



Dissertation

Master in International Business

***Impact of Financial Crisis on Earnings Management in  
Listed Companies of Portugal and UK***

**Aleksandre Kacharava**

*Leiria, June of 2016*



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Dissertation developed under the supervision of Doctor Inês Margarida Cadima Lisboa, professor at the School of Technology and Management of the Polytechnic Institute of Leiria.

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# Abstract

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Firm's financial information is essential to stakeholders' decision making. Although not always financial statements show the firm's real image. This study examines listed firms from Portugal and UK. Firms have different purposes to manipulate earnings: some strive for influencing investors' perception about a particular company, some try to provide better position for gaining finance from credit institutions or paying less tax to tax authorities. Usually, this behaviour is induced when firms have financial problems. Consequently, the study also aims to see the impact of financial crisis on earnings management. We try to answer question how does extent of firms' involvement in earnings management change when the world undergoes financial crisis. Furthermore, we also compare two countries with different legal forces in terms of quality of accounting to see the main differences.

We used a panel data methodology to analyse financial data from 2004 till 2014 of listed firms from Portugal and UK. Beneish (1999) model was applied to categorize manipulator and non-manipulator firms. Analysing accounting information according to Beneish's ratios, findings suggest that financial crisis had certain impact on firms' tendency to manipulate financial results in UK although it is not statistically significant. Moreover, besides the differences between Portugal and UK, results contradict the common view of legal systems' quality, as UK firms tend to apply more accounting techniques for manipulation than the Portuguese ones.

Our main results also confirm that some UK firms manipulate ratios of receivables' days, asset quality index, depreciation index, leverage, sales and general administrative expenses whereas Portuguese firms manipulate only receivables' days. Finally, we also find that the main reason to manipulate results is not to influence the cost of obtained funds neither to minimize tax burden since net profit does not explain the ratios used in the Beneish model. Results suggest that the main concern to listed firms manipulate results is to influence financial investors perception.

**Keywords:** earnings management, financial crisis, IFRS, earnings quality, Beneish model

## List of figures

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Illustration 1: Variation of net profit and M-score in Portugal .....	42
Illustration 2: Variation of net profit and M-score in the UK.....	43
Illustration 3: Variation of net profit and DSRI in Portugal .....	44
Illustration 4: Variation of net profit and DSRI in the UK .....	44
Illustration 5: Variation of net profit and AQI in Portugal .....	45
Illustration 6: Variation of net profit and AQI in the UK .....	46
Illustration 7: Variation of net profit and DEPI in Portugal .....	47
Illustration 8: Variation of net profit and DEPI in the UK .....	47
Illustration 9: Variation of net profit and Leverage in Portugal .....	48
Illustration 10: Variation of net profit and Leverage in the UK .....	48
Illustration 11: Variation of net profit and TATA in Portugal.....	49
Illustration 12: Variation of net profit and TATA in the UK .....	50
Illustration 13: Variation of net profit and SGAI in the UK.....	51

## List of tables

---

Table 1: Dimension of samples.....	29
Table 2: Summary Statistics to Portugal.....	34
Table 3: Summary Statistics to UK .....	36
Table 4 : Manipulators and Non-manipulators .....	40
Table 5: Manipulators and non-manipulators per year .....	41
Table 6: Synthesis of results .....	51
Table 7: Impact of variables to Portugal.....	52
Table 8 : Impact of variables to UK.....	53

# List of acronyms

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EPS - Earnings per share

GAAP – Generally Accepted Accounting Principles

IASB - International Accounting Standards Board

IFAC - International Federation of Accountants

IAS- International Accounting Standards

IFRS – International Financial Reporting Standards

R&D – Research and Development

UK – United Kingdom

# Table of Contents

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<b>1. Introduction</b> .....	1
<b>2. Literature review</b> .....	4
2.1 Purposes of Earnings Management.....	4
2.2 Existing evidence of earnings management tools .....	6
2.3 Earnings management during financial crisis .....	12
2.4 IFRS and Corporate Governance .....	15
2.5 Ethics in accounting profession .....	19
<b>3. Hypotheses development</b> .....	21
<b>4. Sample, Variables and Empirical Model</b> .....	29
4.1 Sample.....	29
4.2 Definition of variables .....	30
4.3 Empirical Model .....	38
<b>5. Results</b> .....	40
5.1 Results of the Beneish Model .....	40
5.2 Hypotheses analysis .....	42
5.3 Impact of net profit in each variable .....	52
<b>6. Conclusion</b> .....	54
<b>References</b> .....	56



# 1. Introduction

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General definition of earnings management is the use of accounting techniques to produce financial statements that may report an overly positive picture of a company's business activities and financial position. Earnings management involves manipulation of accounting rules (Generally Accepted Accounting Principles, GAAP) to favorably represent companies' financial health in order to mislead investors and other stakeholders.

Beneish (1999) used certain financial statement information to construct variables that would spot the effects of manipulation in companies that might engage in such activity. Managerial manipulation usually includes overstating earnings, recording unrealized gains and uncertain revenues, increasing inventory value or increasing capitalized expenditures. Furthermore, earnings can be smoothed which is a specific use of accounting techniques where managers defer revenue during a good year if the next year is anticipated to be a challenging one, or delay the recognition of expenses in a difficult year because profitability is expected to improve in the near future. Moreover, Barua *et al.* (2010) also revealed that managers use discontinued operations for misinterpreting costs which belong to continued operations to exhibit higher profits. What is more, Roychowdhury (2006) indicates that managerial manipulation can influence financial statements not only via use of accounting rules, but also by operational decisions. For instance, it can be achieved through acceleration of sales, alterations in shipment schedules, and delaying of research and development (R&D) and maintenance expenditures as earnings management methods available to managers. Moreover, mainly in manufacturing industry firms' management may make overproduction of goods in order to decrease reported COGS (cost of goods sold) to receive higher gross profit (Roychowdhury, 2006). Furthermore, managers also use for manipulation a business technique called channel stuffing. It involves sending extremely high quantity of products to retailers through distribution channels from which substantial part of them won't be sold to the public (Roychowdhury, 2006). Consequently, a lot of products will be sent back, but perhaps in the following reporting period while recognizing them as sold in a current year as revenue. Thus, it can be concluded that there are two types of manipulation: accrual based (using accounting techniques) and real activity based earnings management (through operational decisions).

Consequently, all of this is subject of concern and alarm for investors, auditors and other regulators, who can use this information for spotting manipulation in financial statements in order to protect themselves from misleading information.

The purpose of this work is to test earnings management of listed companies from Portugal and the UK based on their financial statement data from 2003 till 2014. The reason of choosing these two countries is that they are representatives of different culture and law systems: code and common law. La Porta *et al.* (1998) determined that in terms of legal protection of investors, countries' various legal systems provide peculiar level of security for investors and other stakeholders. The dissimilarity in legal protections of investors' influences and forces firms to be financed and owned differently in different countries. Thus, a question emerges – does difference in law systems have impact on level of earnings management in a particular country? Moreover, the sample will be divided further in two parts: from years 2004 till 2007 (the year of 2003 was used only to calculate ratios), and from 2008 till 2014 in order to explore the impact of financial crisis on firms' embeddedness in manipulation of financial results.

Global Financial Crisis 2008 is considered by many economists to have been the worst financial crisis since the Great Depression of the 1930s (Wikipedia). The collapse of Lehman Brothers, a global investment bank, in September 2008 almost brought down the world's financial system. It threatened the failure of large financial institutions which as a result of financial “bubble” had problems with the quality of assets in their balance sheets. Likewise, this research tries to answer a question - what is tendency of firms to do earnings management before and after financial crisis? How global financial crisis impacted firms' extent of conducting earnings management?

The study contributes to the literature in two ways. First, it examines impact of global financial crisis on firms' embeddedness in manipulation of financial results in chosen countries. Issues regarding many companies' solvency, sharp declines in credit availability and damaged investor confidence obviously had impact on global stock markets, where securities suffered large losses during 2008 and early 2009 (Wikipedia). Thus, in post financial crisis period firms must have strongly persuaded credit sector representatives for gaining finance. Hence, it is expected that in this period firms may engage in activity of earnings management to convince banks in their stability and ability to pay off external liabilities. Moreover, firms may have needs of convincing not only banks and other creditors, but also improve investors' confidence and willingness to invest which lead to increased liquidity in stock markets and thus, healthier world economy.

Second, the research tries to distinguish extent of earnings management in countries from different legal forces and culture. According to La Porta *et al.* (1998), common and civil law countries have different approaches in terms of legal protection of various stakeholders of a company. Moreover, it is important to emphasize that quality of accounting also differs in countries from different laws (La Porta *et al.*, 1998). Thus, different quality of accounting standards may lead to various extent of earnings

management and hence distinct level of risk associated with quality of financial statement for investors and other users.

Results suggest that crisis period had certain impact on firms' behavior in terms of financial management but they contradict with a common view of legal systems' quality. According to the result, UK firms tend to apply more accounting techniques for manipulation than the Portuguese ones. Although the Portuguese sample is small which can cause inferences in results. Moreover, financial crisis induced firms to manipulate accounting reports by a particular rate but in terms of T-test the difference is not statistically significant. Furthermore, according to the Beneish model some UK firms manipulate accounting ratios, the main reason is not to influence debt holders neither to benefit from tax savings. Therefore, results suggest that listed firms use earnings management to influence financial investors' perception. To Portugal, there are few manipulator firms, but those that manipulate also do not do it to have net profit near zero. This result can be explained as analyzed firms are listed firms and thus their main concern is related to investors especially in periods of financial turbulences.

The rest of the paper is organized follows. Sections 2 and 3 provide the theoretical background and the hypotheses of this study. Section 4 describes the definition of variables, the data used, and the methodology employed. Section 5 discusses the empirical results. Section 6 concludes the paper.

## 2. Literature Review

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### 2.1 Purposes of Earnings Management

Earnings management has been subject of research in numerous studies conducted by a lot of authors since 1970-1980s. Examples of the studies are Healy (1985), “The effect of bonus schemes on accounting decisions”, and Lambert (1984) “Income smoothing as rational equilibrium behavior”. Earnings management is a strategy used by a management of a company to deliberately manipulate company's earnings in order to reach a particular target for various purposes (Investopedia). Likewise, it involves the alteration of financial reports to mislead stakeholders and other users about the firm's true underlying performance. Consequently, earnings management has a negative effect on earnings quality which may weaken the reliability of financial reporting. The credibility of financial statements is vital for investors as long as it influences their investment decisions significantly (Investopedia). Thus, this area of study has been researched actively in recent years and becomes more and more actual theme and subject of current interest.

According to Dye (1988), there is internal and external demand for earnings management. The internal demand derives from the principal and agent relationship, between the company's owners and the management, while the external demand induced by the capital market's need to gain finance for the firm. Likewise, main three goals of earnings management are stimulated from external forces: 1) influence investors' financial decisions about a particular company, 2) persuade banks or other credit institutions for gaining loan finance and 3) paying less taxes. As long as earnings provide important information to investors about the firm's value, they adjust their investment decisions, which, respectively, influence the market price. Regarding earnings management targeted for banks or other loan providers, creditors use earnings to decide the firm's ability to pay back loans, and their decisions determine the interest expenses of a firm in its income statement and the capital that can be raised to finance investments. Moreover, firms manipulate financial reports not only for gaining approval of loans, but also for maintaining cost of debt of a company. Cost of debt is the effective rate that a company pays on its current financial liabilities such as loans. This can be measured in either before or after-tax returns; however, because interest expense is tax deductible, the after-tax cost is used most often. This is one part of the company's capital structure, which also includes the cost of equity. In relation to capital structure, this topic was emerged in 1958 suggested by Modigliani and Miller. Furthermore, capital structure of a firm depends not only on legal forces of a country, but also whether it is a family or non-family firm. According to

Lisboa (2015, p. 308) “family firms’ capital structure is different from that of non-family ones and this relation is influenced by market cycles”. As to using of debt, family firms have apparent reasons to avoid taking out loans due to high risk, especially in the market cycle of recession. Likewise, greater involvement of family in a firm leads to decreased obtaining of debt, especially in recession cycles (Lisboa, 2015). Furthermore, in concordance with Moreira (2007), firms incurring negative returns have higher incentive to manipulate financial statements in order to avoid increasing of cost of debt from credit markets. Moreover, firms with negative public announcement and unmanipulated earnings which are slightly below zero and with positive earnings in a previous year will more likely have problems with credit markets as long as bad news of a firm followed by a negative change in earnings will alarm credit institutions (Moreira, 2007). Thus, managers have strong stimulus to manipulate results in order to avoid risk of increasing interest cost and incentives are higher for firms with larger needs of credit. Contrary to this situation, a company appearing in good news but with the same earnings situation will unlikely be subject of concern for creditors and consequently manipulation is less expected.

Finally, tax system and its rates play crucial role in firms’ financial results (net profit, profit available for dividends distributed for shareholders). Thus, firms strive for minimizing tax burden, which, in turn, can be achieved through earnings management. Generally financial profit is reported usually for shareholders of a company or banks or other financial institutions. Although tax authorities require certain rules for calculating tax profit – which usually is different from financial profit. It’s a profit from which a company is taxed (taxable income, income before tax) by a certain rate which may differ in various countries. Hence, companies strive for maximizing financial profit and minimizing taxable profit.

Degree and willingness of earnings management depends on extent of a company’s separation of ownership and management. “Accounting-manipulation practices are likely to occur when there is a clear separation of ownership and control” (Rodríguez-Pérez and Hemmen 2010, p. 141). This statement supports Chen’s *et al.* (2014) proposal that it is expected less financial manipulation in family firms than in non-family ones, as long as they tend to have lower agency costs (costs associated with an agent acting on behalf of a principal) because shareholders and management are from the same family who will be more motivated in pursuing mutual firm goals. Management will work not for achieving personal bonuses but for reputation of its firm in order to maintain financial stability of a company and its brand name.

## 2.2 Existing evidence of earnings management tools

As it was referred earlier, one of the apparent reasons of earnings management is to influence stock price of a company with intent to have impact on investors' perceptions and decisions in a stock market. In times of large fluctuations in income and expenses which may be a normal part of a company's operations, changeable financial indicators may alarm investors who prefer to see stability and growth, tempting managers to take advantage of accounting techniques (Investopedia). According to Biedleman (1973) in Habib (2011) *et al.* earnings smoothing is a special case of earnings management where managers level out net income or cost fluctuations from one period to another to deliver a stable earnings stream. Fudenberg and Tirole (1995) in Habib *et al.* (2011, p. 256) determined income smoothing as "the process of manipulating the time profile of earnings to make the reported income stream less variable, while not increasing reported earnings over the long run". Thus, it is expected that while high environmental uncertainty leads to careful assessment of future cash flows and earnings by investors, as a result encourages managers to reduce fluctuation in reported financial statements in order to provide more predictable financial flow.

