economically developed countries and in legal environments with weaker investor protection, the country characteristics are better able to explain earnings quality variation compared to firm characteristics. In contrast, in more economically developed countries and in legal environments with strong investor protection explanatory power of firm and industry characteristics increases (Gaio 2010).

The question which is of major importance for this thesis is whether the IFRS adoption had changed the quality of earnings management and if so, in what direction. One goal of the International Accounting Standards Committee (IASC) is the development of a set of high quality financial reporting standards, which are acceptable around the world. In line with this goal, the IASC has issued principles-based standards, and has also taken actions to remove acceptable accounting alternatives and to demand the use accounting measurements that more fairly reflect the firm's economic position and performance (IASC 1989). Accounting quality could increase, if these actions by standard setters limit management's opportunistic discretion in determining accounting amounts (Ashbaugh and Pincus, 2001), for example, by managing earnings. In consistent with this, Ewert and Wagenhofer,

(2005) develop a model of rational expectations which proves that the ability of accounting standards to limit opportunistic discretion result in accounting earnings that are more reflective of a firm's economics and that's why they are of higher quality. Changes in the financial reporting system such as more rigorous enforcement along with the IFRS adoption could also increase earnings quality.

However, there are also two reasons why the earnings quality after the IFRS introduction might be decreased. First, IFRS may be standards of lower quality compared with domestic standards. For example, the fact that IFRS restrict managerial discretion through the existence of accounting alternatives could limit the firm's ability to choose and report accounting measurements that best reflect the firm's economic performance. Additionally, the inherent flexibility in principles-based standards could encourage firms to manage earnings thus decreasing accounting quality. Second, other reasons apart from the standards themselves such as the impact of features on the financial reporting system could offset any improvement in accounting quality arising from higher quality accounting standards. This could occur, for example, if there are firms' incentives, changing incentives, other temporal economic changes, or if the enforcement of accounting standards is lax (Barth et al., 2008).

Cairns (1999) and Street and Gray (2001) find that, among firms that apply IAS there is significant noncompliance with IAS. This is also a result of Ball et al. (2003), who argue that the obsession to reduce variation in accounting standards across countries will not resolve differences in quality, unless other important features that influence the reporting process also are also changed, as earnings management is also affected by countries legal and institutional environments. Ahmed et al. (2013) find a significant increase in income smoothing and aggressive reporting in comparison with benchmark firms. Despite these arguments the results of Barth et al.'s paper indicate that firms applying IAS have higher accounting quality than firms that do not and that accounting quality improves after firms adopt IAS (Barth et al., 2008). This contradiction about the earnings quality leads to a question about the earnings quality after the IFRS adoption in Greece and especially whether the quality improved or the lax enforcement of IFRS along with the economic crisis was an incentive for earnings management to be increased.

From all the above, we can conclude that the adoption of IFRS has improved earnings quality, as there is less earnings smoothing, less managing of earnings towards a target, more timely recognition of losses, and a higher association of accounting amounts with share prices and returns.

2.4 Incentives for earnings management

According to Watts and Zimmerman (1990), earnings management occurs when managers exercise their discretion over the accounting numbers with or without restrictions. The discretion can be either firm value maximizing or non-firm maximizing, namely opportunistic. Another segregation of motivations is, according to Chen and Chai (2010), in three broad categories: altruistic motivation (managers want to engage in earnings management activities for the good of the company), speculative motivation (managers want to obtain their own personal benefits or to meet internal targets) and pressure from affiliated parties (motives to engage in earnings management, which include meeting external expectation through pressure from affiliated parties).

The reasons that can lead to earnings management are many. First of all, studies indicate that managers have incentives to avoid reporting losses or decline in earnings, as the small increases in reported earnings are more usual than small declines (Burgstahler and Dichev, 1997; Degeorge et al., 1999). Other studies have also proved that firms report positive unexpected accruals (which increase the income) prior to seasoned equity offers (Teoh et al., 1998b), initial public offers (Teoh et al., 1998) and stock-financed acquisitions (Erickson and Wang 1999), because smoother earnings lead to higher equity prices (Thomas and Zhang, 2002; Francis et al., 2004). In addition, firms also manipulate earnings to meet the expectations of financial analysts (Abarbanell and Lehavy 1998; Lin et al. 2006; Zhang 2008). Graham et al. (2005) and Cook et al. (2009) report that managers alter discretionary expenditure and other real decisions to meet financial reporting objectives. Another factor that made the firms to manage their earnings are lending contracts. As Watts and Zimmerman (1990) support these contracts offer incentive for earnings management as it is likely to be costly for creditors to undo earnings

management. Finally, Aljifri (2007) defines the intention to alter income taxation and as one of the most probable motivations to manipulate earnings.

Managers exercise their discretion not only for firm value maximizing purposes, but also for opportunistic purposes. In this category belongs the management compensation contracts. Healy (1985) and Holthausen (1995) have indicated findings that firms with caps on bonus awards are more likely to report accruals that defer income, if ,in this way, the cap is reached than firms with comparable performance and no bonus cap. Last but not least, Cahan (1992) showed that firms under investigation for antitrust violations reported downward accrual-based earnings management during investigation years (Cahan 1992).

Additionally, Stice and Stice (2010) support another factor, namely that managers engage in earnings management in order to meet external expectations coming from a wide variety of external stakeholders (e.g. employees, customers and suppliers). Each of the stakeholders has his specific interests in the financial performance of the firm and look at the financial figures in different way compared to internal stakeholders because they have their own differing interests in the same figures.

2.4i Incentives to avoid reporting losses or decline in earnings

There is evidence that documents managers' incentives to meet simple earnings benchmarks, such as avoiding losses, reporting increases in seasonally adjusted quarterly earnings or increase in the earnings compared to the previous year. Several papers support that while small losses are unusually rare reported, small profits are very often reported, and they also prove that small declines in reported earnings are unusually rare compared to small increases in reported earnings, which are unusually common (Burgstahler and Dichev 1997; and Degeorge et al.,1999). According to the authors of these studies, their results can be interpreted as evidence that managers engage in earnings management to avoid reporting losses and earnings declines.

Burgstahler and Dichev (1997) provide evidence that earnings decreases and losses are frequently not reported because they are managed away. They found two ways to avoid losses: cash flows from operations and changes in working capital used to manage earnings. According to them, there are two explanations why managers manipulate earnings. The first explanation is that managers avoid reporting earnings

decreases and losses to reduce the cost that is attributable to the firm in transactions with stakeholders. This is supported by two papers: Barth et al. (1999) find that, other things equal, firms reporting continuous growth in annual earnings are priced at a premium to other firms and that this premium increases with the length of the string, whereas the premium is reduced when the string disappears. Skinner and Sloan (2002) document that the stock price response to adverse earnings surprises is disproportionately large for growth stocks. The second explanation is based on prospect theory, according to which there is an aversion to absolute and relative losses.

Degeorge et al. (1999) provide evidence that for managers the most important thing is to avoid losses. After profitability is achieved, the second most important thing is that firm report increases in quarterly earnings. Once the two goals above have been achieved, the last goal becomes meeting analysts' earnings forecasts (Degeorge et al., 1999). Myers et al. (2007) investigate how many firms have presented 17 or less quarters of consecutive increases in quarterly EPS (Earnings Per Share) since 1987. They find that there are 399 firms with such increases in quarterly EPS. A great percentage of them have reported earnings strings that considerably exceed 17 quarters and are ongoing. It is notable that some firms have reported increases in quarterly earnings consecutively for more than ten years. The authors provide evidence that managers of these firms presented smoothing earnings in an effort to help their firms to report consistent earnings growth (Myers et al., 2007).

2.4ii Incentives for stock market purposes

Share offerings is one of the direct incentives for managers to engage in earnings manipulation. Managers can undetectably use upward earnings management, thus improving the terms on which their firms' shares are sold to the public. There are studies that provide evidence that managers manipulate earnings at the time of seasoned equity offerings (Teoh et al. 1998; Rangan, 1998). It is observable that shares of firms that make seasoned equity offerings (SEOs) present lower performance in the years following the offering. The two papers above prove that: the reported performance of firms that make SEOs seems unusually high at the time of the SEO and that this high reported performance comes from unusually high accruals

including discretionary accruals. Moreover, the reported earnings of these firms are unusually low in the years after the SEO. More important is that there is a strong relation between the degree of earnings management and subsequent stock price performance, as the shares of the firms with the highest accruals during SEO tend to present worse performance in the years following the SEO than shares of other firms. The reason for earnings management in that case, is that managers attempt to increase the investors' expectations of future performance their firm, which has a positive impact on the offer price (Healy et al., 1999).

Other studies have also proved the existence of earnings management in the case of stock-financed acquisitions (Erickson and Wang., 1999). They found that acquiring firms take actions to manage earnings upwards by manipulating total accruals in the periods prior to the merger announcement. The manipulation is particularly obvious in the quarter immediately preceding the offer. Louis (2004) examines 373 mergers (236 of which were pure stock swaps) of publicly traded USA firms that were announced and completed from 1992 to 2000. His findings show that discretionary accruals of working capital are positive and statistically significant for bidders engaging in stock swaps. The results are more intensive in the quarter immediately prior to the merger announcement.