There are a number of other explanations of income smoothing. Some believe that managers smooth income in order to maximize their own wealth based on incentives provided in compensation scheme (Lambert, 1984). Fudenberg and Tirole (1995) in Habib *et al.* (2011) suggested that managers minimize the probability of being fired by smoothing of income flows. According to Goel and Thakor (2003) if managers don't smooth earnings, consequences lead to increased potential loss suffered by uninformed stockholders when they trade for liquidity reasons. When informed investors benefit on uninformed ones, this deter uninformed investors from actively taking part in stock trading, with the result of increased illiquidity and reduced stock price. That is why; managers react to such situation by smoothing of earnings in order to influence market of earnings fluctuation and thus firms' stock price.

Ghosh and Olsen (2008) in the research indicated that environmental uncertainty induces managers to smooth income to reduce information skewness. When there is no information asymmetry between stock traders it is recognized as an important technique in decreasing the cost of capital and enhancing market efficiency. However, according to Jensen (1976) there is considerable information asymmetry between managers and outside shareholders as long as there is separation between ownership and control. In concordance with Saar (2002) the impact of trading on asset prices indicates that the price is defined by information asymmetry among investors about the future cash flow of the assets and investor uncertainty about other investors' preferences in the market. High environmental uncertainty makes prediction of future earnings more difficult to implement because of the additional income

fluctuations and volatility. Ghosh and Olsen (2008) suggest that if managers don't respond timely to smooth out additional fluctuations, then the information asymmetry between managers and outsiders becomes more pervasive. Moreover, uninformed traders encounter risk of increased loss as a result they refrain from trading which leads to illiquidity in the market and consequently stock price of the firm is impacted. Furthermore, as long as firms operating in an environmental uncertainty are perceived to be more risky, their managers while smoothing income must obtain reasonable private knowledge regarding the firm's future performance (Wang & Williams, 1994). Logically, according to Wang (1994), a manager who can better foresee future performance should be able to better plan for the future and better deal with those future events. Thus, it is expected that positive association between stock returns and income smoothing is higher for firms operating in an environment of high uncertainty.

Revenue smoothing impacts income statement of a firm. In essence, financial statements of a company include balance sheet, income statement and statement of cash flows. Each of them has its own structure and its specific possibilities for misinterpreting its items. For instance, firms' income statement is divided by two sections: continued and discontinued operations. Barua *et al.* (2010) investigated whether managers use classification change to manage earnings when reporting discontinued operations. GAAP generally requires that material non-operating items to be reported separately in the financial statements. The reason is that investors are more interested in income from continued operations and it is difficult for them to reveal such type of earnings management as long as discontinued operations are not usually disclosed in details in the financial statements. This gave managers opportunity to mislead investors by allocating income and expenses to another stream of classification. It is worth to highlight that such kind of manipulation differs from others because it does not change net income and may be less costly for management (Barua *et al.*, 2010). Consequently, firms can misclassify operating expenditure as a non-operating one giving to investors misleading perception about future earnings.

In concordance with Barua *et al.* (2010), from accounting point of view, gain or loss from discontinued operations is consisted of three amounts. The first amount is the operating income or loss from the operations of the section being discontinued for the whole year in which the decision to stop a particular operating activity is made. The second amount is the gain or loss from disposal, which is the net amount realized over the carrying value of net assets of the section. The third amount is an impairment loss on the "assets held for sale" if the section is not disposed in the same year as the decision to discontinue. By misclassifying items in income statement, ultimate financial result does not change but financial reporting is still manipulated. Thus, there is probability that auditors may fail to discover and spot this manipulation while conducting analytical procedures and verification of financial

statements as long as financial ratios would be similar to what they were in previous years (Barua *et al.*, 2010).

Barua *et al.* (2010) examined whether discontinued operations are used for change of classification. The results show that managers tend to shift operating expenses to discontinued operations in order to increase core earnings which lead to information asymmetry between managers and investors. Thus, information about revenues and expenses is garbled via discontinued operation section of income statement. Therefore, it is expected that “managers engage in classification shifting using discontinued operations to increase core earnings” (Barua *et al.*, 2010, p. 1499).

The process of misclassifying includes two managerial decisions. First, the decision to stop a particular activity and second to shift operating costs to the classification (Barua *et al.*, 2010). It is logical to recognize that these two decisions are independent of each other. First, in order to discontinue a particular business activity it requires board of director approval. Thus, a manager must provide real financial reasons to the board in order to achieve such a decision. Second, it is quite expensive to discontinue a certain activity as long as it incurs not only costs to do it, but also opportunity costs which consist of revenues which a company can lose from stopping a particular component. To summarize, the decision to stop an operation is a long-term and expensive process which has very low probability to be done only for misinterpreting expenses (Barua *et al.*, 2010).

According to Healy and Wahlen (1999) in Roychowdhury (2006, p. 337), “Earnings management occurs when 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 practices.” As it was mentioned before, several studies revealed possibility of managerial intervention not only through accounting gimmicks but also via operational management which is called real activity based manipulation. Bruns and Merchant (1990) and Graham (2005) interviewed financial executives who indicated that they are embedded more in real activity earnings management than based on accruals. Furthermore, there are two possible explanations for this. First, accrual manipulation is more vulnerable and easily detected by auditors or other regulators than operational management intervention. Second, in concordance with DeGeorge (1999) outside stakeholders use certain thresholds as a benchmark for judging and rewarding executives and it is suggested that 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; consequently, “real activities cannot be manipulated at year-end” (Roychowdhury, 2006, p. 338).

Degeorge (1999) indicates three main thresholds utilized by managers while manipulating earnings:

- Report earnings which are above zero to avoid negative profits;
- To maintain stable performance achieved recently, accomplish at least previous year’s result;
- Report statements close to what financial analysts forecast and expect in terms of earnings.

According to Bartov (1993) in Roychowdhury (2006) firms with negative earnings changes report higher profits from asset sales. Furthermore, Roychowdhury (2006) suggests three main possibilities of earnings management based on real activity manipulation:

- Manipulation of sales by effecting timing of sales or changing credit terms (prolong time of sales condition) and offering increased price discounts to foster revenue growth;
- Reduction of discretionary expenditures;
- Substantially increasing production to report lower cost of goods sold.

Sales manipulation aims to increase sales revenue in the short term perspective achieved by offering price discounts or favorable credit conditions. Managers may accelerate sales by setting specific dates for discount opportunities for customers. Extensive sales period will end as soon as discount promotions are ceased. Overall result leads to high sales but cash inflow per sale has lower margins due to price discounts and too high production cost relative to sales (Roychowdhury, 2006). Moreover, managers offer longer credit terms in order to attract more customers and increase revenue. Consequently, this leads to increased receivables days and illiquidity in terms of decreased cash flow (Roychowdhury, 2006).

According to GAAP, accrual method principle provides the rule that firms have to recognize expenses in the period in which they are incurred and not when they are paid on a cash basis. Thus, managers can increase earnings not only through increasing sales and revenues, but via decreasing some of the expenditures, specifically discretionary expenditures. For instance, it can be R&D (Research and Development) costs which are capitalized instead of being expensed in a period. Hence, expenses are reduced and a balance sheet may include intangible asset which is misleading. Likewise, Cooper and Selto (1991) as cited in Seybert (2010, p. 674) proposed that “managers are less willing to invest in

profitable R&D projects when costs are expensed, because they must sacrifice certain current period cash flows for uncertain future cash flows”. According to International Financial Reporting Standards (IFRS), “IAS 38 Intangible Assets” guides that an intangible asset arising from research (or from the research phase of an internal project) must not be recognized. Expenditure on research should be recognized as an expense when it is incurred.

Furthermore, an intangible asset arising from development (or from the development phase of an internal project) should be recognized if, and only if, an entity can provide all of the following:

- The technical feasibility of completing the intangible asset so that it will be available for use or sale;
- Its intention to complete the intangible asset and use or sell it;
- Its ability to use or sell the intangible asset;
- Feasibility of generating probable future economic benefits;
- Possibility to demonstrate the existence of a market for the output of the intangible asset or the intangible asset itself or, if it is to be used internally, the usefulness of the intangible asset;
- The availability of technical, financial and other resources for completion of the development and to use or sell the intangible asset;
- Its ability to measure reliably the expenditure attributable to the intangible asset during its development.

Another way of manipulating is overproduction of goods which leads to decreased cost of goods as long as fixed overheads are absorbed by larger number of products. As a result, fixed cost per unit is reduced and hence, managers’ report better gross profit ratio and operating margins (Roychowdhury 2006). On the other hand, excessive production leads to increased production costs and costs of maintaining inventory (Roychowdhury 2006).

As it was referred earlier, financial statements are consisted of statement of financial position (balance sheet), income statement and statement of cash flows. A number of studies tried to investigate each of their weak points and vulnerability for manipulation to detect earnings management as well as finding more stable and reliable items in the financial reports. Sloan (1996) analyzed accrual and cash components of current earnings in terms of stock price. As long as all three financial statements are interconnected, an auditor is able to check earnings quality by analyzing and comparing one statement with another. According to this researcher, cash flow components of earnings performance are more persistent and reliable than earnings related to accrual components of earnings. He indicates that stock

prices do not reflect the whole picture and consequently, “firms with relatively high (low) levels of accruals experience negative (positive) future abnormal stock returns that are concentrated around future earnings announcements” (Sloan, 1996, p. 290).

Statement of cash flows exhibits performance of a company in terms of cash and cash equivalents. It reflects net amount of cash and cash-equivalents moving into or out of an entity (Investopedia). Positive cash flow indicates that a firm's liquid assets are increasing, giving it opportunity to repay debts and reinvest in its business, distribute dividends, pay expenses and provide a buffer against future financial challenges. Negative cash flow indicates that a company's liquid assets are decreasing. Net cash flow is different from net profit, which involves accounts receivable and other items for which payment has not actually been received (Investopedia). Moreover, cash flow is used to evaluate the quality of a company's income, in terms of how liquid it is, which can indicate whether the company is positioned to remain going concern and avoid bankruptcy. Furthermore, according to Bernstein (1993) in Sloan (1996, p. 292), “CFO (cash flow from operations), as a measure of performance, is less subject to distortion than is the net income figure. This is so because the accrual system, which produces the income number, relies on accruals, deferrals, allocations and valuations, all of which involve higher degrees of subjectivity than what enters the determination of CFO. That is why analysts prefer to relate CFO to reported net income as a check on the quality of that income. Some analysts believe that the higher the ratio of CFO to net income, the higher the quality and liquidity of that income. Put another way, a company with a high level of net income and a low cash flow may be using income recognition or expense accrual criteria that are suspect”. Sloan (1996, p. 292) indicates that when investors rely only based on earnings amount what happens is that “they will tend to overprice (underprice) stocks in which the accrual component is relatively high (low)”. While the value of the stock price is present value of dividends stretching to infinity, stock prices change every day as a consequence of market forces. Moreover, when investors’ strategy is long position, their anticipation is that the acquired stocks will rise in value while short position strategy is the sale of a borrowed security, commodity or currency with the expectation that the asset will fall in value (Investopedia). For instance, an investor who borrows shares of stock from a broker and sells them on the open market is considered to have a short position strategy. Eventually the investor must return the borrowed stock by buying it back from the open market. If the stock falls in price, the investor buys it for less than he or she sold it and thus making a profit. Consequently, all of this is supported by the proposal that “a trading strategy taking a long position in the stock of firms reporting relatively low levels of accruals and a short position in the stock of firms reporting relatively high levels of accruals generates positive abnormal stock returns” (Sloan 1996, p. 292). Likewise, the fact that accrual and cash components are required to be

carefully analyzed in order to predict future in a better way means that based only on stock prices investors cannot be confident with traditional efficient market's view that stock prices fully reflect all publicly available information.

In order to meet analysts' forecast, managers may manipulate deferred tax amount in financial statements. "Deferred tax expense is a component of a firm's total income tax expense and reflects the tax effects of temporary differences between book income (i.e., income reported to shareholders and other external users) and taxable income (i.e., income reported to the tax authorities) that arise primarily from accruals for revenue and expense items that affect both book and taxable income, but in different periods" (Phillips *et al.* 2002, p. 2). It should be emphasized, that there are deferred tax asset or deferred tax liability. Deferred tax assets are created due to taxes paid or carried forward but not yet recognized in the income statement. A deferred tax liability reports the fact that the firm will, in the future, pay more income tax because of a transaction that took place during the current period (Investopedia). For example, a company has a net income (reported for shareholders) \$1 million and taxable net income for tax authorities \$800,000. Assume that tax rate in the country in which the company operates is 15%. The difference between income numbers, which is \$200,000 multiplied by tax rate of 15% = \$30,000 is deferred tax liability (future expense), because taxable income (for tax authorities) is less, so company pays less income tax in current year, but will pay the difference in the future. Similarly, if taxable amount is more, this means that company paid more in the current year, but will deduct by increased amount of current tax payable from future income tax. In this case, a company reports deferred tax asset in a current year of a balance sheet. An example of temporary difference can be depreciation charge as long as firm's policy to depreciate assets is more likely to be different from that which tax rules require to follow. Thus, taxable profit differs from financial profit, because of a different depreciation cost. Furthermore, according to Phillips *et al.* (2002), firms may increase deferred tax liability in financial statement in order to avoid loss or earnings decline. Moreover, "deferred tax expense is incrementally useful to accrual measures in detecting earnings management to avoid failing to meet or beat analysts' earnings forecasts" (Phillips *et al.*, 2002, p. 10). In this way, it is expected that the higher is difference between tax and financial profit, there is more likelihood of earnings management.

## 2.3 Earnings management during financial crisis

According to Grove and Basilico (2011) in Koschtial and Franceschetti (2013) the fall of Lehman Brothers is considered as initial point of the financial crisis and one of the major financial reporting frauds of the 21st century. So why did Lehman Brothers - global financial services firm,

fourth-largest investment bank in the US, collapse? Lehman's high degree of leverage - the ratio of total assets to shareholders equity - was 31:1 in 2007, and its huge portfolio of mortgage securities made it increasingly vulnerable to deteriorating market conditions. The firm borrowed significant amounts to fund its investing in the years leading to its bankruptcy in 2008 and as a result this risk-taking led to high leverage ratio (Valukas, 2010). From sensitivity analysis point of view, this vulnerable position meant that just a 3–4% decline in the value of its assets would entirely jeopardize its book value of equity. Investment banks such as Lehman were not subject to the same regulations applied to depository banks to restrict their risk-taking (Wikipedia). At that time, there was a boom of mortgage business in the US. Consequently, too many credit institutions gave mortgage loans to the public. As a result of high demand market was too active in the beginning. Unfortunately, later there was a sharp decline in demand as long as market has been already satisfied and no one wanted to buy estate. Thus, prices of collaterals (estate) significantly fell, losing opportunity for creditors in case of default to sell them in order to reach at least breakeven point leading to substantial losses (Valukas, 2010).

Lehman Brothers began using one of the earnings management techniques from 2001 which was called *Repo 105*. According to the report of the investigator Anton Valukas (2010), the firm used Repo 105 to effectively eliminate \$50 billion of assets off its balance sheet in the second quarter of 2008 which substantially decreased its leverage ratio. So, what was the trick? Repurchase agreement - or repo involves the transfer of assets to another party in exchange for cash, while agreeing to repay money and take back the assets at a later date. In concordance with the report (Valukas, 2010, p.746) “overarching goal of Repo 105 transactions was to meet net balance sheet targets – i.e., reduce the net asset component (the numerator) of the net leverage ratio calculation – in connection with the filing of Lehman’s financial statements. While the examiner found a large number of contemporaneous documents that talk about the use of Repo 105 transactions to manage the balance sheet and meet leverage targets, few, if any, contemporaneous documents describe any other purpose for those transactions. Repo 105 transactions were not used for a business purpose, but instead for an accounting purpose: to reduce Lehman’s publicly reported net leverage and net balance sheet”. According to International Accounting Standards, *IAS 1 Presentation of Financial Statements*, firms should adopt and follow accounting principles and one of them is called substance over form. Substance over form is an accounting concept which means that the economic substance of transactions and events must be recorded in the financial statements rather than just their legal form in order to present a true and fair view of the affairs of the entity. Its concept requires analysis of the financial statements in order exhibit business sense from the transactions and events and to report them in a way that best explains their true essence. Moreover, although legal factors are subject of high importance, in some case they should be

ignored in order to provide more relevant and fair information to the users of financial statements (International Accounting Standards). Applying the principle to Lehman's case, the repurchase agreement is essentially a type of secured loan and not an ordinary sale as the company reported it in its financial statements. As a result, by classifying the deal as a sale, Lehman significantly reduced its leverage, when in reality the transaction should have led to increasing both assets and liabilities. Consequently, even though it was still obliged to repurchase the assets at a later date, assets disappeared from the balance sheet, and it could use the cash it received to temporarily pay down other liabilities. According to the report, cost of the transaction was 5 % as an interest of cash received- hence the name "Repo 105" (Valukas, 2010). Once the new reporting period had started, and the Repo 105 transaction had matured, Lehman borrowed money to repurchase the assets, increasing its leverage ratio back up again and by the end of 2008 the firm was unable to continue this activity and the "bubble" bursted (Valukas, 2010). Thus, cash generated from Repo 105 was misleading for investors and other users of financial statements. According to Dechow (2004) cash component of earnings can be divided into three categories:

- Cash that is retained by the firm;
- Cash applied to the amount of debt financing;
- Cash applied to the amount of equity financing.

He suggests that stock prices tend to reflect real market values when investors are aware of firms' source of cash and its destination which was not the case in Lehman Brothers. Furthermore, "investors overestimate the persistence of earnings that are held within the firm and correctly estimate the persistence of earnings that are distributed to capital providers" (Dechow, 2004, p. 2). Likewise, while cash is one of the most objectively estimated balance sheet items, it is still subject to misstatement and that is why investors may be misled in company's valuation which has high level of cash on its balance sheet. According to Lehman's report, Big 4 audit firm Ernst & Young could also potentially face legal claims for negligence of breach of duty for not revealing Lehman's non-disclosure of the off-balance sheet transactions (Valukas, 2010). Since investors cannot directly observe the underlying true earnings of the firm, they have to rely on reported accounting numbers. To insure the reliability of these reported figures, external auditors must certify that they conform to GAAP. An auditor's "quality" can then be defined as the characteristic leading to greater awareness of reported earnings (Teoh and Wong, 1992). A lot of studies have used various audit quality measures such as audit firm size, audit fees and audit hours to research the effect of audit quality on earnings management. According to DeAngelo (1981), large audit firms with international brand names such as Big Four auditors are likely to provide higher quality audits than non-Big four auditors. Likewise, it is expected lower level of earnings

management in firms audited by Big four auditors. Contrary to the point, Lehman's case was a big exception.

Persakis and Iatridis (2015) found that firms' quality of reported earnings decreases during financial crisis and bad economic conditions. As long as financial crisis is new, there are not many studies exploring its effect on earnings management. Although, there are researches relating to other financial stresses such as Mexican currency crisis of 1994 and Asian crisis. Davis-Friday and Gordon (2005) in Persakis and Iatridis (2015) found that the value relevance of earnings and explanatory power significantly decreased during the Mexican crisis. Furthermore, Graham *et al.* (2000) in Persakis and Iatridis (2015) explored consequences of Asian crisis in Indonesia, South Korea, Malaysia and Thailand. "Their results indicated that the value relevance of earnings in Indonesia and Thailand was significantly reduced during the Asian financial crisis while the value relevance of book value increased" (Persakis and Iatridis, 2015, p.4). When credibility of earnings decreases but book values increase, this logically raises suspicions. Moreover, Iatridis and Dimitras (2013) investigated impact of financial crisis of 2008 on listed firms that are audited by big 4 auditors in Ireland, Greece, Italy, Spain and Portugal as well. They found that Portugal, Italy, and Greece tend to engage more in earnings management with a purpose to improve their lower profitability and liquidity during the financial crisis of 2008, while Ireland is less involved in activity of earnings manipulation.

## 2.4 IFRS and Corporate Governance

According to IFRS and IASB (International Accounting Standards Board), financial statements must reflect a true and fair view. In terms of auditing point of view, true and fair view means that the financial statements are free from material misstatements and faithfully represent the financial performance and position of the company. "True and fair is not something that is merely a separate add-on to accounting standards but rather the whole essence of standards which is aimed to provide guidance for recognition, measurement, presentation and disclosure for specific aspects of financial reporting in a way that reflects economic reality and hence that provides a true and fair view" (FRC, Financial Reporting Council, 2014, p. 3). According to corporate governance and law, preparation of true and fair financial reporting is considered to be responsibility of a director of a firm. For instance, UK Company law requires auditors to verify whether directors implement their responsibility for the reporting true and fair financial information when giving an audit opinion (Company Act, 2006). This approach is considered as a recommended practice for all countries and thus to Portugal as well. Corporate governance is the system of rules, practices and processes by which a company is directed and

controlled. Likewise, “good corporate governance practices proposed by various independent bodies do not only reduce the likelihood of fraudulent reporting activities but also reduce likelihood of earnings management, where earnings reports may reflect the desires of management rather than the underlying financial performance of the company” (Chtourou 2001, p. 5).

Following IFRS, firms must reflect true and fair position of their financial performance which includes reporting of liabilities that require forecasting and fair estimation. One of such types of liability is warranty provision. A warranty is “an obligation incurred in connection with the sale of goods or services that may require further performance by the seller after the sale has taken place” (FAS 5, Accounting for Contingencies, p. 9). Warranty liability reports the estimated amount that a company will have to spend to repair or replace a product during its warranty period. The liability amount is recorded at the time of the sale as well as when the expense is reported. The liability will be reduced by the actual expenditures to repair or replace the product.

From marketing point of view, warranty is a perfect tool of companies to insure customers to be protected from failure of a product or its defect. Moreover, “warranties can be a means of signaling product quality by producers when information asymmetry exists between producers and consumers” (Cohen and Zach, 2011, p. 570). This means that warranty overcomes problems of convincing uninformed customers regarding product quality. Likewise, as long as a warranty obligation is subject of future estimation, a question emerges - is it also earnings management tool?

According to Cohen and Zach (2011), the disclosures of warranty expenses and liabilities were voluntary but from the beginning of 2003 firms should report:

- Estimated amount of future payments under the warranty plan (warranty provision);
- Accounting policy and methodology used in determining warranty liabilities;
- A tabular reconciliation of the changes in the warranty liability for the reporting period.

Since firms strive for exceeding certain benchmarks mainly from which are (1) avoiding reporting a loss and (2) avoiding reporting an earnings decrease, they may report lower abnormal warranty expenses and hence lower warranty liability in a balance sheet (Cohen and Zach, 2011). Additionally, “stock market places a smaller negative valuation coefficient on warranty liabilities compared to other reported liabilities” (Cohen and Zach, 2011, p. 600). This means that investors expect that reported warranty liabilities are understated in a balance sheet. Thus, investors perceive each reflected \$1 of warranty liability as  $\$1 + \text{expected volatility of warranty obligation}$ .



Investors analyze company and stock market carefully as long as they are concerned about future dividends of a particular company which defines its stock price. Furthermore, they pay considerable attention to type of law in a country in which they might invest. Likewise, laws differ markedly around the world, thus in different countries they tend to give investors various bundle of rights. “In particular, countries whose legal rules originate in the common law tradition tend to protect investors considerably more than do the countries whose laws originate in the civil law, and especially the French civil law, tradition” (La Porta *et al.*, 1998, p. 33). Besides diversity of law, quality of accounting also differs in different law countries which alarms investors in approaching particular financial reporting and extent of its credibility. According to Rodríguez-Pérez and Hemmen (2010), in contrast to most common-law countries such as the United States, countries from code law institutional framework are associated with higher accounting manipulation. As it was mentioned above, extent of expected future dividends is paramount determinant for an investor in valuation of companies. In concordance with Kasanen *et al.* (1996), earnings management can be induced by the dividend-based target earnings as long as investors tend to have strong preference for stable dividends, which as a result tempts managers to manipulate earnings. Generally, dividends should be distributed out of current or retained earnings. Consequently, “if the unmanaged earnings are lower than earnings needed to pay the target dividend, then the reported earnings are managed upwards for meeting the implicit dividend contract. Second, “if the unmanaged earnings are higher than the earnings needed for the dividend payment, then the reported earnings are managed downwards for tax reasons” (Kasanen *et al.*, 1996, p. 293). In common law, the Companies Act 2006 sets out which profits are available for distribution of dividends and what accounts are required in order to justify a dividend. The act indicates that it is prohibited to pay off dividends from unrealized profits or gains. For instance, unrealized gain can be derived from revaluation of assets or from a winning stock position that remains open. A gain becomes realized once the position is closed for a profit. In other words, unrealized gain is often called a non-cash “paper profit” which means increase in the value of an asset that has not been sold yet (Investopedia). Thus, if a dividend is distributed from such a gain, it is considered illegal. Directors of the companies are responsible for legal and right distribution of dividends while auditors for detection and verification whether a dividend is properly paid off.

Besides dividends, one of the methods for investors to value a particular company’s future financial potential is using financial analysts’ predictions. According to Graham *et al.* (2005) as cited in Fang (2008, p. 246) “managers perceive analysts as one of the most important groups affecting the share price of their corporations”. Thus, in practice, one of the paramount earnings targets that managers strive to achieve is to meet analysts’ forecast indicators. Furthermore, along with training and experience in

finance and substantial industry background knowledge, analysts track corporate financial statements on a regular basis. They usually interact directly with management and raise questions on different aspects of earnings numbers through earnings release conferences (Fang, 2008). Moreover, these analysts, who work for a variety of financial firms and reporting agencies, base their expectations on a variety of sources - previous quarterly or annual reports, current market conditions, as well as the company's own earnings' predictions. Likewise, one of the indicators forecasted by analysts is EPS (earnings per share) of a company which is generally considered to be the most important variable in determining a stock price as long as it serves as an indicator of an organization's profitability. Likewise, it is a portion of a company's profit allocated to each outstanding share of common stock. EPS ratio is calculated as:

$$EPS = \frac{\text{Net Income} - \text{Dividends on Preferred Stock}}{\text{Average Outstanding Shares}}$$

For instance, assume that a firm has a net income of \$10 million. If the company distributes \$2 million as preferred dividends and has 5 million shares for half of the year and 8 million shares for the other half, the EPS would be \$1.23  $((10-2)/6.5)$ . First, the \$2 million is deducted from the net income to get \$8 million, and then a weighted average is taken to find the number of shares outstanding  $(0.5 \times 5m + 0.5 \times 8M = 6.5m)$ . Hribar *et al.* (2006) investigated whether firms use stock repurchases to meet or beat analysts' earnings per share (EPS) forecasts. Stock repurchase is an activity by which a company buys back its own shares from the marketplace, consequently reducing the number of outstanding shares. According to these researchers, stock repurchases are used for manipulating reported EPS toward analysts' EPS forecasts as long as repurchase leads to decreasing of denominator of the EPS formula because for some period of time shares are held for sale (hence, weighted average number decreases). Thus, it is expected that firms with zero earnings surprise do earnings management by manipulating EPS numbers through stock repurchases. "At the same time, stock repurchases are reliably less frequent at the zero earnings surprise benchmark among firms with stock repurchase that decreases reported EPS by one penny or more" (Hribar 2006, p. 25). In practice, earnings surprise occurs when a company's reported quarterly or annual profits are above or below analysts' expectations. Consequently, investors discount the portion of firms' quarterly earnings surprises that are material for financial statements due to the stock repurchase (Hribar *et al.*, 2006).

There are different ways of stock repurchases ([www.financetrain.com](http://www.financetrain.com)):

- **Buy in the open market:** This is the simplest method to acquire shares in the market. In this case, the shares will be purchased directly from the market at the current market price. The senior management of a company can permit to acquire a number of shares in

this way. The method gives opportunity of flexibility as long as a firm is able to choose to buy shares at a suitable time.

- **Repurchase a fixed number of shares at a fixed price:** In this case, the company will offer a fixed price to purchase a fixed number of shares at a fixed price. The price will usually be above the current market value.
- **Dutch auction:** This is almost analogic case of the fixed price purchase, but instead of specifying a fixed price, managers announce a range of prices (minimum and maximum) at which they will accept offers from shareholders. For instance, an offer to buy one million shares in a price range of \$15 to \$20. The different shareholders will then quote the price at which they are willing to sell their shares. After receiving all the bids, the firm will qualify these bids starting from the minimum price and then moving up until it has qualified 1 million shares. If the price at which these one million shares were qualified is \$18, then all these shareholders who bid, 16, 17 and 18, will be paid \$20 per share for their shares. All investors who tendered at prices above the offered price are excluded from the deal, and their shares are returned to them.
- **Repurchase by direct negotiation:** In this way, the firm will settle its price based on negotiation with particular investors and shareholders to acquire shares from them but the price usually is higher than current market price.

## 2.5 Ethics in accounting profession

All of the earnings management techniques mentioned above raises a lot of doubts and questions regarding certain financial statements and overall accounting system in finance. Due to the diverse range of accounting services and recent corporate collapses, attention has been drawn to ethical standards accepted within the accounting profession. Based on the information referred earlier, it can be concluded that the nature of the work carried out by accountants and auditors requires a high level of ethics. Investors, shareholders and other various users rely on accountants' work in terms of financial statements which they prepare and on auditors who must verify and give an audit opinion whether a firm reported true and fair view. Thus, they must have high responsibility in acting within their profession. Elias (2002) conducted a study in order to examine the ethical perceptions of selected earnings management actions among practicing accountants. According to this researcher, in terms of ethics

individuals are divided by two categories: relativists and idealists. “High idealists believe that moral actions should and do have positive consequences and that it is always wrong to pursue a course of action that will harm others (Forsyth, 1980 in Elias 2002, p. 36). Hence, it is expected that “High idealists will judge earnings management actions more harshly than low idealists” (Elias 2002, p. 36).