2.4iii Incentives to meet analysts' or management's forecasts

Studies of earnings management for capital market reasons have shown that managers manipulate earnings to meet the expectations of either financial analysts or management. Burgstahler and Eames (1998) find that firms engage in upward earnings management in order to avoid reporting earnings lower than the ones that analysts have expected. Moreover, Abarbanell and Lehavy (1998) use financial analysts' stock recommendations to buy, hold, or sell shares as a predictor of the direction of earnings management that is upwards or downwards. They support that firms which receive "buy" recommendations are more likely to manipulate earnings to meet analysts' earnings expectations, while firms which receive "sell" recommendations are more likely to present negative unexpected accruals. Kasznik (1999) provides evidence consistent with firms being in danger of falling short of a management earnings target, to manipulate their earnings upwards through

unexpected accruals. This is also reported by two more recent studies of Graham et al. (2005) and Cook et al. (2009), who evidence the willingness of managers to alter discretionary expenditure and other real decisions to meet financial reporting objectives. Real activities manipulation is used to meet analysts' forecasts regarding cash flows (e.g. Zhang, 2008) and real earnings management and other earnings management tools are used to meet or beat analysts' forecasts about the earnings of the firms (e.g. Lin et al., 2006).

2.4iv Incentives for management compensation contracts

A number of studies has provided evidence consistent with managers manipulating earnings to increase bonus awards that are based on firm's earnings. Healy's (1985) study provides evidence of how managers' incentives for bonus affect their choices about accruals. More recently, papers by Burgstahler (1998) and Guidry et al. (1998) find that managers of a large multinational firm are likely to manipulate earnings, when the earnings target in their bonus plan will not be met otherwise and if they gained the maximum bonuses permitted under the plan through earnings manipulation. Healy (1985) and Holthausen et al. (1995) suggest that in firms with caps on bonus awards it is more likely to manage reported earnings when in this way that cap is reached than firms that have comparable performance but no bonus cap. Dechow and Sloan (1991) prove that CEOs in their final years in office reduced the amount for R&D spending to increase reported earnings. They believe that this behavior is attributable to the short-term nature of their compensation contracts as well as to their short employment horizons. Jiraporn (2007) found that the existence of employee stock ownership plans (not call or put options) in firms might limit the opportunism of managers in the form of earnings management (Hamid et al., 2012).

2.4v Incentives for lending contracts

Lending contracts are important, as they limit managers' actions that benefit the firm's shareholders at the expense of its creditors. Watts and Zimmerman (1978) suggested that these contracts create incentives for earnings manipulation, as it could be costly or at least difficult for compensation committees and creditors to "undo" earnings management. Studies have examined whether firms that are close to lending

covenants engage in earnings management. DeAngelo et al. (1994) examine whether firms close to their dividend constraint changed accounting numbers through accounting methods, accounting estimates, or accruals to prevent reducing dividends or making costly restructuring decisions. According to the results, there is no strong evidence of earnings management among firms close to their dividend covenant. Firms in financial trouble have the tendency to put more emphasis on managing cash flows by reducing dividend payments and restructuring their operations and contractual relations. Dividend-paying firms can avoid the violation of their dividend constraint by cutting dividends when necessary, while the options may be fewer, if firms have to meet other covenants, such as restrictions on interest coverage or debt-equity ratios.

DeFond and Jiambalvo (1994) find that firms accelerate earnings one year before the violation of a covenant and they suggest that their findings provide evidence that firms manage their earnings close to their lending covenants. In line with this, Sweeney (1994) finds that covenant violators manipulate earnings upwards after the violation, which implies that they did not make accounting changes with the purpose to avoid violating the lending covenant. However, one could claim that the changes were made to reduce the possibility of future covenant violations. It is important to mention that the sample in Sweeney's study (1994) consisted only of firms that have actually violated loan covenants. This means that the firms which have successfully managed earnings to avoid a technical default, do not include in the sample, which makes earnings management for debt covenant purposes less possible (Healy and Wahlen, 1999). A recent study by Iatridis and Kadorinis (2009) establish that firms, which have almost acted in ways that violated the debt covenants violation, manage earnings to avoid both financial suffering and disappointing lenders.

2.4vi Incentives for decreasing income tax

The fact that income tax affects the incentives for earnings management has been examined and verified by different studies. Aljifri (2007) defines the intention to enhance the confidence of stakeholders, to alter income taxation and to avoid breaching the covenant in the debt contract as the most probable motivations to manipulate earnings. Dhaliwal et al. (2004) investigate whether changes in effective

tax rates (ETRs) are consistent with earnings management, so with the purpose of meeting analysts' and finding a positive relation between them. Also Myers et al. (2007) prove a relation between effective tax rates and changes in earnings management. Another study is that of Othman and Zeghal (2006), who try to determine the potential influences on earnings management policy with reference to the Anglo-American (represented by Canada) and Euro-Continental (represented by France) accounting models and find evidence that incentives for earnings management for French firms are specifically linked among others to effective tax rate. According to their research, the primary role of financial accounting in France (and in most Euro-Continental accountings systems) is the determination of the amount of income tax that a company owes to the government. That's why the tax and financial reporting systems are very closely related in France and most Euro-Continental countries.

The Greek accounting framework has many common features with the other Euro-Continental countries (Tsalavoutas et al., 2012). Spathis and Georgakopoulou (2007) have characterized the Greek accounting framework as tax-driven. Financial reporting in Greece, like in France, is closely related to taxation (Ballas et al., 1998). Moreover, the fact that financial statements are not required an information source by owners gives the company the choice to use aggressive tax reducing strategies (Tzovas, 2006), including the adoption of creative accounting (Baralexis, 2004).

2.5 Is there only upward earnings management?

According to studies there is both upward and downward earnings management. We present two studies. The study of DeAngelo et al. (1994) suggest that a substantial portion of the negative accruals is due to an abnormal inventory decline, which is more plausibly explained as the result of managers' real choices rather than as earnings management. The other part of negative accruals is, according to their evidence, because of income decreasing accounting choices (e.g. non-cash write-offs). Reduced earnings can also help managers convince unionized labor or government authorities that the firm is truly troubled and needs wage concessions or government assistance, while non-cash write-offs give the lenders the signal that managers try to deal with their firm's financial problem. Badertscher et al. (2009) examine the

motivation in downward earnings management. According to their evidence, through downward earnings management managers meet or beat their earnings targets e.g. to reduce share prices in anticipation of stock repurchases and in anticipation of net insider purchases of stock. It does also makes sense, that large firms were more likely to take actions to manage earnings downwards, as these firms try to avoid political costs. To the extent firms engage in downward earnings management motivated by tax incentives, their results prove the existence of ways that involve real activities manipulation.

2.6 Accrual-based earnings management models/Real earnings management models

Researchers usually start to measure discretionary accruals from total accruals. After the measurement of discretionary accruals the researchers assume a particular model for the process, which generates the non-discretionary part of total accruals and the model enables total accruals to consist of both discretionary and non-discretionary accruals. The majority of the models require the estimation of one parameter at least which is typically implemented using an "estimation period" in which there is no prediction of systematic earnings management (Dechow et al., 1995). There are five models presented, as in the study of Dechow et al. (1995).

•The Healy model

The test for earnings management existence in Healy's model (1985) is based on the comparison of mean total accruals over lagged total assets across the earnings management partitioning variable. Under his prediction systematic earnings management occurs in every period. The partitioning variable split the sample into three subsamples: one with predicted upward earnings management (estimation period) and two with predicted downwards earnings management (event period). The measure of non-discretionary accruals is the mean total accruals from the estimation period.

$$NDA_{\tau} = \Sigma TA_t/T$$

NDA: estimated non-discretionary accruals

TA: total accruals scaled by lagged total assets

t: a year subscript for years included the estimation period, t=1…T

τ: a year subscript indicating a year in the event period

•The DeAngelo model

Using first differences in total accruals, DeAngelo tests for earnings management. The model assumes that these first differences have an expected value of zero under the null hypothesis of no earnings management. The measure of non-discretionary accruals in this model is last year total accruals over total assets:

$$NDA_{\tau} = TA_{t-1}/T$$

The DeAngelo model is a subcase of the Healy model. In case discretionary accruals have a mean of zero in the estimation period and non-discretionary accruals are constant over the time, we have two models that are equivalent. However, if non-discretionary accruals are not constant but change over the time, then both models estimate non-discretionary accruals with error. If non-discretionary accruals change following a White noise process around a constant mean, then the Healy model is more appropriate. If they change following a random walk, then the DeAngelo model is more suitable. But evidence shows that the nature of the accrual accounting process makes the level of non-discretionary-accruals to change in response to changes in economic circumstances (Kaplan, 1985). Failure to model the impact of economic circumstances on non-discretionary accruals will cause inflated standard errors attributable to the omission of relevant variables. Additionally, if the firms under examination systematically experience abnormal economic circumstances, the failure to capture the effect of economic circumstances on non-discretionary accruals will lead to biased estimates of the coefficient on PART (Dechow et al., 1995).

•The Jones model

Jones (1991) tests for earnings management assuming that non-discretionary accruals are not necessarily constant, but they can change. Her model attempts to take

into account the impact of changes in a firm's economic circumstances on discretionary accruals. The Jones model in the year event is:

$NDA_\tau = \alpha_1 * (1/A_{\tau-1}) + \alpha_2 * (\Delta REV_\tau) + \alpha_3 * (PPE_\tau)$

ΔREV_t=revenues in year τ less revenues in year τ-1scaled by total assets τ-1
PPE_t=gross property, plant & equipment in year τ scaled by total assets τ-1
$A_{\tau-1}$=total assets at τ-1
α_1, α_2, α_3= firm-specific parameters

The firm-specific parameters are generating using the following model:

$TA_\tau = a_1 * (1/A_{\tau-1}) + \alpha_2 * (\Delta REV_\tau) + a_3 * (PPE_\tau) + u_t$,

where a_1, a_2,a_3 denote the OLS estimators of α_1,α_2,α_3 and TA are total accruals scaled by lagged total assets

The results in Jones (1991) prove that the model can successfully explain about one quarter of the variation in total assets. The only problem is the assumption that the revenues are non-discretionary accruals. According to Dechow et al. (1995), if there is earnings manipulation through discretionary revenues, then the Jones model will affect the result removing part of the managed earnings from the discretionary accrual proxy.