IFAC (International Federation of Accountants) provides code of ethics for professional accountants whose mission is to strengthen the worldwide accountancy profession and contribute to the development of high quality professional standards. In concordance with code of ethics, a professional accountant is required to comply with the following fundamental principles (IFAC):

- **Integrity.** A professional accountant should be straightforward and honest in all professional and business relationships.
- **Objectivity.** A professional accountant should not allow bias, conflict of interest or undue influence of others to override professional or business judgments.
- **Professional Competence and Due Care.** A professional accountant has a continuing duty to maintain professional knowledge and skill at the level required to ensure that a client or employer receives competent professional service based on current developments in practice, legislation and techniques. A professional accountant should act diligently and in accordance with applicable technical and professional standards when providing professional services.
- **Confidentiality.** A professional accountant should respect the confidentiality of information acquired as a result of professional and business relationships and should not disclose any such information to third parties without proper and specific authority unless there is a legal or professional right or duty to disclose. Confidential information acquired as a result of professional and business relationships should not be used for the personal advantage of the professional accountant or third parties.
- **Professional Behavior.** A professional accountant should comply with relevant laws and regulations and should avoid any action that discredits the profession.

### 3. Hypotheses development

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Findings suggest that, in general, the earnings quality decreases during the financial crisis (Persakis and Iatridis, 2015). Hence, it indicates that earnings management during this period is increased which is induced by such factors as skeptical investors, banks and other creditors. When firms encounter difficult times, they strive for avoiding negative losses in order to avoid negative perception of their various stakeholders about their going concern. In this way, financial crisis is the most difficult period for all companies which gives rise to suspicion about the credibility of their financial reports.

Beneish (1999) model suggests several indexes which can signal for manipulation of financial statements while comparing them with previous year's results of the same variables. According to Beneish (1999, p. 34) "the evidence suggests that accounting data not only meet the test of providing useful information, but they also enable an assessment of the reliability of the reporting". In this way, the model distinguishes manipulated from non-manipulated reporting which includes following variables:

**Days' sales in receivables index.** The DSRI is a measure of the average number of days that a company takes to collect revenue after a sale of goods or service has been made. It is calculated dividing receivables by total credit sales and multiplying by number of days (if the ratio is calculated for year-365 days, if for a month the relevant number of days of that month is used). For example, assume that during the month of April, a firm made a total of \$400,000 in credit sales and at the end of the month had \$300,000 in accounts receivable. There are 30 days in April, so the company's receivables' days for April can be calculated as:

$$(\$300,000/\$400,000) * 30 = 22.5 \text{ days}$$

The ratio measures liquidity of receivables, in other words indicates average period that company needs to convert receivables into cash. What qualifies as a high or low ratio may often vary depending on business type and structure of the firm. For instance, those entities dealing with ultimate customers (individuals who do not in turn re-sell the things bought but either passes them to the consumer or actually is the consumer) are paid immediately right after the sale and hence do not have high receivables in their balance sheets compared to other types of business sector. Furthermore, it should be highlighted that due to the high importance of cash in running a business, it is in a company's best interest to collect outstanding receivables as quickly as possible in order to avoid cash flow

problems. On the other hand, the receivables item in balance sheet corresponds to accrual sales in income statement which in turn affects earnings before interest and tax and respectively net profit. Moreover, according to Beneish's (1999) model, if the collecting period is increased compared to previous year, this may indicate to a firm's change in credit policy, but unreasonable disproportionate increases in receivables could suggest revenue inflation. Thus, it is expected that large increase in the DSRI is correlated with higher probability that income and earnings are manipulated. Taking into consideration that in the period of the financial crisis companies struggle with more difficulties and the probability of manipulation increases (Persakis and Iatridis, 2015), the first hypothesis is established:

**H1.** Firms abnormally inflate revenue via credit sales accruals to increase earnings especially during and after financial crisis.

**Asset quality index (AQI).** Asset quality is measured as the ratio of non-current assets other than plant, property and equipment to total assets, versus prior year. According to Beneish (1999), this measures the proportion of total assets for which future benefits are less certain (that is why property plant and equipment are eliminated, because they are one of the certain sources of generating income) and if it considerably increases it may be a possible sign of improper capitalization of expenses and cost deferral. When cost is deferred, by incorrect capitalization, it means that assets are illegally increased, and cost is delayed which is going to be recognized as depreciation by that incorrect capitalization part during several years instead of being recognized as an expense in the year incurred. In this way, if the AQI ratio of current year divided by the previous year one is greater than 1, the company potentially increased its commitment in cost deferral (Beneish, 1999). The decision to capitalize or expense some items depends on the senior management of the firm. Consequently, this choice will have an impact on a company's balance sheet, income statement and cash flow report.

In terms of profitability, in a short term perspective, a company that manipulates costs for capitalization will have a higher profitability than it would have had if it expensed them. As a result, net income is manipulated and increased.

In terms of cash flow statement, improper capitalization effects reported cash flow from operations and cash flow from investing. If a company exhibits its cost as expenses it will be reported in cash flow from operations while capitalization will be included in cash flow from investing (lower investment cash flow and higher cash flow from operations). On the other hand, there are items that

usually are expensed in Income statement, but in a specific situation should be capitalized. For example, interest cost which is usually cost of the period in which it is incurred and accrued, must be capitalized if the loan on which interest is paid, is intended to be used for construction of the asset. This issue is regulated by IAS 23, *Borrowing costs*, which requires that borrowing costs directly attributable to the acquisition, construction or production of a 'qualifying asset' (one that necessarily takes a substantial period of time to be constructed for its intended use or sale) are included in the cost of the asset. The rest of the borrowing costs are recognized as an expense. A qualifying asset is an asset that takes a substantial period of time to get ready for its intended use or sale. For instance, it could be property, plant, and equipment and investment property during the construction period. Consequently, capitalized interest costs in a cash flow statement will be classified as cash flow from investing and not from operations.

In terms of financial ratios, a company that capitalizes its costs will exhibit higher profitability ratios in the beginning and lower ratios in later years. Operation-efficiency ratios such as total asset and fixed-asset turnover will be lower under the capitalization method, due to higher reported fixed assets. Moreover, at the onset, equity turnover will be higher under the capitalization method (lower total equity due to lower net profit). Companies that capitalize their costs will initially report higher net income, lower equity and higher total assets. On average, Return on equity (ROE) will initially be higher for capitalizing firms. Solvency ratios are better for firms that capitalize their costs because they have higher assets, earnings before interest and tax (EBIT) and shareholders' equity (Investopedia). In this way, cost deferral is considered as earnings management tool which can be used with higher intensity during and after financial crisis due to the reasons referred earlier, hence:

**H2.** Firms abnormally inflate revenue via improper capitalization to increase earnings especially during and after financial crisis.

**Depreciation** is an important component of an accrual-based accounting. It is the process by which a company allocates an asset's cost over the duration of its useful life. According to Knivsfly *et al.* (1998, p. 5) "the depreciation recognized for a specific accounting period can be interpreted either as a measure or approximation of fixed asset services consumed in that period, or the measure of the cost of fixed asset services consumed in a typical accounting period, given the firm's depreciable assets". Each time a company prepares its financial statements, it records a depreciation expense to allocate a portion

of the cost of the buildings, machines or equipment it has purchased to the current fiscal year. The purpose of recording depreciation as an expense is to spread the initial price of the asset over its useful life. For intangible assets - such as brands and intellectual property - this process of allocating costs over time is called amortization (Investopedia). There are different methods of charging the depreciation expense and firms are free to choose which one to use for calculating depreciation for their financial statements. Most common methods of depreciation are:

- **Straight-line method** - This takes an estimated scrap value of the asset at the end of its life and subtracts it from its original cost. This result is then divided by management's estimate of the number of useful years of the asset. The company expenses the same amount of depreciation each year. The formula for the straight-line method is:

$$\text{Straight line depreciation} = \frac{\text{Original cost of asset} - \text{Scrap Value}}{\text{Estimated asset life}}$$

- **Accelerated Method** - This method writes-off depreciation costs more rapidly than the straight-line method. Usually, this method is used with an aim to minimize taxable income for paying less tax (income tax). This is a popular method for achieving this goal, which essentially doubles the rate of depreciation of the straight-line method. The formula for double declining depreciation is:

$$\text{Accelerated depreciation} = 2 \times \frac{\text{Original cost of asset} - \text{Scrap Value}}{\text{Estimated asset life}}$$

- **Declining balance method** is a common depreciation-calculation system that involves applying the depreciation rate against the non-depreciated balance. Instead of spreading the cost of the asset evenly over its life, this system expenses the asset at a constant rate, which results in declining depreciation charges each successive period. The formula for declining method of depreciation is:

$$\text{Declining balance method} = \frac{\text{Net Book Value of Asset} - \text{Scrap Value}}{\text{Estimated asset life}}$$

Or



*Declining balance method = (Net Book Value – Scrap Value) X depreciation rate*

For instance, if an asset's original value is \$1000, scrap value is 0, and it has 5 year of estimated useful life, first year's depreciation will be  $\$1000/5 = \$200$ , but the second year's depreciation will be  $(1000-200)/5 = \$160$  under declining or reducing balance method of depreciation. In other words, 5 years of useful life means that the depreciation rate is 20%, as long as the denominator in the formula is 5 (5 years).

Depreciation index is calculated as a ratio of depreciation of current and previous years' rates (Beneish, 2010). If current year's ratio is substantially lower than previous one it indicates that the rate by which assets were depreciated has slowed. Thus, it can be a sign of management's intervening in altering (increasing) estimates of assets' useful lives which leads to decreasing costs and increasing income. In this way, "if managers change depreciation policies in the face of poor performance, then the poorer the performance, the higher the impact of the policy change used" (Zimmerman, 1999, p.2). Moreover, according to this researcher empirical evidence indicates that method changes have, on average, a relatively small effect on depreciation expense and earnings, partly because many method changes are applied only to new assets. Consequently, in order to accomplish a desired change in depreciation expense, earnings or book values, managers more likely prefer estimate revisions over method changes (Zimmerman, 1999). Similarly, the technique might be applied more actively for reflecting better position and easing financial problems which was undergone by companies during financial stress. Therefore it is expected correlation between the depreciation and the probability of manipulation. Hence, the third hypothesis naturally follows:

**H3.** Firms abnormally inflate revenue via decreasing of depreciation charge to increase earnings especially during and after financial crisis.

**Leverage index.** Generally, leverage ratio exhibits how much of a company's assets are financed from loan or other credit source. Leverage ratio is a very important indicator of a company's financial health. Too high leverage ratio can be dangerous for a company and its investors, because it is one of the paramount indicators estimating companies' going concern. Furthermore, "companies with high debt are at risk of bankruptcy due to failure in settling their external financing which

subsequently may put them in another future risk of not being able to find other new lenders” (Zamri *et al* 2013, p. 88). There are several different specific ratios that may be categorized as a leverage ratio, but the main factors considered include debt, equity, assets and interest expenses. Most common leverage ratios are calculated as:

$$\text{Leverage ratio} = \frac{\text{Debt}}{\text{Equity}}$$

Or

$$\text{Leverage ratio} = \frac{\text{Total Assets}}{\text{Equity}}$$

According to Sweeny (1994) in Zamri (1994, p. 88) “the larger a firm’s debt to equity ratio, the more likely the firm’s manager is to select income increasing accounting procedures”. In this way, analyzing the formulas above, it can be concluded that leverage can be manipulated (decreased) by removing assets through assets disposal like it was done by the Lehman Brothers (the less the assets in the numerator the less the ratio) or increasing equity (the more the equity in the denominator the less the ratio) which can be achieved by inflating revenues since companies must present their lenders and investors good results. Specifically, companies highly needed gaining credit during and after financial crisis as long as they were in hard economic conditions. Hence, we expect:

**H4.** Firms manipulate leverage ratio via inflating revenues and deflating expenses especially during and after financial crisis.

**Total accruals to total assets (TATA).** Basically, “accruals can be either a reflection of earnings manipulation or just normal accounting estimations based on future business expectations” (Investopedia). This ratio analyzes and evaluates quality of reported revenue as long as it reflects percentage of earnings in terms of liquidity. Furthermore, there is evidence that the size of accruals can be used as a rough measure for earnings manipulation, especially in high-accrual firms (Investopedia). The ratio is calculated:

$$TATA = \frac{\text{Income from Continuing Operations} - \text{Cash Flows from Operations}}{\text{Total Assets}}$$

From the formula it can be concluded, in order to evaluate net accruals it should be taken reported earnings produced with accrual accounting during the period and subtract the cash earnings during the period. The ratio takes part of the operating income which is not collected yet and compared to total assets, receiving ratio showing quality of reported revenue. The higher the ratio, the more is probability of earnings management, which is expected to be higher during and after financial crisis as long as firms in this period try to improve their positions through high accruals. Hence:

**H5.** Earnings manipulator firms' TATA ratio is higher than normal especially during and after financial crisis due to revenue inflation.

**Gross profit margin & sales and administrative expenses.** “Gross profit margin is a financial metric used to assess a firm's financial health by revealing the proportion of money left over from revenues after accounting for the cost of goods sold” (Investopedia). It measures financial health position of a company in terms of revenue and direct costs associated with producing or acquiring the inventory or services without taking into consideration sales and administrative expenses. Gross profit is amount which is achieved by a company after deducting cost of goods from revenue. In this way, gross profit margin in percentage is calculated as:

$$\text{Gross profit margin} = \frac{\text{Revenue} - \text{Cost of goods sold}}{\text{Revenue}}$$

For example, if a company has revenue of 10 million and 6 million expense attributable to cost of goods sold, the company's gross profit margin would be  $(10 - 6) / 10 = 40\%$ . Consequently, this means that for every dollar that this company generates in revenue, it really has only \$0.40 at the end of the day, which is further deducted by overheads. Moreover, gross margin ratio is not an exact evaluation of the firm's pricing strategy but it does give a good indication of financial health. If a company's gross margin deteriorates, it will be unable to pay its operating and other expenses for everyday activity. In general, a company's gross profit margin should be stable, desirably growing from

year to year. It should not fluctuate much from one period to another, unless the industry it is in has been undergoing drastic changes which will affect the costs of goods sold or pricing policies (Investopedia). From analytical point of view, if a company's gross margin ratio increases, but net profit is increased considerably at lower percentage compared to gross profit, if not manipulation, it means that the company probably has problems with controlling its overheads. For example, let's say a company's gross profit increased from 20% to 40%, when net profit increased only by 3%, this signals about poor management from managerial point of view in condition of absence of earnings manipulation. In the same situation, a company which is a manipulator may deflate overhead expenses in order to keep net profit higher which is proportionate with gross profit and sales growth. In this way, Beneish (1999) suggested that disproportionate increase of sale and administrative expenses compared to sales may indicate trace of manipulation. In this way, as it was referred earlier, companies may apply more intensively accounting gimmicks during financial stress to inflate income and deflate expenses which leads to higher disproportionate changes between the two. If sales are increased by let's say 30% (and respectively net profit is also increased by a particular rate), when sales expenses are increased by only 5%, that may be result of earnings management. Hence:

**H6.** Earnings manipulator firms have disproportionate increase of net profit and sales expenses especially during and after financial crisis.