•The Modified Jones model

Dechow et al. (2005) use a Modified version of the Jones model, in order to eliminate the conjectured tendency of the Jones model to estimate discretionary accruals with error, when earnings management is exercised over revenues. The non-discretionary accruals are measured as:

$NDA_\tau = a_1 * (1/A_{\tau-1}) + \alpha_2 * (\Delta REV_\tau - \Delta REC_\tau) + a_3 * PPE_\tau$
$\Delta REC\tau$=net receivables in year τ less net receivables in year τ-1 scaled by lagged assets

The estimates of α_1,α_2,α_3 and non-discretionary accruals during the estimation period are the those that are used by the original Jones model. The Modified version of Jones model assumes that all changes in credit sales in the event period are caused

by earnings management, which is based on the fact that it is easier to manipulate earnings by exercising discretion over the recognition of revenues on credit sales than it is to engage in earnings management by exercising discretion over the recognition of revenue on cash sales.

•The industry model

This is model used by Dechow and Sloan (1991). Under this model the assumption that non-discretionary accruals are constant over time is relaxed. Instead of modeling directly the components of non-discretionary accruals, the model makes the assumption that non-discretionary accruals are common across firms that belong to the same industry.

$NDA_{\tau}=\gamma_1+\gamma_2 median_{\iota}\ (Ta_{\tau})$

$median_{\iota}\ (Ta_{\tau})$: the median value of total accruals scaled by lagged assets for all non-sample firms in the same 2-digit SIC code.

OLS is used for the estimation of the firm specific parameters γ1 and γ2 in the estimation period. The ability of the industry model to cause measurement error in discretional accruals depends critically on the fact that removes variation in non-discretionary accruals that is common across firms in the same industry and on the fact that removes variation in discretionary accruals that is correlated across firms in the same industry.

If the sample consists of firms with extreme financial performance, all models reject the null hypothesis of non-earnings management at rates exceeding the specified test-levels, but the Modified Jones model generates the fewest Type II errors (Dechow et al., 1995).

Next, we present a model that is between accrual-based and real earnings management. The model of Dechow, Kothari and Watts. They developed a model of earnings, cash flows and accruals.

•The Dechow, Kothari and Watts model

Dechow et al. (1998) make an assumption about the process that generates sales and not about the one that generates operating cash flow,

as the sales contract determines the timing and amount of the cash inflows and often the related cash outflows as well as the recognition of earnings (when and under what conditions customers have the obligation to pay according to sales contract giving the ability sales to be recorded in earnings -including combined cash outflows).

Under the assumption that sales for period t, S_t, follow a random walk process:$S_t=S_{t-1}+\varepsilon_t$,
The fact that sales are made not only on cash but on credit as well means that sales and cash flow from sales have no proportional relationship, so α is the proportion of the firm's sales, which hasn't collected at the end of the period so that accounts receivable for period t, AR_t, is $AR_t=\alpha S_t$

The accounts receivable accrual include also the collection of accounts receivable in the future, e.g. future cash flow. The assumption that expenses vary with sales result in the following equation:$(1-\pi)S_t$, where π is the net profit margin on sales and earnings (E_t) are πS_t. Target inventory is defined as a constant fraction,γ_1 ,of next period's predicted cost of sales. Because of the assumption that sales follow a random walk, target inventory is defined as $\gamma_1(1-\pi)S_t$, where $\gamma_1>0$. Target inventory is succeed, if a firm's inventory is increased in response to sales changes by $\gamma_1(1-\pi)\Delta S_t$,where $\Delta S_t=S_t-S_{t-1}=\varepsilon_t$. In contrast, actual inventory misses the target, because actual sales differ from predictions, which is given by $\gamma_2\gamma_1(1-\pi)[S_t-E_{t-1}(S_t)]= \gamma_2\gamma_1(1-\pi)\varepsilon_t$, where γ_2 is a constant that measures the speed in which a firm adjusts its inventory to the target level. If γ_2 is 0, there is no deviation from the target, while if 1, the firm doesn't adjust its inventory. Inventory for period t, INV_t, is then $INV_t=\gamma_1(1-\pi)S_t- \gamma_2\gamma_1(1-\pi)\varepsilon_t$

(Note: If $\gamma_1=\gamma_1/(1-\pi)$ and $\gamma_2=-\gamma_2/\gamma_1$, then $INV_t=\gamma_1 S_t+\gamma_2 S_{t-1}+err_t$)

Difference between earnings and cash flows is also caused by the credit terms for purchases. Purchases for period t, are:
$P_t=(1-\pi)S_t+ \gamma_1(1-\pi)\varepsilon_t-\gamma_2\gamma_1(1-\pi)\Delta\varepsilon_t$

When a firm purchases its inputs in time, inventory is zero ($\gamma_1=0$) and purchases are equal to expenses for the period $(1-\pi)S_t$. The second term - $\gamma1(1-\pi)\varepsilon t$ -consists of the required purchases in order to adjust inventory

due to the change in target inventory. The third term -γ2γ1(1-π)Δεt- is the purchases representing the deviation from target inventory. The fact that purchases, like sales, are also on credit, means that purchases are not proportionally related to cash flow, so β represents the difference. Purchases (AP_t)are estimated :$AP_t=\beta P_t=\beta[(1-\pi)S_t+\gamma_1(1-\pi)\varepsilon_t-\gamma_2\gamma_1(1-\pi)\Delta\varepsilon_t]$

Future cash outflow is predicted by the accounts payable accrual (sales and purchases), so earnings are defined as:

$E_t=CF_t+\alpha+\gamma_1(1-\pi)-\beta(1-\pi)]\varepsilon_t-\gamma_1(1-\pi)[\beta+\gamma_2(1-\beta)]\Delta\varepsilon_t-\beta\gamma_2\gamma_1(1-\pi)\Delta\varepsilon_{t-1}$

If there are no accruals (sales and purchases are cash not on credit so $\alpha=\beta=0$, and no inventory so $\gamma_1=0$), earnings are equal to cash flows for the period. The second, third and fourth terms represent the period's accruals as a function of the current shock to sales and differences between current and lagged sales shocks. Given that, the two terms are ignored, so cash flow and earnings are given by $CF_t=\pi S_t-\delta\varepsilon_t$ and $E_t=CF_t+\delta\varepsilon_t$

(The equation can be expressed as $CF_t=\pi S_t-\delta S_t-S_{t-1}=(\pi-\delta)S_t+S_{t-1})$)

The model can explain how accruals counterbalance the negative impact on cash flow changes to produce earnings changes that have a much less negative effect and why current earnings and not the current operating cash flows is a better prediction of future operating cash flows.

We move now to models under which the pure real earnings management is estimated.

• Bartov methodology

Bartov (1993) examines the existence of earnings manipulation through the timing of income recognition from disposal of long-lived assets and investments. There are two hypotheses tested: the negative relation income from asset sales and earnings changes and the positive relation between income from asset sales and debt equity ratios. First the two hypotheses are separately tested through univariate tests for sales assets(the sample splits into firms with positive earnings change before

asset-sale income and into firms that experience a negative earnings change) and through univariate tests for debt-equity hypothesis (sample splits into high- and low-leverage firms based on the basis of the median debt-equity ratio).Then the hypotheses are tested together using a regression with depended variable the income from assets sales over stock price (ASSIN) and independed variables the change in pre-tax annual ordinary income per share (exclusive from assets sales) sales over stock price (δEPS) and the ratio of book value of long-term debt to the book value of owners' equity (DETEQ):

$$ASSIN_i = a_0 + a_1 \delta EPS_i + a_2 DETEQ_i + e_i$$

In order to make the relation between asset sales and income from asset sales monotonic, the asset sales are multiplied by negative one.

• Graham et al methodology

Graham et al (2005) created a survey of questions with their subsections, which was modified from academic researchers, CFOs and marketing experts in an effort to minimize biases and maximize number of responses. The survey has both been sent to executives and was also distributed to executives before a conference, which was attained by many firms. Apart from the survey, twenty interviews of senior executives representing firms of different industry, market capitalization and analyst coverage took place as well .Generally, the interviews gave the researchers the ability to understand more and in detail the findings that survey provided. It is important to make clear that these firms were not chosen by random, because firms that presented variation in reporting policies were chosen. It is also important that the questions were so stated, as the questioned person wasn't affected and of course the more difficult questions were asked at the beginning of the interview. The importance of this studies lies in the fact that it reveals the willingness of executives to prefer less accrual and more real earnings manipulation (through decrease of R&D, advertising, and maintenance and investments), for which there is no large volume of literature.

•Roychowdhury methodology

Roychowdhury (2006) defines three variables for real earnings management: sales manipulation, decrease of discretionary expenditures and overproduction. Following Dechow et al. (1998), normal cash flow from operations (CFO) are expressed as an equation of sales and their change from the previous period for each industry year model. The abnormal part of cash flow from operations is estimated as the difference between the actual CFO and the normal CFO. Roychowdhury (2006) expresses cost of goods sold as a linear function of current sales, whereas the model for normal inventory change includes both current and past decrease/increase of sales. The cost of goods sold along with the change of inventory define production costs. Although, Dechow et al. (1998) express discretionary expenses also as an equation of current sales, Roychowdhury (2006) deviates from this approach uses lagged sales, as he thinks that this approach causes the following problem: if firms engage in upwards earnings management through sales in any year, they can present unusually low residuals from the above regression in that year, even if they do not decrease discretionary expenses.

In comparison to previous literature (e.g. Bushee, 1998; Graham et al, 2005), which has been focused mainly on the discretionary expenses, the study of Roychowdhury develops empirical methods to control the existence of real activities (sales manipulation, overproduction and discretionary expenses) manipulation in large samples.

• Gunny methodology

Gunny (2005) focuses on four types of real earnings management activities: decrease of discretionary research and development expense (R&D), decrease of discretionary selling, general and administrative expense (SG&A), timing the sale of fixed assets to present earnings and overproduction in order to decrease prices or extend more lenient credit terms to increase sales and/or overproduce to reduce cost of goods sold.

The normal level of R&D expense is estimated using as independent variables lagged R&D, internal funds, firm's market value, capital expenditures and market value of equity. Current over lagged sales and a dummy variable that captures the decrease/increase of sales are used as regressors to estimate the normal level of SG&A and advertising expense. The dummy is included in the model in line with the general theory that managers substitute the expected costs of maintaining unutilized resources during periods of low demand to the expected adjustment costs of replacing these resources, if demand is increased again. The normal level of gain on asset sales is estimated with the sales of non-current assets, the sales of long-term investment, the sales and the percentage change in sales for the current period as explanatory variables. Including asset sales in equation requires that gain from asset sales and non-current asset sales and long-term investment sales are monotonically correlated. That's why, following Bartov (1993), the variables are modified to represent a positive relation. Using sales in the regression, helps to test for any size effects and their percent change to test, if firms are less likely to recognize earnings because they are in a period of expansion (Gunny, 2005). The normal level of production cost, measured as the sum of inventory change and cost of goods sold explained by sales, change in sales in current period and change in sales in past period. The empirical results show that the four types of real earnings management provide information about future earnings and cash flows.

2.7 IFRS-accrual-based and real earnings management

As of 1st January 2005, all publicly listed companies that belong to member states of the European Union are required to prepare financial statements in accordance with International Financial Reporting Standards (IFRS) (1606/2002/EC). (In addition, the Financial Accounting Standards Board has embarked on a comprehensive project aimed at convergence between IFRS and U.S. standards (The Norwalk Agreement, 2002)). This meant for Greece that Greek Generally Accepted Accounting Principles (GAAP), which were mandated by a Greek law (Presidential Decree

1123/1980), were replaced by a set of accounting standards which was the same for almost all firms in European Union (EU) countries.

The adoption of IFRS has led to changes in a significant number of accounting policies and acceptable accounting choices, because a number of accounting policies and methods, permitted under local GAAP, were no longer acceptable by IFRS. IASC has issued principles standards and taken steps to remove allowable accounting alternatives and to require accounting measurements that better reflect a firm's economic position and performance (IASC 1989). The possibility of the uniform application of IFRS across different countries has been strongly questioned not only because of differences in compliance and enforcement mechanisms but due to various cultural and institutional backgrounds as well (Ball, 2006; Nobes, 2006; Larson and Street, 2004; Zeff,2007).

The objective of IFRS adoption was to force firms to produce financial reporting of higher quality, as there is greater aggressiveness in the recognition of bad news than in the recognition of good news which is considered a key qualitative characteristic of financial reporting (Watts, 2003a; Francis et al., 2004; Ball et al., 2008; Dechow et al., 2010; Kothari et al., 2010). This means that potential economic losses should be reported, whereas potential economic gains should be delayed. This conservatism is a response to the stable demand for credible financial information from both shareholders and debt holders (Kothari et al., 2010). Hence, since IFRS restrict this discretion with respect to the local accounting standards in use before the mandatory IFRS adoption (Ding et al. 2007), which makes them tighter than before local GAAP, although IFRS are principle standards and their implementation leaves managers with a great amount of discretion.

The existence of tighter accounting standards changed the kind of earnings management, as it has restricted the ability to use accrual earnings management through accounts such as accounts payable, accounts receivable and goodwill. In order to keep manipulating the financial

information, management should start using a different way, which would not contradict to the IFRS obligations.

The relation between the two types of EM, AEM and REM, regarding different events recently became a theme for many papers (Anderson et al., 2003; Xu and Taylor, 2007; Mizik and Jacobson, 2007; Cohen and Zarowin, 2010). Cohen and Zarowin (2010) document that firms use both real and accrual- based, earnings management methods around SEOs (season equity offerings). The firms' choices about the earning management depends on the firm's ability to use accrual management as well as on the costs of doing so. Their findings prove that the decline in post-SEO operating performance attributable to real activities management is more severe than that attributable to accrual management.

Another paper about the substitutive relation between the two kinds of earnings management is that of Zang (2012), whose results show that real manipulation is positively correlated with the cost determinants of accrual manipulation, and that accrual manipulation is negatively correlated with real manipulation. Moreover the two kinds of manipulation (real and accrual) are negatively related with their own cost determinants and positively correlated with earnings management incentives. The switch from accrual to real earnings management applies for firms subject to securities class action lawsuits during 1995-2004, where accrual- based decreases and real earnings management increases after lawsuit filings (Zang, 2012). This verifies the fact that in the presence of tighter situations (litigation risk) firms turn to real- based earnings management.

The fact that tighter regulatory regime leads to a shift from accrual to real earnings management has been a very popular theme for research. Cohen et al. (2008) examine the effect of the passage of the Sarbanes-Oxley Act (SOX) on earnings management. This passage was created after the wave of corporate governance failures, which raising highly publicized concerns about the integrity of the accounting information, resulted in a drop in investor confidence to the reported financial statements (Rezaee 2004). While the accrual earnings management increased steadily from

1987 until the passage of SOX in 2002, followed by a significant decline after the passage of SOX, the level of real earnings management activities declined prior to SOX and increased significantly after the passage of SOX (Cohen et al.,2008). This provides evidence that firms switched from accrual to real earnings management since the passage of SOX. Another fact that verifies the substitution is that firms achieved important earnings benchmarks using less accrual and more real earnings management after SOX, when compared to similar firms before SOX (Cohen et al.,2008).The tightened accounting standards accounting according to Ewert and Wagenhofer (2005) lead managers to substitute accrual with real earnings management, because it is much more difficult to restrict real than accrual earnings management, as real earnings management is often indistinguishable from the firm's others economic transactions.

According to Parbonetti and Ipino (2011), there is also evidence that the introduction of IFRS has made the firms to abandon accrual earnings management and turn to real earnings management. Using firm-year data from 2000 to 2008 from 37 European countries, they compare the change in accrual and real earnings management metrics in the treatment sample (mandatory IFRS adopters) to the change in accrual and real earnings management metrics in the control sample (non-IFRS adopters) around the time of mandatory IFRS adoption. Specifically, they test earnings management (both accrual and real) in relation to the type of adopter (mandatory versus non-mandatory), the time period (pre- versus post-mandatory adoption), and the interaction between the two and a set of controls. Their results show a trade-off between accrual and real earnings management only for firms that were mandated to adopt the IFRS in 2005 and that are in countries with relatively strict legal enforcement regimes. So the accounting standards and their enforcement plays a major role in the type of earnings management that the manager chooses (Ipino and Parbonetti, 2011).

On the contrary, Doukakis (2013), whose sample consists of 20 European countries, finds evidence that accrual earnings management was not reduced after the mandatory adoption of IFRS and that the introduction of

IFRS did not have any effect on the real earnings management. Consistent with this finding, Van Tendeloo and Vanstraelen (2005) find that German firms applying IAS do not present differences in earnings management compared to those applying German standards.

Special motivation for this paper gives that Greece along with Austria are the countries with the highest degree of earnings management (Leuz et al., 2003). They find that the factors that affect earnings management across countries are the high percentage of firm's ownership, the lax investor protection and the small stock markets. Greece has exactly these features, as it exhibits strong ownership and there is also lax investor protection and the Athens Stock Exchange belongs to less developed stock markets, all these affect earnings management. This was the situation in Greece before 2005, when the accounting standards were the Greek GAAP and not IFRS. According to Ding et al. (2007), Greece has the highest number of issues absent from local GAAP but covered by IAS compared to 30 counties that were examined. For this reason exactly, it is very interesting to examine whether the adoption of IFRS has attributed to decreasing earnings management in Greece. Furthermore the fact that the intention of IASB was to decrease earnings management and that there is evidence that IFRS increases earnings quality (Barth et al, 2008) gives us additional reasons for this thesis. Moreover the results in the studies about Germany, as described above, leads to a question about what happened in Greece after the IFRS adoption. Is there also no change in earnings management like in Germany or is there a difference in earnings management, and particularly a decrease as intended by IASB?

In addition, it has been previously established that situations with restricted alternatives in accounting scope (e.g. litigation risk, tighter regulatory regime etc) make firms to abandon the accrual and turn to real earnings management. IFRS restricted the available accounting choices (Tsalavoutas and Evans, 2008), so is there a substitution between accrual and real earnings management?

Moreover, the study of Ipino and Parbonetti (2011) as well that by Doukakis (2013), have examined the IFRS adoption and the trade-off between accrual and real earnings management. Their findings are not in accordance, as Doukakis (2013), in contrast to Ipino and Parbonetti (2011), does not find evidence of significant changes in earnings management after the introduction of IFRS, which makes us wonder about the impact of IFRS on earnings management in Greece (Both studies include Greece in their sample). Despite the uniform application, there are differences in compliance and enforcement mechanisms as well as different cultural and institutional backgrounds among European countries. These country-level characteristics affect the earnings manipulation and whether it either increases or decreases. Therefore, Ipino and Parbonetti (2011) use different dummy variables regarding stock market, previous GAAP and legal enforcement in order to capture the effect of these along with IFRS adoption on earnings management. This means that each country is a special case. That's why, we examine the effect of IFRS on Greece alone.