## 4. Sample, Variables and Empirical Model

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### 4.1 Sample

The sample consists of Portuguese and UK listed firms' financial data from 2003 till 2014. As it was referred earlier, these countries were chosen with a purpose to compare extent of earnings management in different cultures and regions with different legal forces and law. According to La Porta *et al.* (1998, p.2) "common law countries generally have the strongest, and French civil law countries the weakest, legal protections of investors, with German and Scandinavian civil law countries located in the middle". As a consequence, quality of accounting in UK might be higher than in Portugal. The samples differ mainly in size as long as in the UK sample there are 358 firms with 3939 observations and 56 firms and 618 observations in the Portuguese sample. Moreover, the dimension of the firms (measured by natural logarithm of total assets) confirms statistical difference as it is shown in table 1 below:

**Table 1: Dimension of samples**

	<b>Portugal</b>	<b>UK</b>
Size	12.04746181	9.550445505
T-test		0*

Size is measured as the natural logarithmic of total assets. T-test is the Student's t-test.

\*significance level of <1%, \*\* <5% and \*\*\* <10%

The analyzed period is 10 years from 2004 till 2014 and year 2003 was used for calculating some ratios for the year 2004, as long as they need previous year data to be calculated. We also split the sample period in two: before 2008 was analyzed separately for each of the samples in order to compare it with the results of the rest of the years (after 2008) with a goal to detect whether financial crisis impacts firms to engage in activity of earnings management. Generally, the results indicate that earnings management increases by a particular rate for both countries as the world undergoes financial crisis (Persakis and Iatridis, 2015). Moreover, it should be admitted that financial crisis began in early 2006 followed with collapse of Lehman Brothers Bank in the USA in 2008 when the subprime mortgage market in the U.S. began to display an increasing rate of mortgage defaults. Furthermore, in 2008 Banco

Português de Negócios (November) and Banco Privado Português (December) were also collapsed due to the crisis. Consequently, Portugal underwent public deficit in 2010 and in April, 2011 Portugal asked Troika's help to deal with the issue. Although, it seems that the financial crisis is over, in 2014 another Portuguese bank - Banco Espírito Santo also collapsed. In the UK, the Bradford and Bingley Building Society was effectively nationalized in late 2008 and then partially sold to the Spanish Grupo Santander Bank. Also late in 2008 the UK Government partially nationalized the struggling Royal Bank of Scotland Group, initially taking a 58% stake, but eventually by late 2009 raising this to 84%. The UK Government also effectively forced the UK's largest mortgage lender, Halifax Bank of Scotland (HBOS), which was in deep trouble, into the Lloyds TSB group and, in January 2009, took a 43.4% stake in the combined business. Other UK banks, such as Barclays and HSBC, although not nationalized, were forced to raise capital by new share issues to preserve their capital ratios. In summary both countries were influenced by crisis, but as long as UK money market involves higher financial flows in terms of size, it underwent stronger impact than Portugal.

## 4.2 Definition of variables

The information was obtained from a DataStream database in the University of Coimbra. The following financial data of Portuguese and UK listed firms was extracted from the database:

- Receivables
- Receivables' days
- Total assets
- Current assets
- Depreciation
- Net profit
- Sales revenue
- Cost of Sales
- Property, plant and Equipment
- Total debt

Based on the information gained from the database, the following ratios were calculated:

**Receivables' days index (DSRI)** – is calculated as receivables days of a current year divided by the previous year's data. If the ratio is more than 1, it means that the collecting period increased, indicating suspicion about credit policy of the firm.

**Asset Quality index Ratio (AQI)** – the ratio is measured as the ratio of non-current assets other than plant, property and equipment to total assets, versus prior year. There are two ways of calculating the ratio:

- 1)  $AQI = \frac{1 - (Current\ Assets + PP\&E + Securities)}{Total\ Assets}$  compared to the previous year's indicator
- 2)  $AQI = \frac{(Non - Current\ Assets - PP\&E)}{Total\ Assets}$  versus prior year

As long as there was not available information about securities, it was more optimal to use the second formula, by only calculating additionally non-current assets by deducting total assets by current ones which were both available. If the ratio is more than 1, it indicates that capitalization policy of the firm might have changed, which in turn may be manipulation of expenses.

**Depreciation Index (DEPI)** - is the ratio of the previous year's depreciation rate to the current one. Furthermore, depreciation rate is calculated by the ratio of current year's depreciation divided by sum of net depreciable non-current assets plus current year's depreciation.

$$Depreciation\ rate = \frac{Current\ year's\ dep'n\ charge}{Current\ year's\ dep'n\ charge + PP\&E}$$

The ratio measures whether the firm tries to defer depreciation expense either through changing its policy or altering non-current assets' useful lives which are subject of depreciation. In this case, as long as in the denominator is previous year data, when it decreases, it gives suspicion of manipulation (rate of depreciation slowed).

**Leverage (LVGI)** – is calculated as total debt to total assets which measures financial risk of the firm and indicates percentage from which total assets are financed through loans or other financial liabilities. Manipulator firms strive for maintaining lower leverage indicator in order to have impact on decisions of banks and investors.

**Total Accruals / Total Assets (TATA)** – is calculated by ratio of operating income which is not paid by customers and other debtors yet to total assets indicating percentage of total assets which

are financed through only accrued revenue and not collected yet. Higher ratio represents less quality of assets as long as they are not supported by real currency or by other assets which are more liquid than accruals. For the purpose of calculating the ratio, receivables were used as a denominator as long as receivables represent accrued revenue at the end of the accounting period.

**Gross Margin Index (GMI)** –is calculated as a ratio of gross margin of previous year to current one. It measures change of gross profit level indicating effectiveness or poor management of production in a firm. Although gross profit was not provided by the database, there was cost of goods available which gave opportunity to calculate gross profit by deducting it from sales. Onwards, gross margins were calculated as ratio of gross profit to sales. When gross margin index increases, it means sales revenue increased or cost of goods decreased either because of optimization of production (less costs with the same efficiency) or manipulation of expenses.

**Sales growth (SGI)** – is calculated as a ratio of current revenue to prior year’s one measuring sales’ change. “Growth does not imply manipulation, but growth companies are viewed by professionals as more likely than other companies to commit financial statement fraud, because their financial positions and capital needs put pressure on managers to achieve earnings targets” (Beneish 1999, p. 27).

**Sales and administrative expenses (SGAI)** – is calculated as ratio of sales, general, and administrative expenses to sales in a current year relative to the corresponding measure in a prior year. If the ratio is changed dramatically it indicates probability of disproportionate change thus causing suspicion. To Portugal, due to the lack of sufficient information, this variable was not possible to use. The ratio should be compared to sales revenue and profit changes whether there are logical changes in them. If there are significant differences between them, it should be explained and analyzed for further verification.

All calculations are present in excel files (for each Portuguese and UK samples) as an attachments in CD disc. All extracted data from DataStream is present in the excel files separately on different sheets with relevant names. In both samples, some values were changed to zero which were inadequate. For example, for the variable receivables days, the database extracted very high values (10,000 and even more days) which is not adequate. Receivables’ days is calculated as receivables divided by sales and multiplied by 365 days. Hence, it is apparent that if the receivables’ days are more than 365 that means that a company does not collect cash for an year, but it’s almost impossible to survive for a firm without cash even one accounting period. In this way, when the ratios were calculated, in order to get maximally precise results, for some variables’ zero values were replaced by



an average result of the particular ratio. Furthermore, some of the ratios are not calculated for 2003 year as long as it was needed previous year's data for their calculation, thus analysis period is from 2004 year. Onwards, we made principal statistics of the variables (panel A) and the correlation matrix (panel B) which is provided in the table 2 to Portugal and table 3 to UK.

**Table 2: Summary Statistics to Portugal**

<b>Panel A: Descriptive Statistics</b>									
	<b>M_SCORE</b>	<b>NET_PROFIT</b>	<b>DSRI</b>	<b>AQI</b>	<b>DEPI</b>	<b>GMI</b>	<b>LEVERAGE</b>	<b>SGI</b>	<b>TATA</b>
<b>Mean</b>	-0.39741	69738.06	0.775788	7.037965	0.926005	1.640667	0.372148	0.038632	0.169730
<b>Median</b>	-3.06145	3910.000	0.919877	0.998251	0.971830	1.060851	0.385745	0.007315	0.128234
<b>Maximum</b>	1379.680	5672200.	10.66292	3422.398	5.412296	91.84709	1.504635	6.210526	0.806927
<b>Minimum</b>	-4.96209	-1219053	0.000000	0.000000	0.000000	-1.75076	0.000000	-1	0.000000
<b>Std.Dev.</b>	55.89789	299928.5	0.666156	138.1354	0.526749	5.524740	0.226393	0.365348	0.154705
<b>Skew.</b>	24.49832	11.12407	5.595826	24.60239	2.049525	14.01415	0.510432	7.751234	1.238372
<b>Kurtosis</b>	605.1603	201.1408	82.16236	608.6439	19.61438	215.0535	4.591963	135.1965	4.747923
<b>Jarque-Bera</b>	9368275.	1020372.	164059.6	9476791.	7516.224	1174308.	91.79712	454717.1	235.8636
	*	*	*	*	*	*	*	*	*

<b>Panel B Correlation Matrix</b>									
	<b>M_SCORE</b>	<b>NET_PROFIT</b>	<b>DSRI</b>	<b>AQI</b>	<b>DEPI</b>	<b>GMI</b>	<b>LEVERAGE</b>	<b>SGI</b>	<b>TATA</b>
<b>M_SCORE</b>	1								
<b>NET_PROFIT</b>	-0.010208	1							
<b>DSRI</b>	0.026363	0.020216	1						
<b>AQI</b>	0.998567 *	-0.009201	0.017	1					
<b>DEPI</b>	0.005284	0.010671	0.342663 *	0.001517	1				
<b>GMI</b>	0.050268	-0.031749	-0.014848	-0.00193	-0.014291	1			
<b>LEVERAGE</b>	-0.061223	0.046142	0.196278 *	-0.062864	0.347205 *	0.005579	1		
<b>SGI</b>	0.010762	0.079354 **	-0.155955 *	0.004885	0.022984	0.033523	0.00741	1	
<b>TATA</b>	0.040367	-0.098693 **	0.285604 *	0.035775	0.171457 *	0.015983	0.027081	0.091779	1

M-Score is calculated according to Beneish Model. Net profit is firm's net income. DSRI is receivables' days. AQI is asset quality index. DEPI is depreciation index. GMI is gross margin index. SGI is sales growth index. TATA is total accruals to total assets. \* Significance level of 1%, \*\* 5% and \*\*\* 10%

Table 2 presents the summary statistics of the variables presented before for Portugal. Panel A shows descriptive statistics: mean, maximum, minimum, standard deviation, skewness and kurtosis, and Jarque-Bera. Panel B shows the correlation coefficients and its statistical significance. Analyzing this table the following facts emerge. M-score is negative and greater than -2.22 (in mean) which suggest that some Portuguese firms manipulate their results. Net profit is in mean positive but there are huge differences among the sample with a minimum value of -1,219,053€ and a maximum value of 5,672,200€. DSRI is less than 1 (in mean) which suggests that firms don't manipulate by extending credit terms in order to boost receivables. AQI is around 7 which is more than 1 indicating manipulation of improper capitalization of costs. Mean of DEPI is less than 1 indicating manipulation of depreciation rates. GMI in mean is more than 1 indicating that gross margins have deteriorated. Deterioration of gross margin is a negative signal about a company's prospects. In this way, companies with poorer prospects are more likely to engage in earnings manipulation. Leverage is less than 1 in mean which suggests that firms are not highly leveraged. SGI is less than 1 in mean indicating that there is not stable growth in sales. Mean of TATA less than 1 indicating normal level of accruals in earnings and thus, less suspect of manipulation.

In regards to the correlation matrix, only AQI ratio is significant to explain M-score, the others ratios do not present statistical significance, SGI and TATA ratios are significant to explain net profit. None of the other variables are highly correlated.

**Table 3: Summary Statistics to UK**

<b>Panel A: Descriptive Statistics</b>										
	<b>M_SCORE</b>	<b>NET_PROFIT</b>	<b>DSRI</b>	<b>AQI</b>	<b>DEPI</b>	<b>GMI</b>	<b>LEVERAGE</b>	<b>SGI</b>	<b>TATA</b>	<b>SGAI</b>
<b>Mean</b>	0.022428	112347.9	1.088023	5.191493	1.066165	1.370936	1.63004	1.209601	0.189251	1.502642
<b>Median</b>	-2.405714	212.5	1.08	0.944808	0.946294	1.05	0.300334	0.0158	0.1909	1.275476
<b>Maximum</b>	2764.949	10438832	22.3494	6843.887	506.6667	862.7639	3134	1252.636	1	303.433
<b>Minimum</b>	-1026.913	-23541000	-8	-197.8093	-185.946	-22.02731	5.42E-05	-1	6.52E-05	-57.9291
<b>Std. Dev.</b>	67.32258	786318.2	0.665038	143.4139	9.813244	14.23844	50.30829	26.9458	0.137966	6.591897
<b>Skewness</b>	27.25689	-2.059485	14.31436	43.03831	38.93118	56.95115	61.4142	37.7581	1.637471	33.42105
<b>Kurtosis</b>	1095.095	265.3395	379.8033	1916.552	1990.83	3411.497	3819.049	1558.64	7.943999	1335.033
<b>Jarque-Bera</b>	196000000	11295333	23431151	602000000	6490000	191000000	2390000000	39800000	5770.542	2920000
	*	*	*	*	*	*	*	*	*	*
<b>Panel B Correlation Matrix</b>										
	<b>M_SCORE</b>	<b>NET_PROFIT</b>	<b>DSRI</b>	<b>AQI</b>	<b>DEPI</b>	<b>GMI</b>	<b>LEVERAGE</b>	<b>SGI</b>	<b>TATA</b>	<b>SGAI</b>
<b>M_SCORE</b>	1									
<b>NET_PROFIT</b>	-0.002588	1								
<b>DSRI</b>	0.004186	-0.000203	1							
<b>AQI</b>	0.858335 *	-0.00124	-0.007292	1						
<b>DEPI</b>	0.011954	-0.001473	0.01701	0.000554	1					
<b>GMI</b>	0.13197*	-0.003531	-0.003301	-0.001915	-0.001986	1				
<b>LEVERAGE</b>	-0.245071 *	-0.003736	-0.026388	-0.000682	-0.002447	-0.000551	1			
<b>SGI</b>	0.363723 *	-0.005995	-0.011182	0.0000809	-0.015584	0.061272 *	-0.000746	1		
<b>TATA</b>	0.023156	-0.04873 *	0.033372 **	0.037989 *	-0.022857	-0.02129	0.036025 **	-0.0323 **	1	
<b>SGAI</b>	0.120221 *	-0.002335	0.02834 ***	0.161225 *	0.002679	-0.00556	-0.002429	-0.004926	-0.038242	1

M-Score is calculated according to Beneish Model. Net profit is firm's net income. DSRI is receivables' days. AQI is asset quality index. DEPI is depreciation index. GMI is gross margin index. SGI is sales growth index. TATA is total accruals to total assets. SGAI is sales and general administrative expenses index. \*Significance level of 1%, \*\* 5% and \*\*\* 10%

Table 3 presents the summary statistics of the variables for the UK with the same data and panels A and B as in table 2. Analyzing this table it can be told that mean of M-score greater than -2.22 indicating manipulation behavior of the UK firms. Mean of net profit is positive but too volatile, ranging between -23,541,000€ to 10,438,832€, while DSRI is in mean more than 1, suggesting that firms manipulate credit policy for boosting receivables and respectively sales. AQI's mean is around 5 indicating manipulation of capitalization policy. DEPI's mean is more than 1 suggesting that firms don't manipulate earnings through depreciation policies or rates. GMI is more than indicating the same suspect of manipulation as in the previous sample. Leverage's mean is more than 1 indicating vulnerability of financial health of the firms in terms of risk of credit defaults. SGI in mean is more than 1 indicating sales growth thus, suspect of manipulation. TATA's mean less than 1 suggesting good quality of earnings and less suspect of earnings management. SGAI's mean is more than 1, indicating that sales and administrative expenses increased, this should be compared to net profit variation, in order to see if there is disproportionate increase of net profit compared to one of expenses which would signal about manipulation.

In regards to the correlation matrix, AQI, GMI, Leverage, SGI and SGAI are significant to explain M-score, the others ratios do not present statistical significance. AQI is positively correlated with M-score, which is consistent with model; as long as the higher is AQI the greater is M-score which means higher probability of manipulation. GMI is also positively correlated but not strongly, although positive correlation is also consistent with the model. On the other hand, leverage is negatively correlated with M-score, suggesting that higher leverage means less manipulation (less M-score). Contrary, the model suggests that high leverage firms try to manipulate leverage level to push it down to give less risky impression to lenders. SGI is positively correlated which is logical, higher sales growth raises suspicion about manipulation and M-score increases. TATA and SGAI are also positively correlated but weakly, although positive correlation is according to the model's proposal. Moreover, TATA ratio is significant to explain net profit.

In comparison, the mean of DSRI of UK is higher than 1 where as in Portugal it is less, suggesting real activity manipulation in UK (extending credit terms or discount promotions for increasing sales and respectively receivables). Mean of the AQI in both samples are more than 1 suggesting improper capitalization manipulation in terms of decreasing costs. Mean of DEPI is less than 1 in Portugal suggesting manipulation of depreciation rates whereas in UK it's more than 1 which means opposite. Leverage indicators show that UK firms have higher leveraged business than in

Portugal. Moreover, M-score is explained by AQI, GMI, Leverage, SGI and SGAI in UK while to Portugal only AQI is statistically relevant to explain M-Score.

### 4.3 Empirical Model

After making calculations of all ratios for all years it was possible to apply Beneish (1999) model. Beneish M-score aims to detect firms which are likely to manipulate their financial statements. The higher M-score, the higher is likelihood of manipulating results. However, the model is a mathematical probabilistic model that uses financial ratios and eight variables; thus, it will not detect manipulators with 100% accuracy. Based on the eight ratios described, the formula for calculating M-score is:

$$M - score_{it} = -4.840 + 0.920 \times DSRI_{it} + 0.528 \times GMI_{it} + 0.404 \times AQI_{it} + 0.892 \times SGI_{it} + 0.115 \times DEPI_{it} - 0.172 \times SGAI_{it} - 0.327 \times LVGI_{it} + 4.697 \times TATA_{it}$$

Where "i" represents the individual companies and "t" the year. This model is calculated per year and company in excel.

An M-score greater than -2.22 indicates a high probability of earnings manipulation. In order to compensate absence of one of the negative variables (SGAI) and some missing information in Leverage (negative as well), and M-score to be maximally precise and fair, one of the positive variables (TATA) was not used in calculation of M-score to Portugal.

We also analyzed impact of absolute net profit for each ratio in order to see whether firms manipulate ratios (DSRI, AQI, DEPI, GMI, Leverage, SGI, TATA, SGAI) in order to achieve net profit near zero, ie, to influence the cost of obtained funds or to benefit from tax savings. In this way, if net profit is negative, companies want a positive value to influence perception of creditors. If net profit is positive, firms strive for achieving a value near zero to avoid the payment of income tax. The model that will be analyzed is:

$$Ratio_{it} = \beta_0 + \beta_1 \times Abs.Net Profit_{it} + U_i + V_t + \varepsilon_{it}$$

Where "i" represents the individual companies and "t" the year, "U" and "V" incorporate the fixed effects of the companies (cross-section) and of the years (time series), respectively; "E" represents the error of the model designated as disturbance term.

The model is estimated using the method of least squares (OLS) with fixed effects (according with Hausman test random effect was not an accurate model of estimation), applied to the panel data and admits the existence of fixed, unobservable effects for the companies, individually, and for years.

## 5. Results

### 5.1 Results of the Beneish Model

The Beneish model presented was calculated in excel (M-score) for each year and each firm from 2004 till 2014 (2003 was not calculated for the reason explained above). Results are not presented because are very extensive. Further, it was calculated mean (average) of M-score before 2008 (for years 2004-2007), and mean for the rest of the years (2008-2014). Onwards, it was used a logical test in excel for both categories “=IF (Mean of M-score>-2.22,"manipulator","NOT manipulator)”, giving results and opportunity to compare periods before and after 2008 year. Results are presented in table 4.

**Table 4 : Manipulators and Non-manipulators**

	Portugal				UK			
	Manipulators		Non-Manipulators		Manipulators		Non-Manipulators	
	Number of firms	%	Number of firms	%	Number of firms	%	Number of firms	%
<b>Total Sample</b>	8	14.29%	48	85.71%	183	51.12%	175	48.88%
<b>Before Crisis</b>	3	5.36%	53	94.64%	155	43.30%	203	56.70%
<b>With Crisis</b>	9	16.07%	47	83.93%	187	52.23%	171	47.77%
<b>T-Test</b>	16.72%				26.30%			

Firms are classified as manipulators if M-Score of Beneish is greater than -2.22 and non-manipulators otherwise. Before crisis includes the years 2004-2007, and with crisis 2008-2014. T-test is the Student's t-test to see if the difference in results before and with crisis is statistically significant.

From the total sample in Portugal there are 8 manipulating firms out of 56 and 183 out of 358 firms in the UK, representing 14.29 % and 51.12 % respectively. If taking into account crisis period,



from the total Portuguese sample there are 5% and 16% manipulators before and after crisis respectively. This result is similar with those of Iatridis and Dimitras (2013) that suggest that listed firms manipulate more results during financial crisis. In the UK there are 43% and 52% manipulator firms respectively.

The table above shows that manipulation is increased by around 20% (155/187 \*100%) after beginning of financial crisis 2008 in the UK. On the other hand, in terms of percentage, manipulation is increased by 200% in Portugal, but in terms of number of companies from 3 to 9 firms. The T-test was conducted of average M-scores of before and after 2008, which concludes that although results suggest difference before and after financial crisis, it is not statistically significant, contrary to our expectations.

Table 5 present the number of manipulators and non-manipulators per year and per country, and the difference between both countries.

**Table 5: Manipulators and non-manipulators per year**

Year	Manipulators		Non-Manipulators	
	Portugal	UK	Portugal	UK
2004	6	117	50	241
2005	4	134	52	224
2006	7	162	49	196
2007	5	152	51	206
2008	6	159	50	199
2009	5	124	51	234
2010	6	137	50	221
2011	6	174	50	184
2012	10	160	46	198
2013	9	154	47	204
2014	0	166	56	192
<b>T-test</b>	23.69%		14.23%	

Firms are classified as manipulators if M-Score of Beneish is greater than -2.22 and non-manipulators otherwise. T-test compares average M-score of manipulators in Portugal versus the ones in UK, and the same for non-manipulators of both countries.

The table above shows the number of manipulators and non-manipulators per year. To Portugal, there no significant change over time whereas to UK, number of manipulators increases as

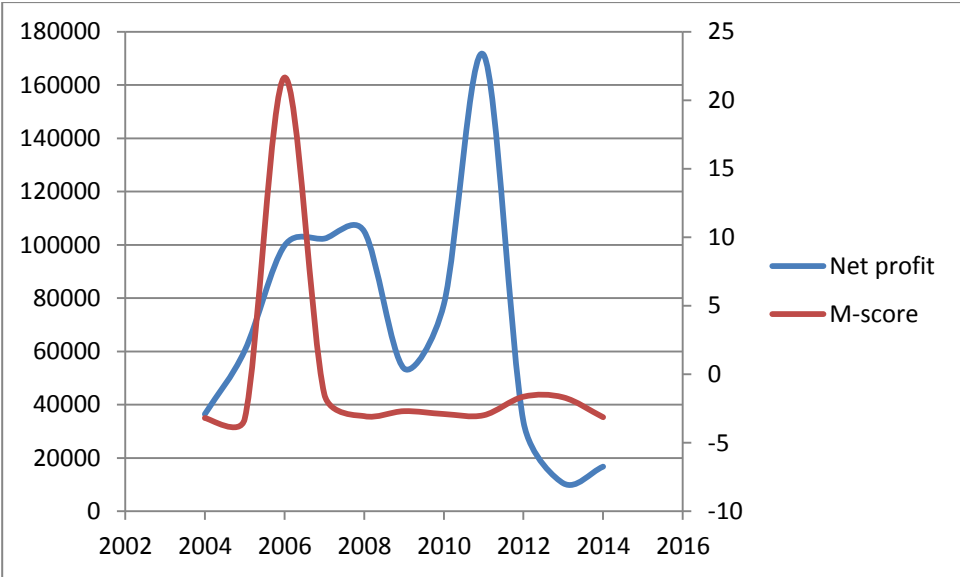
financial crisis starts. Results contradict the common view of legal systems' quality, since it was expected that UK firms have less propensity to manipulate results compared to Portuguese ones.

Although, T-test was done of average M-score of Portuguese manipulators versus UK ones, and the same for non-manipulators. Results suggest no statistical significance, but there may exist some inferences due do the size of the Portuguese sample.

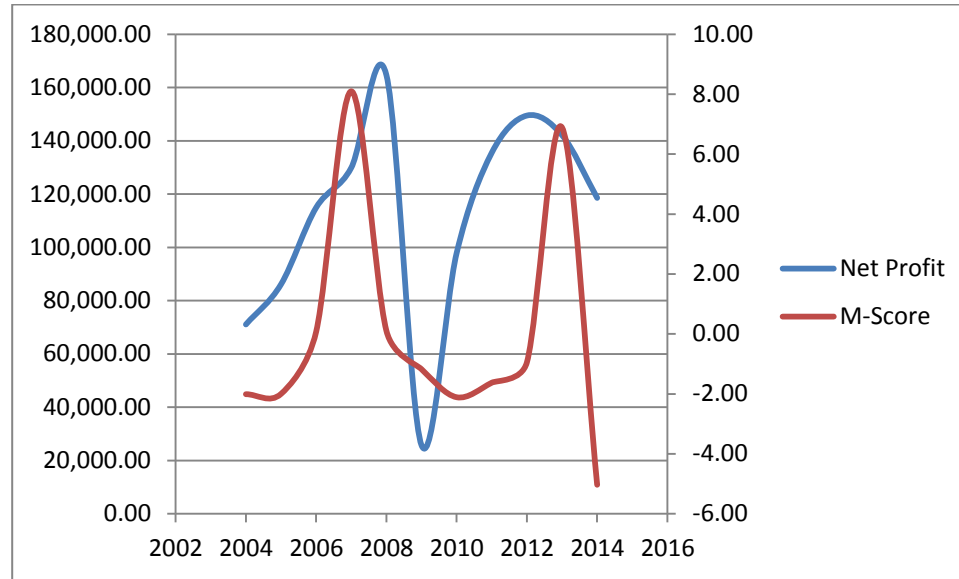
## 5.2 Hypotheses analysis

To validate the hypotheses established we analyzed the means of each variable (including M-score and net profit) per year and made graphs for both samples.