3. Sample selection, estimation of earnings management and descriptive statistics

3.1 Sample selection and estimation of earnings management

The sample selection process began with retrieving data for all firms based in Greece and listed in the Athens Stock Exchange during 2001-2008, following either local GAAP or IFRS. According to Worldscope-Data, there were 558 firms. We then excluded the 64 firms that belonged to the financial sector including banks, real estate, insurance services, investments and financial services. After removing duplications and firms with no available data for the estimated period, (157), unclassified firms (30), firms that were not at least 8 to generate a sector- we require at least 8 observations for each industry per year- (99), there were 211 firms.

The firms are classified in 8 industries: chemicals (13), construction and materials (39), food producers (33), industrial general and engineering (18), metals and mining (20), personal goods (30), software and hardware

(36) and travel and leisure (22). Because the change before and after the IFRS adoption is the event under consideration, the observations coming from three years before (2002-2004) and three years after (2006-2008) the mandatory IFRS introduction in 2005 are compared. To estimate the effect on the substitution of the accounting standards, before 2005 only local GAAP should be used and after 2005 only IFRS should be used. The firms, that were presenting their financial statements in accordance with IFRS before 2005, were excluded from the sample for the years 2002-2004. In the end, the sample consists of 1248 observations.

Insert Table 1 here.

3.1.1 Detecting accrual-based earnings management (AEM)

Following the previous literature, the existence of possible AEM is tested by estimating discretionary accruals and by differentiating them from non-discretionary accruals. The Jones model (Jones, 1991), as it has been modified by Dechow et al. (1995), and has been augmented by Kothari et al. (2005), is used. The Jones model discretionary accrual is estimated cross-sectionally each year using all firm-year observations in the same industry.

$$TA_{it}/Assets_{it-1}=a_o+a_1*(1/Assets_{it-1})+a_2*(\Delta Sales_{it}/Assets_{it-1}) \quad (1)$$
$$+a_3*(PPE_{it}/Assets_{it-1})+a_4*ROA_{it}+e_{it}$$

TA_{it} : firm i's total accruals

$Assets_{it}$: firm i's total assets at the end of the year *t-1* (WC02999)

$\Delta Sales_{it}$: firm i's change in sales between *t* and *t-1* (WC01001)

PPE_{it} : firm i's net value of property, plant & equipment in year *t* (WC02501)

ROA_{it} : firm i's return on assets in year *t* defined as net income before interest and taxes (WC18191) over the average of opening and closing total assets (WC02999)

e_{it} : error term

In order to calculate total accruals the balance sheet approach is used (Kothari et al., 2005): Accruals are defined as the change in non-cash current assets (CA) minus the change in current liabilities (CL) minus depreciation & amortization (D&A).

CA(WC02201) – ΔCash(WC02003+WC02008) – ΔCL (WC03101) − D&A (WC04051)

Then the industry- and year-specific parameter estimates ($\hat{a}_0$,$\hat{a}_1$, $\hat{a}_2$, $\hat{a}_3$ and $\hat{a}_4$) are used and to infer firm-specific discretionary accruals through:

$$DA_{it}=TA_{it}/Assets_{it-1}-[\hat{a}_0+ \hat{a}_1*(1/Assets_{it-1}) + \hat{a}_2*((\Delta Sales_{it} - \Delta AR_{it}) /Assets_{it-1})+\hat{a}_3*(PPE_{it}/Assets_{it-1})+ \hat{a}_4*ROA_{it}] \quad (2)$$

where all variables as before and DAR_{it} (WC02051) : firm i's change in accounts receivable between year *t* and *t-1*

In Appendix (1.a and 1.b) are presented the items of Datastream/ Wordscope that were used for the estimation of total and discretionary accruals.

The reason that the Modified Jones model is used and not the Jones model is, according to Dechow et al. (1995), the conjectured tendency of the last one to measure discretionary accruals with error, when discretion is exercised over sales. So, in the Modified Jones model the difference ΔRev_{it}- ΔAR_{it} substitutes the term ΔRev_{it}. Although recently, researchers have begun to estimate cross-sectional versions of the Modified-Jones model in which the term REV is adjusted by AR not only for the estimation of discretionary accruals, but also for the estimation of total accruals (e.g., Rajgopal and Venkatachalam, 1998; and Kothari et al., 2005), we decided not to adjust REV by AR for the estimation stage. Our decision is based on the study of Peasnell et al. (2000b), who repeated their empirical tests using this alternative specification of the Modified-Jones model, and in all cases the findings were consistent with those based on original Modified Jones model.

The augmentation of ROA (performance-adjusted Modified Jones model) in the Modified Jones model is coming from the fact that empirical

assessments of the Modified Jones model suggest that estimated discretionary accruals are significantly influenced by a firm's contemporaneous and past performance (e.g.,Dechow et al., 1995), despite the fact that the model attempts to control for contemporaneous performance. This means that there is a danger of spurious indication of discretionary accruals, if the discretionary accrual models do not adequately filter out the performance-related predictable component of accruals, (Kothari et al., 2005). The ROA term tries to affront this problem. The performance-adjusted Modified Jones model is therefore useful, because in the sample there are observations from both the period of high growth in Greece (mean GDP growth 2002-2004 of 4.57%) and the first year of financial crisis (GDP growth 2008 of 1%) (source: Hellenic Statistic Authority, 2011) and the ROA term lessens the effect on the discretionary accruals due to the bad performance of firms caused by the financial crisis.

While prior research typically does not include a constant in the model, Kothari et al. (2005) include a constant in the estimation for it provides an additional control for heteroskedasticity not alleviated by using assets as the deflator and it mitigates problems stemming from an omitted size (scale) variable (see Brown et al., 1999). Moreover they find that discretionary accrual measures based on models without a constant term are less symmetric, thus making power of the test comparisons not so clear-out (Kothari et al., 2005). This way it was decided to use not only the scaled intercept but also an unscaled one in the models.

3.1.2 Detecting real earnings management (REM)

We generate the normal levels of cash flow from operations (CFO), discretionary expenses, and production costs using the model developed by Dechow et al. (1998) as implemented in Roychowdhury (2006) to test for REM. According to this, there are three types of earnings management: overproduction, discretionary expenses and sales manipulation. He finds evidence consistent with firms trying to avoid losses by sales manipulation, overproduction and reducing discretionary expenditures aggressively to

improve margins (Roychowdhury, 2006). The variables that are used to capture the effect of real activities are production costs, discretionary expenses and cash flows from operation. The thing of interest in order to estimate real earnings management is whether the firms present abnormally low discretionary expenses and cash flows from operating activities and abnormally high production costs relative to sales. The net effect on abnormal CFO is hard to be estimated, as price discounts, offering lenient credit terms and overproduction have a negative effect on contemporaneous abnormal CFO, while reduction of discretionary expenditures has a positive effect (Roychowdhury, 2006).

CFO are expressed as a function of sales and change in sales which are estimated cross-sectionally by the following regression for all years for each industry of the firms:

$$CFO_{it}/A_{it-1}=a_0+a_1(1/A_{it-1})+a_2(S_{it}/A_{it-1})+a_3(\Delta S_{it}/A_{it-1})+ e_{it} \quad (3)$$

CFO_{it} : firm i's cash flows from operating activities for year *t* (WC04201+WC04831)
A_{t-1} : firm i's total assets at the end year *t-1* (WC02999)
S_{it} : firm i's sales at the end of year *t* (WC01001)
$\Delta Sales_{it}$: firm i's change in sales between *t* and *t-1*
eit : error term

For every firm-year, abnormal cash flow from operations (Ab_CFO) is the actual CFO minus the normal CFO calculated, which are estimated through the coefficients â0, â1, â2, â3 from the above model for every year for each industry:

$$Ab\_CFO_{it}=CFO_{it}/A_{it-1}-[\hat{a}_0+\hat{a}_1(1/A_{it-1})+\hat{a}_2(S_{it}/A_{it-1})+\hat{a}_3(\Delta S_{it}/A_{it-1})] \quad (4)$$

Production costs consist of both cost of goods sold and inventories. Cost of goods sold are estimated as a function of contemporaneous sales for all years and each industry:

$$COGS_{it}/A_{it-1}=a_0+ a_1(1/A_{it-1})+ a_3(S_t/A_{it-1})+e_{it} \quad (5)$$

$COGS_{it}$: cost of goods sold at the end of year *t* (WC01051)
A_{t-1} : firm i's total assets at the end year *t-1* (WC02999)
S_{it} : firm i's sales at the end of year *t* (WC01001)
e_{it} : error term

The normal inventory is a function of contemporaneous sales, change in sales and past change in sales and is estimated cross-sectionally by the following regression for all years and each industry:

$$DINV_{it}/A_{it-1} = a_0 + a_1(1/A_{it-1}) + a_3(\Delta S_{it}/A_{it-1}) + a_4(\Delta S_{it-1}/A_{it-1}) + e_{it} \quad (6)$$

$DINV_{it}$: firm i's change in sales between *t* and *t-1* (INV:WC02101)

A_{t-1} : firm i's total assets at the end year *t-1* (WC02999)

S_{it} : firm i's sales at the end of year *t* (WC01001)

ΔS_{it} : firm i's change in sales between *t* and *t-1*

ΔS_{it-1} : firm i's change in sales between *t-1* and *t-1*

e_{it} : error term

So the production costs (PROD) are defined as:

$$PROD_{it}/A_{it}\text{-}1 = a_0 + a_1(1/A_{it-1}) + a_2(S_{it}/A_{it-1}) + a_3(\Delta S_{it}/A_{it-1}) + a_4(\Delta S_{it-1}/A_{it-1}) + \varepsilon_{it} \quad (7)$$

Using the industry- and year-specific parameter estimates the â0, â1, â2, â3,â4 abnormal production costs (Ab_PROD):

$$Ab\_PROD_{it} = PROD_{it}/A_{it-1} - [\hat{a}_0 + \hat{a}_1(1/A_{it-1}) + \hat{a}_2(S_{it}/A_{it-1}) + \hat{a}_3(\Delta S_{it}/A_{it-1}) + \hat{a}_4(\Delta S_{it-1}/A_{it-1})] \quad (8)$$

Normal discretionary expenses (DISEXP) are expressed as a function of past sales and are estimated cross-sectionally by the following regression for all years and each industry:

$$DISEXP_{it}/A_{it-1} = a_0 + a_1(1/A_{it-1}) + a_2(S_{it-1}/A_{it-1}) + \varepsilon_{it} \quad (9)$$

$DISEXP_{it}$: selling, general and administrative expenses and R&D (WC01101+WC01201)

A_{it-1} : firm i's total assets at the end year *t-1* (WC02999)

S_{it-1} : firm i's sales at the end of year *t-1* (WC01001)

ε_{it} : error term

Unfortunately, in Worldscope-Data there is not any accounting item for the advertising cost. This is the reason why the term DISEXPit includes selling, general and administrative expenses and R&D and not the advertising cost.

In Appendix (1.c) are presented the items of Datastream/ Wordscope that were used for the estimation of abnormal cash flows, abnormal production cost and abnormal discretionary expenses.

The industry- and year-specific parameter estimates â0, â1 and â3 are used to infer abnormal discretionary expenses (Ab_DISEXP):

$$Ab\_DISEXP_{it}=DISEXP_{it}/A_{it-1}-[a_0+a_1(1/A_{it-1})+a_2(S_{it-1}/A_{it-1})] \quad (10)$$

The use of a constant in the used model is included to access the existence of real earnings management (Roychowdhury, 2006). As it is obvious from all the equations above, the models include lagged variables (e.g. total assets). Total assets are estimated at fair value under IFRS, whereas at historical cost under local GAAP, so there is difference in the accounting value of total assets with respect to the used accounting standards. As the event under examination is the IFRS adoption, our sample would be miss-specified, if the observations of the firms that in 2005 presented their financial statements under local GAAP were included in the estimations of 2006 (total assets lagged 2006=total assets 2005).

In addition, another measure is used to estimate the real earnings management and that is the RM_PROXY variable, as in Cohen et al. (2008). This variable contains the accumulated effect of the three variables in one measure but not as a simple sum. Managers reduce discretionary expenditures such as R&D, advertising, and maintenance, that are expensed in the same period that they are incurred, in order to meet earnings targets. So, firms exhibit lower discretionary expenses. If the upward REM is through overproduction, managers of manufacturing firms can produce more goods than those demanded. In this way fixed overhead costs are spread over a larger number of units, lowering both total cost per unit and reported COGS. Because there are no generated sales in the same period that expenses occurred, cash flows from operations are lower than normal and the production cost increases due to additional inventories. On the other hand, the prices discounts and the offer of more lenient credit terms lead to higher production cost (Roychowdhury, 2006). It is clear that upward REM through DISEXP and CFO means abnormally low amounts, while through PROD means abnormally high amounts. In order to avoid measuring the variable with error, as the direction of both DISEXP and CFO is opposite with the

direction of PROD, the first two variables are multiplied by negative one and then added to PROD.

3.2 Descriptive Statistics

Table 2 reports descriptive statistics (mean, median 25th and 75th percentile values and standard deviation) for key variables for our sample of firms during 2001-2008. The Table reports statistics for earnings management variables both AEM (DA) and REM (Ab_CFO, Ab_PROD, Ab_DISEXP and RM_PROXY). The Table also presents control variables, including LN(ASSETS), B/M (market-to-book ratio), LEV (total liabilities/total assets), ROA(total income/average of last and current year's assets).

Insert Table 2 here.

The discretionary accrual measures (means and medians) present values close to zero and in the same direction, in accordance with previous research (Cohen et al., 2008). According to DeAngelo et al. (1994), negative discretionary accruals are partially due to income decreasing accounting choices (e.g. non-cash write-offs). When it comes to REM, it is to observe that means of abnormal CFO, discretionary expenses and production costs are also very close to zero at the sample level, and the same applies to the combination measure RM_PROXY. Medians are also close to zero, though larger than means for Ab_PROD and RM_PROXY and smaller than mean for Ab_DISEXP and Ab_CFO), indicating that overall, year and industry controls explain firm expenses, production costs or cash flows. Moreover the sign of medians of Ab_CFO and Ab_DISEXP verifies the fact that firms who engage in REM, exhibit at least one of the following: unusually low cash flow from operation or unusually low discretionary expenses. In addition, the sign of Ab_PROD shows that firms present unusually high production costs in order to increase the reported income. The sign of RM_PROXY, which captures the entire effect of earnings management, is positive, as it should be, if firms engage in upward earnings management. Finally, the standard deviation for DA is larger than the standard deviation of REM variables.

When it comes to control variables we observe that the mean of assets is 11.497910 and there are not big deviations between the observations in 25% of sample observations and 75% of sample observations. The mean and median value of leverage are 0.550377 and 0.560741 respectively. Market-to-book value has a range of value, including 0.65 in the 25% of the sample 1.19 in the 50% of the sample and 2.09 in the 75% of the sample. Finally, the mean of ROA is 0.033259 and the median is 0.032650.

Table 3 reports pair-wise correlation coefficients (Pearson coefficients) between accrual (DA) and real earnings management metrics (Ab_PROD, Ab_DISEXP, RM_PROXY).

Insert Table 3 here.

It can be observed from the Table 3 that a significantly positive relation exists between RM_PROXY and Ab_PROD about 74%. RM_PROXY and DISEXP also exhibit significant correlations of about 80%. The correlation of DA with Ab_PROD is also positive. The relation between DA and Ab_DISEXP is positive, yet not significant. All previous results are consistent with Cohen and Zarowin (2010) in every single case. RM_PROXY positively and significantly correlates with DA, indicating that there exists, at least at the sample level, a possibility for REM to coexist with AEM. Positive correlations between the two types of earnings management are explained by both REM and AEM being positively correlated with incentives to manage earnings (Zang, 2012).

4. Empirical Findings

4.1Estimating means and medians

To examine the impact of IFRS adoption on both the AEM and REM, the mean and median values of AEM and REM measures before and after the IFRS adoption, as well as their statistical significance are estimated. Table 4 reports medians and means of accrual and real earnings management measures, during 2002-2004 and 2006-2008. Estimating the significant level of medians and means of discretionary accruals and abnormal cash flows, abnormal production costs and abnormal discretionary

expenses, tests the existence of accrual and real earnings management before and after the IFRS adoption.

Insert Table 4 here.

It is observable from Table 4 that there is accrual based earnings management before the IFRS introduction, as the mean of DA measure is statistically significant at the significance level of 10 %. After the IFRS introduction, mean and median of DA are no longer statistically significant, which means that the importance of AEM measure dampens. On the other hand, it is notable that the medians of REM measures Ab_PROD and RM_PROXY are significant after the IFRS adoption, which indicates the existence of real earnings management after 2005. Before the IFRS adoption all the REM measures, except for Ab_DISEXP, are not statistically significant. Although the median of Ab_DISEXP is significant before and after the IFRS introduction, it is important that the median is even more negative (which means that it increases) after the adoption of IFRS. One could argue that despite the fact that there is real earnings management through discretionary expenses before 2005, it is more intensive after the IFRS adoption. When it comes to Ab_CFO, it seems that there is no earnings management through cash flow from operating activities at least at a statistically significant level equal to or below 10%. From all the above, we can conclude that there is a change from accrual to real earnings management after the IFRS adoption (2006-2008). The two types of EM may coexist, but it is obvious that there is significant existence of AEM before IFRS adoption, and significant existence of three measures of REM after the introduction of IFRS.

In Table 4 we observe that there is a downward earnings management in accrual basis, which is substituted by upward earnings management in real basis. Maybe this is attributable to taxation. Othman and Zeghal (2006) find evidence that income tax is a strong incentives for earnings management in France and most Euro-Continental countries. Financial reporting in Greece, as in France, is closely related to taxation (Ballas et al., 1998). The fact that financial statements are not required as information source for owners gives the company the capability to adopt aggressive tax reducing strategies (Tzovas, 2006). The incentive to engage in downward earnings management during 2002-2004 compared to upward earnings management is that

according to Tax Law 2238/1994, the tax rate for S.A. was 35% in 2002, 2003 and 2004. This implies that the higher the earnings the higher the amount of income tax. By reducing the income, firms would have to pay less money to the government. The fact that there was a growth in GDP and firms had only earnings and no losses, they were given the opportunity to keep reporting earnings after downward earnings management.

According to the same law, the plan was to reduce the tax rate in the following years. So in 2006, the tax rate was 29%, while in 2007 and 2008 it was 25%. The reduction of the tax rate along with the financial crisis in 2008 led firms to engage in upwards earnings management during 2006-2008. This is consistent with the study of Hevas and Karabinis (2013), who report that although before the implementation of IFRS there were powerful incentives for firms to reduce upward earnings management and engage in downward earnings management due to the fact that firms were facing higher tax pressure, this effect dampens after the IFRS adoption. The change in the direction of earnings management can be possibly attributed to the reduction in book–tax conformity for Greece, which releases financial income from tax implications (Karampinis and Hevas, 2013) thus restricting the incentives of downwards EM for the decrease of income tax. From all the above, we conclude that the incentives for accrual earnings management during 2002-2008 were mixed. On the one hand, there were incentives for downward earnings management and on the other hand, both decrease in accrual earnings management and upward earnings management.