**Illustration 1: Variation of net profit and M-score in Portugal**

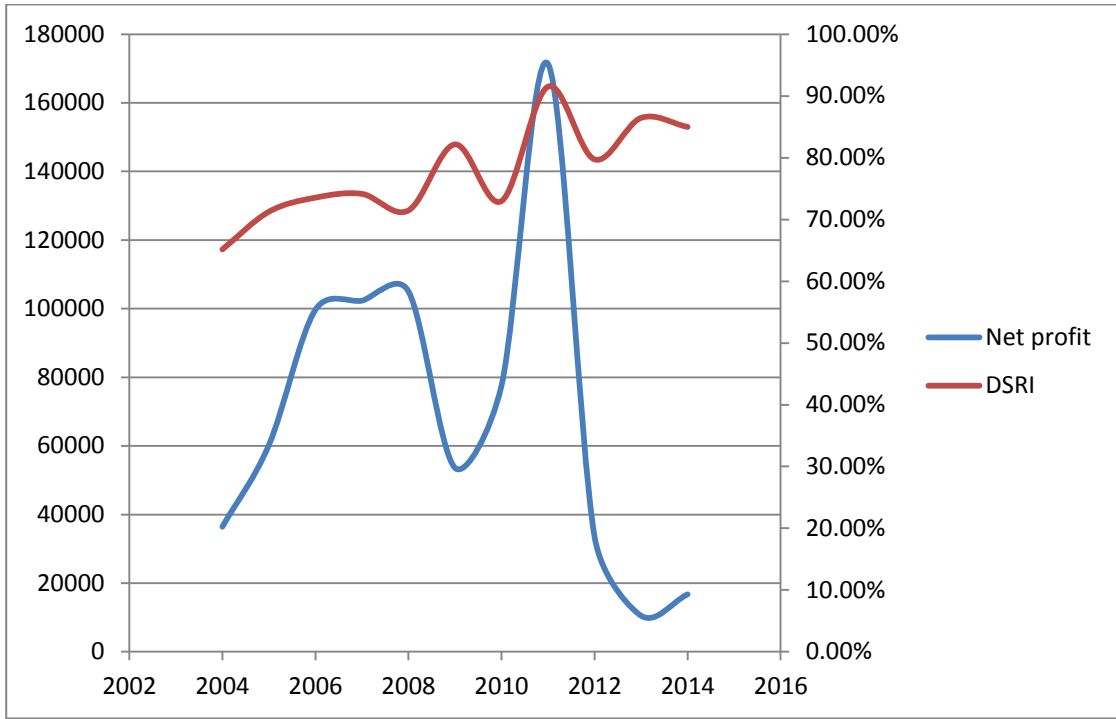


**Illustration 2: Variation of net profit and M-score in UK**

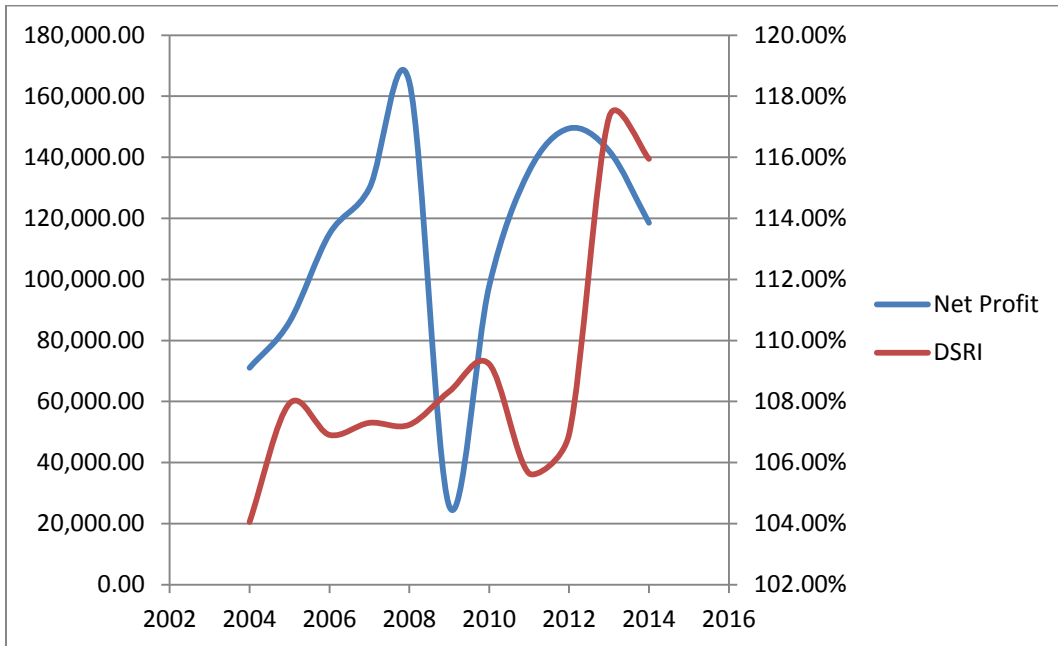


It can be seen on the graphs that net profit declines dramatically during 2008-2009 which is a period of the crisis confirming that financial crisis had impact on the firm's net profit. To UK it increases from 2010 and slightly declines again 2013-2014. To Portugal it declines from 2011 and slightly increases in 2014. This result suggests different impact of financial crisis in the firm's results to Portugal and UK but similar impact in the beginning of the crisis. Analyzing the variation of M-score in UK, the graph is consistent with Beneish's approach as long as it almost follows net profit line, when profit increases, M-score is also increasing and becoming greater, thus the greater M-score, more likelihood of manipulation. When net profit decreases, M-score also decreases. To Portugal, M-score does not follow net profit. M-score increases only till 2006 while net profit increases till 2008, reaching the lowest point in 2007, before the beginning of the crisis. M-score only increases again around 2012 but is slightly insignificant.

**Illustration 3: Variation of net profit and DSRI in Portugal**

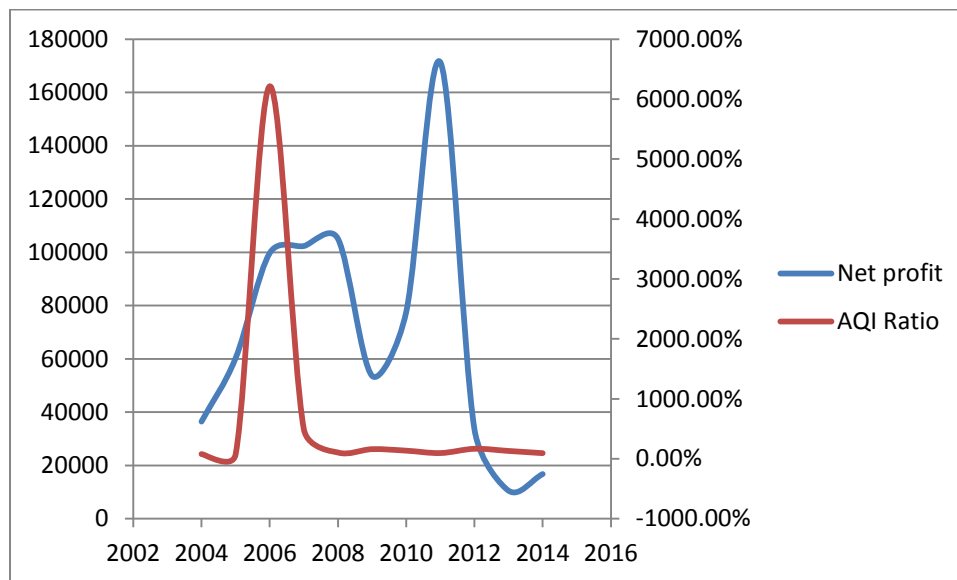


**Illustration 4: Variation of net profit and DSRI in UK**

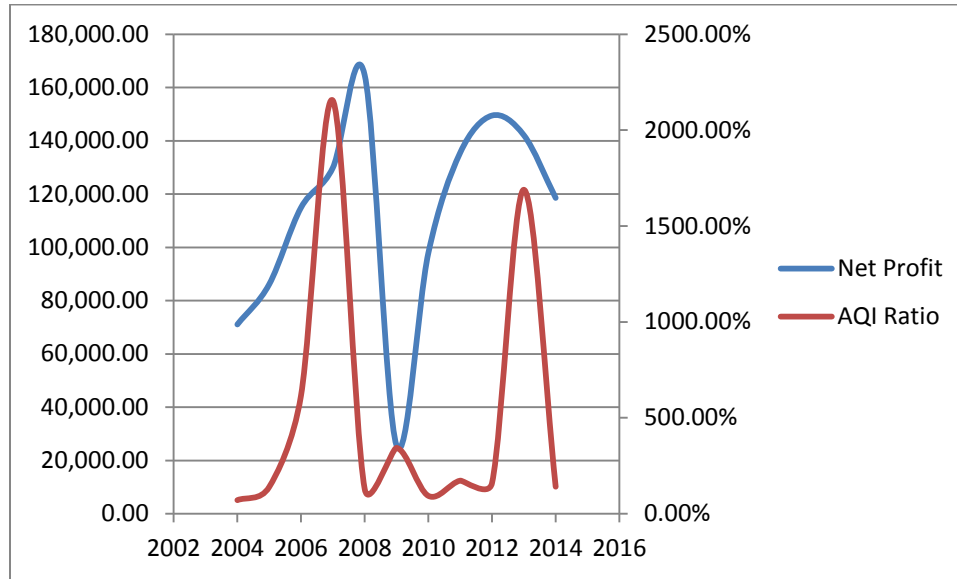


The first hypothesis suggests that firms manipulate receivables through real activity earnings management leading to increased receivables days, proposing that involvement of this activity increases especially in the period of crisis. Consequently, it can be observed in illustrations 3 and 4 that DSRI is increased from 104% to 116% in the UK from 2004 to 2014 and 65% to 85% in Portugal and in terms of graph analysis of the variables' means, DSRI keeps growing during crisis years when net profit is falling, suggesting that firms at that period strive for increasing receivables and respectively revenue to ease sharp declines in profits. This result is found to Portugal and UK so, the hypothesis is confirmed.

**Illustration 5: Variation of net profit and AQI in Portugal**

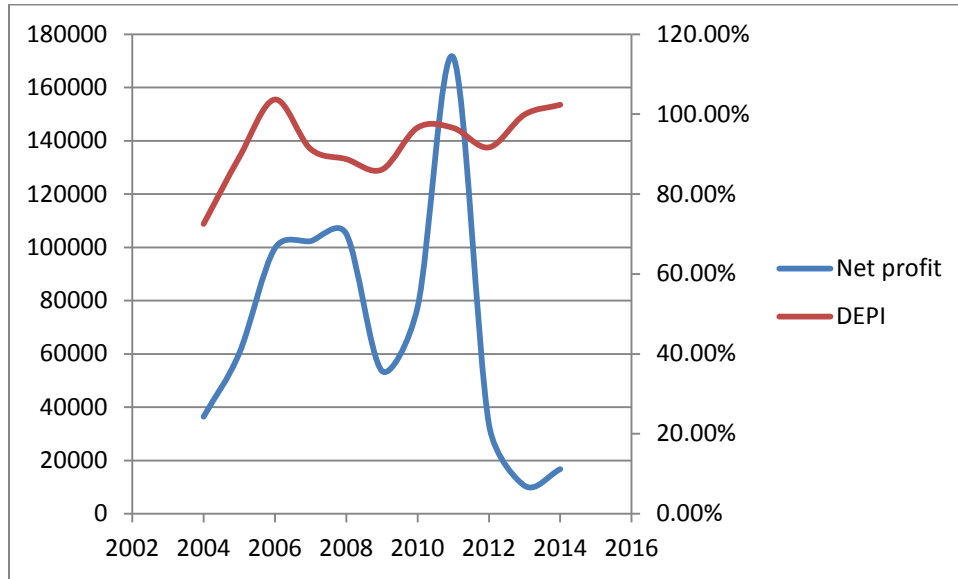


**Illustration 6: Variation of net profit and AQI in UK**

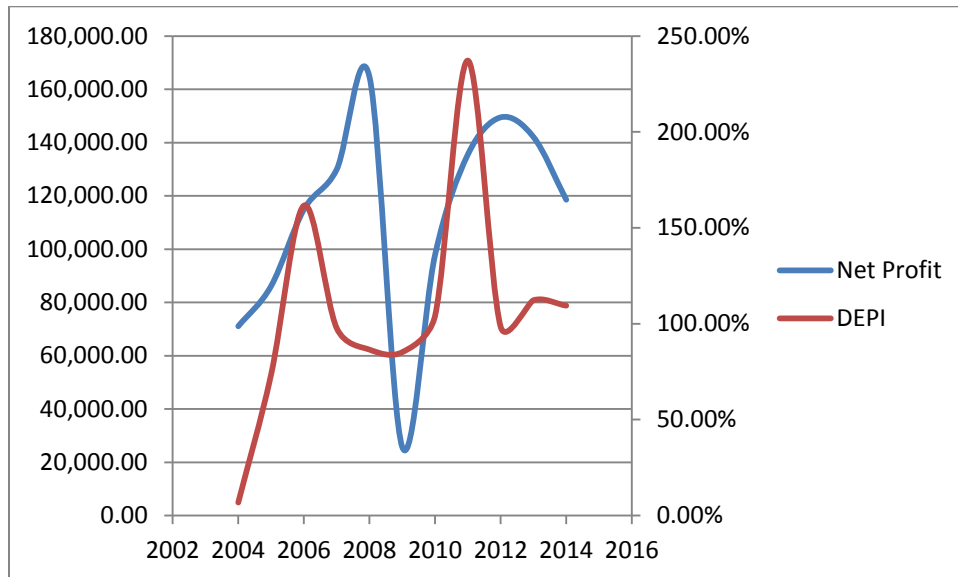


The second hypothesis proposes that firms conduct improper capitalization for decreasing expenses in order to inflate their revenues. In this way, it can be seen from the graphs 5 and 6 that AQI ratio almost follows net profit tendency when it increases in the UK sample, whereas it does not change significantly during and after crisis years in Portuguese sample. To UK, the AQI ratio reaches highest levels similarly as net profit, thus the result supports the hypothesis in terms of the UK sample. To Portugal, AQI is almost constant after 2007 while net profit changes. Therefore, the second hypothesis is not validated to Portugal.

**Illustration 7: Variation of net profit and DEPI in Portugal**



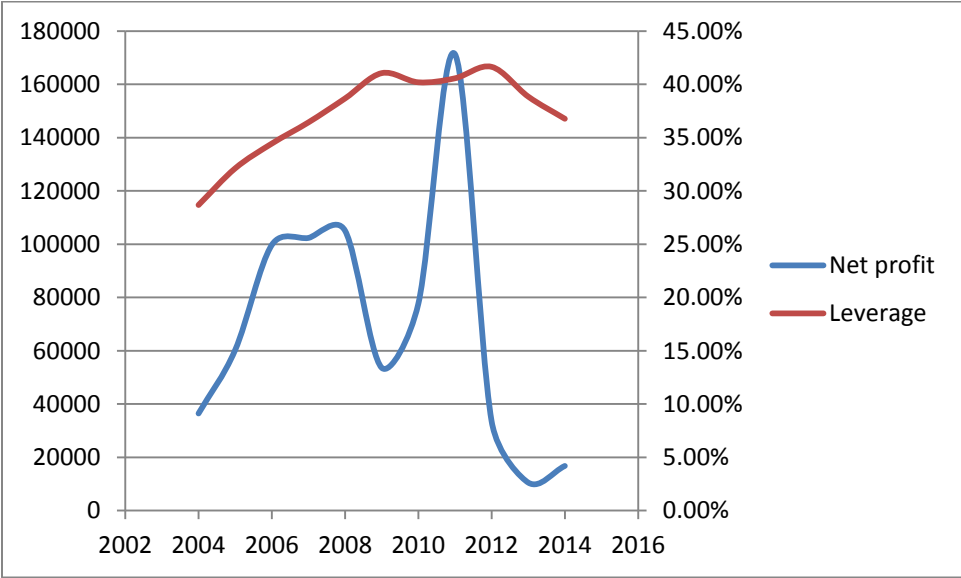
**Illustration 8: Variation of net profit and DEPI in UK**



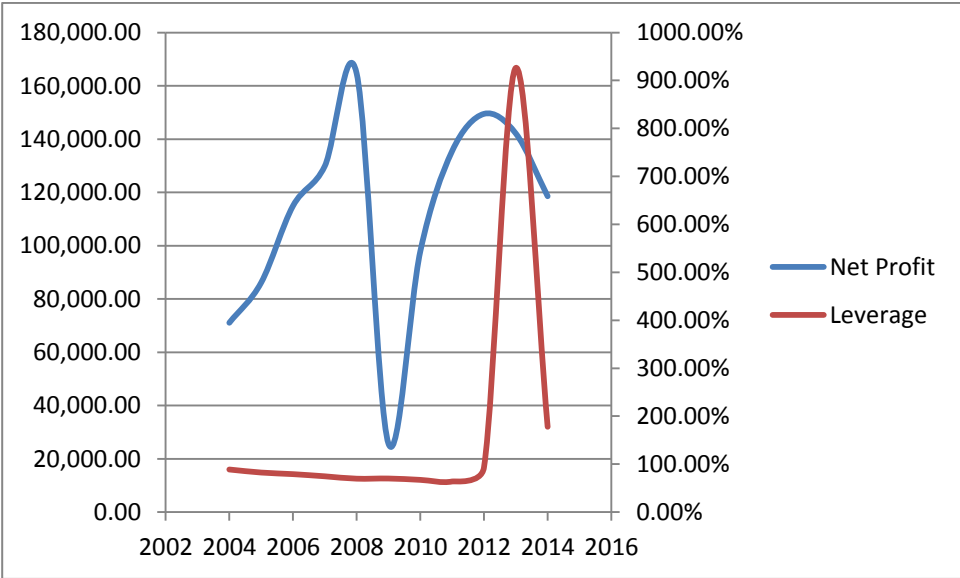
The third hypothesis' proposal is that firms try to decrease depreciation charge by manipulation of depreciation rates in order to increase revenue. Depreciation charge does not change in significant way in Portuguese sample's graph (illustration 7). This is because the only depreciation

method fiscally accepted in Portugal is constant depreciation so firms do not use this item to manipulate results. In the UK sample (illustration 8), there is tendency of depreciation to fall with decline of net profit, and a tendency to increase when net profit goes up. This can be trace of avoiding of negative losses; hence the hypothesis is confirmed to UK.

**Illustration 9: Variation of net profit and Leverage in Portugal**



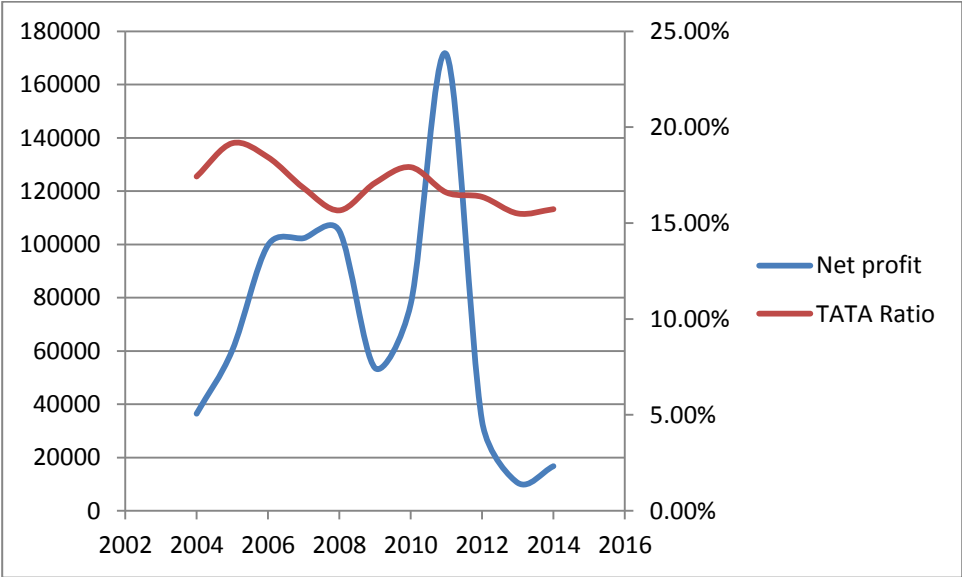
**Illustration 10: Variation of net profit and Leverage in UK**



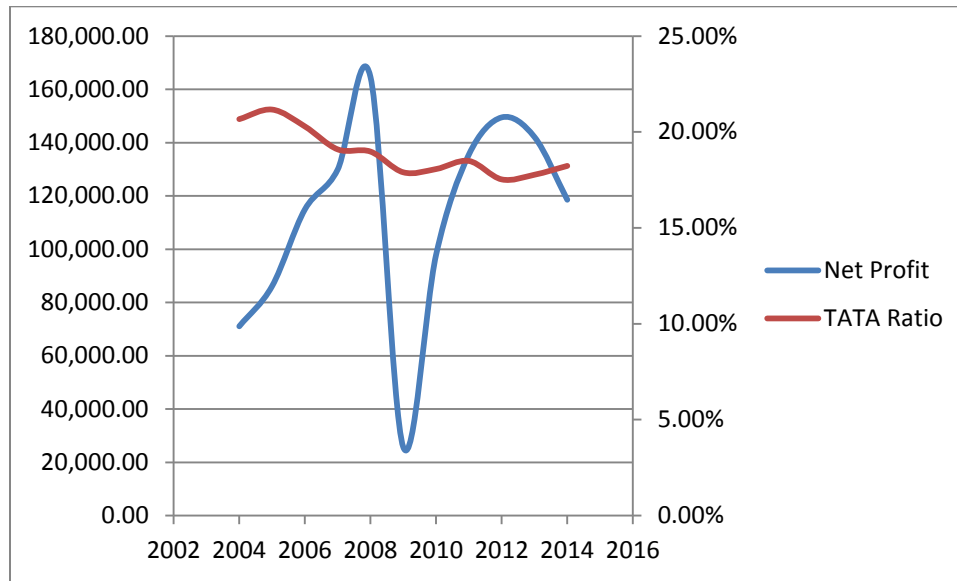


The fourth hypothesis suggests that firms manipulate leverage ratio through inflating revenues. In the Portuguese graph, it can be seen that leverage increases till 2012-2013 and then slightly decreases. When net profit decreases during crisis, leverage increases because firms needed external finance as long as their profits were declining and thus, the firm's self-funding. Moreover, the increases of debt before crisis reflect the financial problems of the Portuguese country. This means that leverage was not manipulated. To UK, leverage increases only from 2013, while being on the same level in prior years, thus, this might be a trace of manipulation, because leverage could be pressured down on the same level in the years of crisis, but as we see the net profit increased in those years in UK. Thus, the hypothesis is confirmed to UK.

**Illustration 11: Variation of net profit and TATA in Portugal**

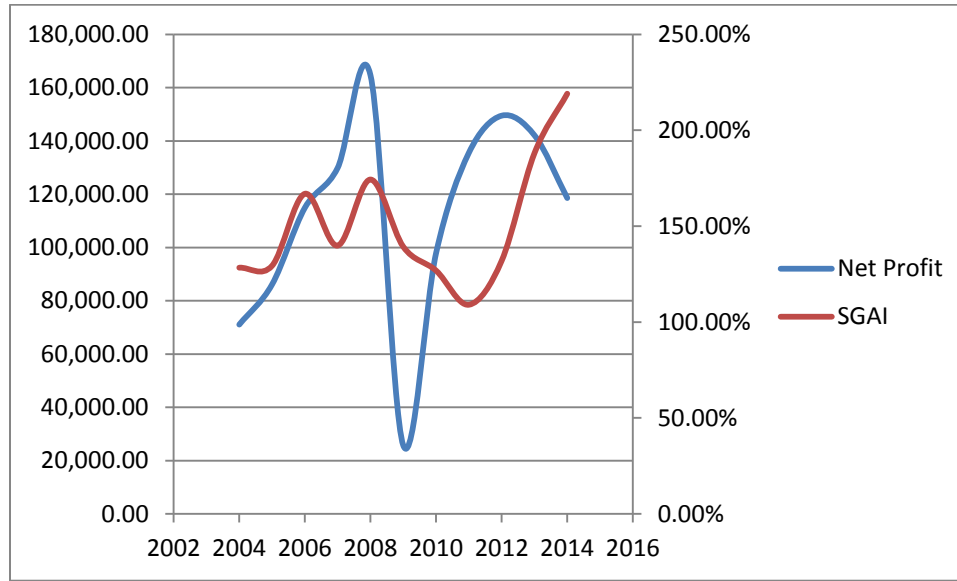


**Illustration 12: Variation of net profit and TATA in UK**



The fifth hypothesis proposes that firms' accruals increase in the years of the crisis leading to higher TATA ratios. TATA ratio exhibits quality of earnings in terms of accruals, to specify percentage of earnings which is not yet collected. The illustration 12 shows that TATA is not increasing dramatically during crisis and even declines after it in the UK. To Portugal (illustration 11), right after 2008 as the profits started declining in Portugal, TATA began slightly increasing but insignificantly. It does not volatile dramatically, thus, the hypothesis 5 is not validated. Although, analyzing the correlation matrix it suggest that TATA and net profit are negatively correlated but it is not confirmed graphically.

**Illustration 13: Variation of net profit and SGAI in the UK**



The sixth hypothesis suggests that disproportionate increase of sales or net profit compared to sales expenses might signal about manipulation. We only can analyze this effect to UK since we do not have sufficient information to do these calculations to the Portuguese sample. Illustration 13 supports the hypothesis as long as net profit falls much more dramatically (disproportionately) during crisis years than SGAI. Moreover, it can be seen on the graph that from 2010 net profit is increasing significantly while SGAI is decreasing. Consequently, this might be trace of manipulation.

The next table presents a synthesis of the results found:

**Table 6: Synthesis of results**

	<b>Expected</b>	<b>Portugal</b>	<b>UK</b>
<b>Hypothesis 1</b>	DSRI grows during crisis	confirmed	confirmed
<b>Hypothesis 2</b>	AQI grows during crisis	denied	confirmed
<b>Hypothesis 3</b>	DEPI decreases during crisis	denied	confirmed
<b>Hypothesis 4</b>	Leverage manipulation	denied	confirmed
<b>Hypothesis 5</b>	TATA increases during crisis	denied	denied

<b>Hypothesis 6</b>	SGAI disproportionately change compared to net profit.	Not available information	confirmed
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### 5.3 Impact of net profit in each variable

Finally to validate previous results and to find if firms manipulate results either to influence creditors perceptions of the firm value or to minimize tax burdens, we analyze the impact of net profit in the variables analyzed before, namely: DSRI, AQI, DEPI, GMI, SGI and TATA. Results are present in table 7 to Portugal and table 8 to UK.

**Table 7: Impact of variables in Portugal**

	<b>DSRI</b>	<b>AQI</b>	<b>DEPI</b>	<b>GMI</b>	<b>Leverage</b>	<b>SGI</b>	<b>TATA</b>
<b>C</b>	0.7825 *	7.089507	0.9237 *	1.6464 *	0.3712 *	0.025744	0.1692 *
<b>Net profit abs</b>	0	0	0	0	0	0	0
<b>Adj. R- square</b>	28.39%	0.28%	24.21%	0.51%	59.22%	0.43%	68.98%
<b>F-statistic</b>	4.6947 *	0.97348	3.9773 *	0.95267	14.533 *	1.040852	21.726 *
<b>Durbin-Watson</b>	2.079874	2.417879	1.864128	2.458113	0.873056	2.110601	0.792155

This table presents the estimates of DSRI (receivables' days), AQI (asset quality index), DEPI (depreciation index), GMI (gross margin index), Leverage, SGI (sales growth index), and TATA (total accruals to total assets) on Net profit abs (absolute net profit).

\* Significance level of 1%, \*\* 5% and \*\*\* 10%.

From the table above it can be concluded that Portuguese firms don't manipulate results using the ratios above when net profit is near zero because absolute net profit is insignificant to explain each ratio analyzed. As we the firms analyzed are listed firms their main concern could be related to investors' perceptions and not to reduce tax payment. Using the Beneish model we also found that the number of manipulators is small, which can also explain this result.

Moreover, to DSRI, DEPI, GMI, Leverage, and TATA are explained by other variables than net profit, because the constant is significant. Although net profit is insignificant (at a significance level of 10%) to explain the proposed ratios, the model analyzed is accurate to explain DSRI, DEPI, Leverage, and TATA with an explanation power of 28%, 24%, 59% and 69% (adjusted R<sup>2</sup>)

respectively. When we analyzed the hypotheses, we have validated the hypothesis of manipulation through DSRI. These results are also consistent with it. Finally, analyzing the Durbin-Watson test we verify problems of autocorrelation in the model of Leverage and TATA.

**Table 8: Impact of variables UK**

	<b>DSRI</b>	<b>AQI</b>	<b>DEPI</b>	<b>GMI</b>	<b>Leverage</b>	<b>SGI</b>	<b>TATA</b>	<b>SGAI</b>
<b>C</b>	1.088097*	5.222767**	1.065186*	1.3726 *	1.672 **	1.2379 *	0.1891 *	1.5085 *
<b>Net profit abs</b>	0	0	0	0	0	0	0	0
<b>Adj. R- square</b>	0.58%	-0.11%	-0.13%	0.73%	3.23%	0.34%	61.46%	1.15%
<b>F-statistic</b>	1.0622	0.9884	0.98627	1.07832	1.3577 *	1.036706	18.059 *	1.12 ***
<b>Durbin-Watson</b>	2.275669	2.419695	2.303616	2.443361	2.122319	2.419123	1.308576	1.806312

This table presents the estimates of DSRI (receivables' days), AQI (asset quality index), DEPI (depreciation index), GMI (gross margin index), Leverage, SGI (sales growth index), TATA (total accruals to total assets), and SGAI (sales and general administrative expenses index) on Net profit abs (absolute net profit).

\* Significance level of 1%, \*\* 5% and \*\*\* 10%.

Based on the table 8 similar to previous conclusion is derived that UK firms don't manipulate results using the ratios to have net profit near zero either to benefit from tax savings or to reduce the cost of obtained funds because absolute net profit is insignificant. As in previous analysis we found that some UK firms are manipulators according with the Beneish model, and results were even more significant during crisis. This new result suggests that UK firms manipulate results either to influence investors' perception or to have easily access to debt.

Moreover, all the ratios are explained by other variables than net profit, because the constant is significant. Furthermore, even if net profit is insignificant to explain the variables, the model analyzed is accurate to explain Leverage, TATA and SGAI are explained with an explanation power of 3%, 61%, 1% (adjusted R<sup>2</sup>) respectively by the proposed model. These results are consistent with the analysis of the hypotheses, validating previous conclusions.

Finally, analyzing the Durbin-Watson test, we verify problems of autocorrelation in the model of TATA.

## 6. Conclusion

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This paper analyzes influence of financial crisis on earnings management behavior of listed firms in Portugal and UK using a panel data and covering a period from 2004 till 2014. The aim of the study is to explore two different countries from different legal forces and culture and to compare extent of their engagement in activity of financial manipulation and earnings management. Furthermore, study aims to define impact of financial crisis in each country, whether the level of financial manipulation increases in the period when the world undergoes certain financial stress.

We have used three different analyses. First we used the Beneish model to define companies as manipulators and non-manipulators. We also divided results in two periods taking into consideration financial crisis 2008 as a split point. Consequently, findings suggest that despite the fact that common law countries have higher quality of accounting, according to the model, UK firms used more accounting ratios for manipulation than the Portuguese ones. Furthermore, in concordance with this model, manipulation was increased by a particular rate during financial crisis, but in terms of analysis of M-score before and after crisis was not statistically significant. The difference of manipulators and non-manipulators between both countries is also not significant but it can be due to inferences caused by the small number of Portuguese firms.

Second, we analyzed proposed hypotheses. According to the analysis Portuguese firms manage reports through manipulating receivables' days (DSRI) whereas UK firms manipulate receivables' days (DSRI), improper capitalization of expenses (AQI), depreciation (DEPI), Leverage and sales and general administrative expenses (SGAI).

Third, we analyzed impact of absolute net profit for each ratio in order to see whether firms manipulate the ratios above to pay less income tax or minimize costs of obtained funds. To both Portugal and UK firms do not manipulate results to reach net profit near zero. Using the Beneish model, we also found that there are few manipulators in Portugal. To UK, as this model indicates that absolute net profit is not relevant to explain each ratio, results suggest that the main reason to manipulate is to change the perception of financial investors.

In conclusion, we can say that generally financial crisis impacts firms' management's behavior leading to manipulation of earnings which can be spotted using accounting information for narrowing suspect firms for further inspection.

With this study we have accomplished the proposed aims. Although, it has some limitations as all studies do. First, only two countries were selected for analysis, so results cannot be extrapolated to other countries. Second, only listed firms were studied. Non-listed firms may have different reasons to manipulate. Third, the Portuguese sample was much smaller than the UK one with lack of some information which can cause some inferences on the conclusions found.

For future analysis, it would be useful to study other countries with different legal systems and culture, exploring not only listed companies but also other firms. Distinguishing between family and non-family firms can also be relevant to analyze since both firms have singular characteristics and types of governance. Finally it could be interesting to analyze the impact of this ratios on the firm's stock price to confirm if listed firms manipulate results to influence investors' perception.

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