When it comes to the earnings quality, the result regarding the two types of earnings management changes. As it is obvious from Table 4, the mean of DA decreases after the IFRS implementation, which implies that IFRS restrict accrual management, which has a positive effect on earnings quality. The mean of discretionary expense also decreases (there is management through abnormally low discretionary expense), indicating that earnings quality might increases. The increase of the earnings quality due to IFRS implementation is supported by Barth (2008). This is also consistent with Ewert and Wagenhofer, (2005) who develop a rational expectations model which proves that the ability of accounting standards to limit opportunistic discretion results in accounting earnings that are more reflective of a firm's underlying economics and, therefore, of higher quality.

On the other hand, the mean of Ab_PROD, RM_PROXY and AB_CFO (there is management through abnormally low cash flow from operating activities), indicating that there is a decrease in the earnings quality. The degree of compliance with IFRS has a major role in the increase or decrease of the earnings quality. A rather weak compliance may lead to the opposite effect of the one that was intended by the IASB. Cairns (1999) and Street and Gray (2001) find substantial noncompliance with the IAS among firms applying IAS and according to Leuz (2003), in Greece this effect is strong. So, perhaps it is the level of compliance that leads to these results in respect to the earnings quality.

4.2 Regression analysis

We now investigate the factors that influence firms' decisions to manage earnings. The factors that are included are both firm-level and country-level characteristics. In respect of firm-level characteristics, Holthausen and Leftwich (1983) find that firm size and leverage are the only two significant variables explaining choices of accounting techniques in their review of 14 papers that study the economic consequences of voluntary and mandatory choices of accounting techniques. So we include a variable that captures the effect of size, which is assets (LN (ASSETS)). According to Dechow and Dichev (2002), earnings quality is positively related to the firm size. This is also supported by Francis et al. (2004). That's why we expect the sign of assets to be positive. In order to determine the effect of lending-contracts motivations on earnings management, we also include leverage (LEV)-defined as total liabilities over total assets. A higher leverage ratio indicates a greater possibility of violations of lending contracts, which creates an incentive to increase reported earnings. Apart from the above variables, we also include a variable for growth. Skinner and Sloan (2002) document that firms with growth prospects e.g. high market-to-book (B/M) value are penalized more by the stock market when they miss earnings thresholds. In order to address the possibility that abnormal values correlated with performance, we also include control profitability, as it has been shown to affect significantly EM (in the case of REM, for example, Roychowdhury (2006) or Cohen et al. (2008)). So, the relation between market-to-book and earnings management is predicted to be positive. The IFRS dummy variable represents the effect of accountings standards on earnings management and is an indicator variable that takes

the value of one if the observations are after the IFRS adoption (2002-2004), and zero otherwise (2006-2008). The regression model is:

$$\left|DA_{it}\right| = c_0 + c_1 LN(ASSETS)_{it} + c_2 B/M_{it} + c_3 LEV_{it} + c_4 IFRS_t + c_5 \left|RM\_PROXY_{it}\right| + e_{it} \quad (11)$$

$$\left|RM\_PROXY_{it}\right| = c_0 + c_1 LN(ASSETS)_{it} + c_2 B/M_{it} + c_3 LEV_{it} + c4 IFRS_t + c_5 \left|DA_{it}\right| + c_6 ROA_{it} + e_{it} \quad (12)$$

where:

$\left|DA_{it}\right|$ =absolute value of DA

$\left|RM\_PROXY_{it}\right|$ =absolute value of RM_PROXY

$LN(ASSETS)_{it}$= firm i's total assets at the end of the year t (WC02999)

B/M_{it}= firm i's market-to-book value at the end of the year t, defined as market capitalization over common equity (WC09704)

LEV_{it}= firm i's leverage, defined as total liabilities scaled by total assets (WC03351/WC02999)

ROA_{it}= firm i's return on assets in year t defined as net income before interest and taxes (WC18191) over the average of opening and closing total assets (WC02999)

$IFRS_t$=a dummy variable that takes the value of one if the observations are after IFRS adoption (2006-2008), and zero otherwise (2002-2004) (WC07536)

In Appendix (1.d) are presented the items of Datastream/ Wordscope that were used for the estimation of variables LN(ASSETS), B/M, LEV, ROA and IFRS.

Table 5 reports results of the estimation of Equations (11) and (12). The equations are estimated with panel ordinary least squares during 2001-2008.

Insert Table 5 here.

The equations are estimated with panel ordinary least squares during 2001-2008. The reason why we use the measure |DA| and |RM_PROXY| instead of DA and RM_PROXY is because the second variables are influenced by sign. As we have described above, the high income tax rate caused firms to engage in downward earnings management before 2005, whereas after 2005 these incentives do not exist and there is a decrease in earnings management. This implies that there are mixed incentives which lead to different directions of earnings management. The absolute value enables us to examine the EM undependable of the direction of earnings management. This is also the reason why we use the absolute value of earnings management. Furthermore, following Cohen et al. (2008), we include the measures of AEM (REM) as an independent variable in the regression of REM (AEM). If we hadn't used the absolute value, the interpretation of the results would have been more difficult. (We use RM_PROXY among the other measures of REM, because it captures the aggregate effect of earnings management).

Results from Table 5 confirm that the size has a positive impact on accrual and a negative impact on real earnings management but not at a significant level. Another factor that affects earnings management is the need to access the stock markets. We had made the hypothesis that firms that have a high dependence on stock market will also have incentives for upward earnings management. This is plausible, if someone takes into consideration, that shareholders want their shares to be profitable and present growth opportunities. In addition, if a firm wants to issue shares, it needs to increase reported earnings so that the issue is successful. This is not the case for the accrual management. Evidence of the capital market consequences of earnings management shows that in an efficient market investors can not be"fooled" by earnings management or conjecture that there will be earnings inflation and that financial statements provide useful information to the investors (Stein 1989). Nowadays financial markets are completely competitive, because of the high availability to information so may be efficient. Shivakumar (2000) also concludes that investors are not misled and account correctly for the manipulative behavior of managers. The relation between AEM and B/M is negative at 10% significance level, which can be interpreted as firms do not engage in upwards earnings management in order to meet investors' expectations. This can be explained by the fact that, as we have mentioned, it is easier for accrual earnings management to be detected. Because

of the high dependence on the capital market, managers don't risk losing the trust or investors by accrual manipulation.

From prior research (Watts and Zimmerman, 1978) to recent research (Iatridis and Kadorinis, 2009) it is suggested that lending contracts also play an important role in earnings management. To examine the effect of these debt covenants on EM, we use the variable (LEV). As Table 5 reports, AEM is affected positively by earnings management, given that efforts of executives manage earnings to avoid financial suffering and disappointing lenders. Existing research has indicated that firms have the tendency to engage in income-increasing accrual earnings management in an effort to avoid debt covenant violations (Defond and Jiambalvo 1994, Jaggi and Lee 2002). The positive relation applies also to the REM, but not at a significant level.

Our results confirm Roychowdhury (2006) regarding the significantly positive influence of profitability on REM. Guay et al. (1996) support that managers' incentives to manipulate earnings are probably linked with firm performance. This means that mangers engage in REM in order to present positive profitability or positive changes in profitability.

We now move to country-level characteristics. The variable under examination is the dummy IFRS. According to our results, IFRS led to an increase of REM, as the relation between earnings management and IFRS dummy is significantly positive, consistent with past evidence of Cohen et al. (2008) and Ipino and Parbonetti (2011) who have found evidence that the stricter regulatory regime leads to increase of real activity manipulation. On the other hand, the accrual management seems to have a negative relation with the introduction of IFRS. This verifies the fact that accrual-based earnings management was decreasing after the IFRS adoption, while real earnings management was increasing. This is also consistent with our findings about means and medians. Combining the findings from Table 4 and Table 5, we suggest that firms don't engage in accrual-based earnings management but in real earnings management, after the substitution of local GAAP with IFRS.

The positive relation between the two types of earnings management implies the coexistence of both. The fact that the one form is used primarily doesn't mean the total absence of the other form. Usually both types are used, because, as Roychowdhury (2006) suggests, in this way there is less risk.

Finally for robust purposes, the (11) and (12) equations are estimated with panel ordinary least squares by making use of heteroskedasticity robust standard errors. The results, that are taken (Appendix 2), are in line with those that have been estimated without the heteroskedasticity robust standard errors (Table 5).

5. Conclusion

This thesis examines the existence and tendency of accrual and real earnings management before (2002-2004) and after the adoption of IFRS (2006-2008). The country under investigation is Greece. To test the existence of accrual-based earnings management, we estimate discretionary accruals under the performance-matched Modified Jones model (Kothari et al., 2005). Following Roychowdhury (2006) we capture the existence of real earnings management through the estimation of abnormal levels of cash flows from operations production cost and discretionary expenses.

Our results indicate the existence of negative accruals before 2005. This means that the firms engaged in downward earnings management. This can be justified by the fact that there were incentives for reduction of income tax due to the high tax rate (35%). This is not the case after 2005. The results suggest that there is upward real earnings manipulation during 2006-2008. This can be explained by the fact that the mean GDP growth rate in 2006-2008 was lower compared to the one in 2002-2004 as well as the eventual reduction of tax rate since 2005. Moreover, there is evidence (Karampinis and Hevas, 2013) for restriction of book–tax conformity in Greece, which releases financial income from tax implications and thus reduces the incentive for downward earnings management.

We document changes on both accrual and real earnings management during the sample period. In particular, the effect of the IFRS adoption on REM is positive, which means that real earnings manipulation increases after 2005 (the year IFRS were adopted). According to our results, after the IFRS introduction, the level of accrual based earnings management declined, which indicates the negative impact on AEM after the introduction of IFRS. This suggests that Greek firms shifted from using accrual to real earnings management after the IFRS adoption, probably due to the different nature of IFRS compared to the local GAAP. This exactly has also been shown by Ipino and Sarbonetti (2011) in a study about the effect of the IFRS

introduction on earnings management in European countries and by Ewert and Wagenhofer (2005), who examine the effect of tighter accounting standards on earnings management. Our findings are also consistent with the study of Cohen et al. (2008), who prove that tighter regulatory regimes cause a substitution from accrual-based to real earnings management. All these give evidence that tighter regime leads to a shift from accrual-based to real earnings management.

We provide also evidence that leverage has a positive impact on accrual-based earnings management, whereas the market-to-book value have a negative effect on AEM. Regarding real earnings management, we document that it is positively related to profitability.

Although we get evidence on more limited AEM after the adoption of IFRS, which could increase earnings quality, the real earnings management has the opposite effect on earnings quality, as it increases after the adoption of IFRS. The purpose of IFRS was that firms would prepare and present financial statements of higher quality, which would provide investors with credible and valuable information. The fact that real activities manipulation increased, raises questions about the accomplishment of the target. If the earnings quality has not improved enough probably due to the lax enforcement of IFRS in Greece, then the Greek government should take measures to resolve this problem.

Tables

Table 1: Industry structure

The table reports the industries and the firms that consist each industry in the Athens Stock Exchange during 2001-2008. The sample includes 211 firms.

Industry	Number of firms
Chemicals	13
Construction and materials	39
Food producers	33
Industrial general and engineering	18
Metals and mining	20
Personal goods	30
Software and hardware	36
Travel and leisure	22
Total	211

Table 2: Descriptive Statistics

The table reports summary statistics for the sample of firm-year observations with accounting data on Wordscope-Data during 2001-2008. DA, Ab_CFO, Ab_PROD, Ab_DISEXP, RM_PROXY stand for Discretionary Accruals, Abnormal Cash Flows from Operations, Abnormal Production Costs, Abnormal Discretionary Expenses and the composite measurement of the three last. LN(ASSETS) stands for log assets, LEV stands for leverage, B/M stands for market to book value.

Variable	Number of observations	Q1	Mean	Median	Q3	Standard Deviation
DA	503	-0.050935	-0.009691	-0.001090	0.040715	0.139299
Ab_CFO	1029	-0.038620	0.000117	-0.000084	0.039982	0.343933
Ab_PROD	1017	-0.052485	0.013688	0.006670	0.058838	0.377277
Ab_DISEXP	1020	-0.052440	0.000446	-0.011655	0.033263	0.175487
RM_PROXY	961	-0.105965	0.008498	0.020070	0.118077	0.472751
LN(ASSETS)	1248	10.538370	11.497910	11.456450	12.432910	1.320255
LEV	1090	0.429673	0.550377	0.560741	0.676969	0.202449
B/M	1061	0.650000	1.768219	1.190000	2.090000	4.779997
ROA	1062	0.008700	0.033259	0.032650	0.063700	0.084238

Table 3: Pearson Correlation Coefficients of Earnings Management Measures

The table reports pair-wise Pearson correlation coefficients between REM and AEM.

	RM_PROXY	Ab_PROD	Ab_DISEXP	DA
RM_PROXY	-			
Ab_PROD	0.800411***	-		
Ab_DISEXP	-0.740548***	-0.633043***	-	
DA	0.080638*	0.107596**	0.002852	-

Asterisks *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively.

Table 4: Means and medians of accrual and real earnings management measures

The table reports the means and medians of AEM and REM measures before and after the IFRS adoption in 2005.

	2002-2004			2006-2008		
	No of obs	Mean	Median	No of obs	Mean	Median
DA	250	-0.018102*	-0.004589	253	-0.001591	0.000870
Ab_CFO	524	-0.000073	-0.000175	514	-0.004498	0.000289
Ab_PROD	510	0.000986	0.006210	507	0.026489	0.008574*
Ab_DISEX	531	-0.000029	-0.006100***	498	0.002430	-0.013520***
RM_PROXY	484	0.000112	0.011943	477	0.019617	0.034418***

Asterisks *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively.

Table 5: Regression Analysis

The Table reports estimation results of the panel regressions: $|DA_{it}| = c_0 + c_1 LN(ASSETS)_{it} + c_2 B/M_{it} + c_3 LEV_{it} + c_4 IFRS_t + c_5 |RM\_PROXY_{it}| + e_{it}$

$|RM\_PROXY_{it}| = c_0 + c_1 LN(ASSETS)_{it} + c_2 B/M_{it} + c_3 LEV_{it} + c_4 IFRS_t + c_5 |DA_{it}| + c_6 ROA_{it} + e_{it}$

The dependent variable RM_PROXY is the real earnings management metric outlined in section 3.1. The dependent variables Abs_DA is the discretionary accruals under model outlined in section 3.1

Variable	|DA|	|RM_PROXY|
Intercept	0.045933	0.100303
LN(ASSETS)	0.000373	-0.001483
LEV	0.054551*	0.042455
B/M	-0.001672*	0.001637
|RM_PROXY| / DA|	0.054581*	0.170009**
ROA		0.444672***
IFRS	-0.018157*	0.058187***
Adjusted R^2	0.012625	0.068419
F-statistic	2.222364	6.740877
P-value	0.051024	0.000001

Asterisks *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively.

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Appendix

1.Data from Datastream/ Wordscope

1.a Items for estimation of total accruals using the balance sheet approach.

$$CA - \Delta Cash - \Delta CL - D\&A$$

Worldscope item:

CA (WC02201)	Current assets represent cash and represents cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle.
ΔCash (WC02003+WC02008)	WC02003: Cash represents money available for use in the normal operations of the company. WC02008: Short term investments represent temporary investments of excess cash in marketable securities that can be readily converted into cash.
ΔCL (WC03101)	Current liabilities represent debt or other obligations that the company expects to satisfy within one year (e.g. accounts payable, short term debt, notes payable, current portion of long term debt).
D&A (WC04051)	Depreciation represents the process of allocating the cost of a depreciable asset to the accounting periods covered during its expected useful life to a business. Depletion refers to cost allocation for natural resources such as oil and mineral deposits. Amortization relates to cost allocation for intangible assets such as patents and leasehold improvements, trademarks, book plates, tools and film costs.

1.b Items for the estimation of discretionary accruals under performance-matched Modified Jones model.

Assets (WC02999)	Total assets represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
Δsales (WC01001)	Net sales or revenues represent gross sales and other operating revenue less discounts, returns and allowances.
PPE (WC02501)	Property, plant and equipment represents Gross Property, Plant and Equipment less accumulated reserves for depreciation, depletion and amortization.
ROA (WC18191/ WC02999)	WC18191: Earnings before interest and taxes represent the earnings of a company before interest expense and income taxes. It is calculated by taking the pre-tax income and adding back interest expense on debt and subtracting interest capitalized. WC02999: Total assets represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
DAR (WC02051)	Receivables (net) represent the amounts due to the company resulting from the sale of goods and services on credit to customers (after applicable reserves). These assets should reasonably be expected to be collected within a year or within the normal operating cycle of a business.

1.c Items for the estimation of abnormal CFO, discretionary expenses and production costs.

CFO (WC04201+WC04831)	WC04201: funds from operations represents the sum of net income and all non-cash charges or credits. It is the cash flow of the company. WC04831: funds from/for other operating activities represent the net change in working capital apart from the increase/decrease in short term borrowings and increase/decrease in cash and equivalents.
A (WC02999)	Total assets represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
S (WC01001)	Net sales or revenues represent gross sales and other operating revenue less discounts, returns and allowances.
COGS (WC01051)	For manufacturing companies, cost of goods sold represents specific or direct manufacturing cost of material and labor entering in the production of finished goods. For merchandize companies, cost of goods sold represents the purchase price of items sold, as well as indirect overhead such as freight, inspecting, and warehouse costs. If a breakdown of total operating cost of non-manufacturing companies is not available then it is treated as cost of goods sold. For Utilities and Service Organizations, if there is no clear breakdown between cost of goods sold and Selling, General and Administrative Expenses, the total amount is updated to Cost of Goods Sold and noted that Selling General and Administrative Expenses are included.
DINV (WC02101)	Total inventories represent tangible items or merchandize net of advances and obsolescence acquired for either (1) resale directly or (2) included in the

	production of finished goods manufactured for sale in the normal course of operation. In manufacturing companies this item is classified as follows (depending upon the stage of completion in the manufacturing process): finished goods, work in process, raw materials and supplies.
DISEXP (WC01101+WC01201)	WC01101: selling, general & administrative expenses represents expenses not directly attributable to the production process but relating to selling, general and administrative functions. WC01201: research and development expense represents all direct and indirect costs related to the creation and development of new processes, techniques, applications and products with commercial possibilities.

1.d Items for the estimation of the variables of (11) and (12) regressions

LN(ASSETS) (WC02999)	Total assets represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
B/M (WC09704)	Market Capitalization / Common Equity.
LEV (WC03351/WC02999)	WC03351: total liabilities represent all short and long term obligations expected to be satisfied by the company. WC02999: total assets represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
ROA (WC18191/ WC02999)	WC18191: Earnings before interest and taxes represent the earnings of a company before interest expense and income taxes. It is calculated by taking the pre-tax income and adding back interest expense on debt and subtracting interest capitalized.

	WC02999: Total assets represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
IFRS (WC07536)	Accounting standards followed

2. Robust test (White diagonal standard errors & covariance (d.f. corrected)) of (11) and (12) regression

Variable	|DA|	|RM_PROXY|
Intercept	0.045933	0.100303
LN(ASSETS)	0.000373	-0.001483
LEV	0.054551*	0.042455
B/ M	-0.001672***	0.001637
|RM_PROXY| / |DA|	0.054581**	0.170009***
ROA		0.444672***
IFRS	-0.018157*	0.058187***
Adjusted R^2	0.012625	0.068419
F-statistic	2.222364	6.740877
P-value	0.051024	0.000001

Asterisks *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively.