Do bankrupt companies manipulate earnings more than the non-bankrupt ones?

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ABSTRACT

Financial fraud is defined as the deliberate misrepresentation of the financial condition of an enterprise accomplished through the intentional misstatement or omission of amounts or disclosures in the financial statements to deceive financial statement users. Insolvency is defined as the state in which the company is not capable of honoring some commitment. The 2008's Deloitte Forensic Center Report states that companies filing for bankruptcy protection are three times more likely than non-bankrupt companies to face enforcement action by the Securities and Exchange Commission (SEC) relating to alleged financial statement fraud. The report concludes with the thesis that companies facing a potential insolvency are more likely to act fraudulent. But the study being carried out is just based on the information being provided by the SEC and lacks an analysis of the financial statements. The presented research carries out the missing step with an academic prove of the correlation of insolvency and fraud using Beneish's approach to detect earnings manipulation tested on a sample of 30 bankrupt and 30 non-bankrupt Small and Medium-sized enterprises. The results are consistent with prior research suggesting income decreasing earnings behavior of firms approaching bankruptcy. It is shown that earnings manipulation in bankruptcy firms decreases substantially in the years prior to failure. Furthermore, we will propose an Information Systems (IS) approach which supports and eases an analysis of risky fraud cases.

Keywords**:** Earnings management, Earnings manipulation, Fraud, Beneish's ratios, Bankruptcy

INTRODUCTION

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 (Grove and Basilico, 2011). The Association of Certified Fraud Examiners (2012) estimates a potential projected global fraud loss of more than $3.5 trillion. Financial fraud has contributed to the bankruptcy of major organizations throughout the world (Albrecht et al., 2008; Abbasi et al., 2012).The 2008's Deloitte Forensic Center Report states that companies filing for bankruptcy protection are "three times more likely than non-bankrupt companies to face enforcement action by the Securities and Exchange Commission (SEC) relating to alleged financial statement fraud". That report used the Accounting and Auditing Enforcement Releases (AAERs) issued by the SEC from the period 2000 to 2007 to analyze a variety of aspects dealing with fraud like the frequency among sectors, the amount of fraud schemes among one organization, or the roles of the individual subjects. It concludes with the thesis that companies facing a potential insolvency are more likely to act fraudulent. This leads to the point that financially distressed firms may adopt aggressive or even fraudulent earnings behavior before filing for bankruptcy but there is not enough research on the relation between insolvency and fraud, yet. Researchers have "not specifically investigated whether prebankruptcy firms manage earnings" (Rosner, 2003:366) since they focused on earnings behavior either of financially distressed, or Securities Exchange Commission (SEC) sanctioned firms (Rosner, 2003). "While there is extensive research analyzing the quality of accounting numbers in financially troubled firms, empirical evidence on the earnings behavior of ex-post bankrupt (failed) firms in the years leading up to bankruptcy is scarce" (Lara et al., 2009: 1). The purpose of this paper is to examine whether financially distressed companies approaching bankruptcy adopt aggressive or fraudulent income increasing accounting choices more frequently than healthy firms.

The paper undermines whether the relationship discovered by Deloitte can be proven by using a well known tool such as Beneish's M-score (Beneish, 1997; 1999, 2012) as previous research (Sweeney,1994;DeAngelo et al.,1994, Kallunki and Martikainen, 1999; Rosner, 2003; Charitou et al.,2007a, Leach and Newsom, 2007, Lara et al., 2009)) used miscellaneous techniques with heterogeneous results to assess the earnings behavior of companies facing financial difficulties. Due to this reason this paper deals with an academic prove of the correlation of insolvency and fraud. Therfore, we contribute to the discussion of how auditing might be supported in order to detect earnings manipulation. It will be proposed an Information Systems (IS) approach, which supports an effort reduction in favor of an analysis of risky fraud cases. This paper contributes to the existing literature on the quality of earnings in failed firms as well as to Accounting Information Systems (AIS)[1] research by enhancing the discussion of the relationship between insolvency and financial data manipulation and ways of its potential recognition.

The remainder of the paper is as follows. Among Section 2, the paper describes the state of the art in the analysis of the relation between fraud and insolvency and furthermore ways of financial fraud detection. Section 3 describes the research methodology and presents a detailed

[1] AIS are seen as socio technical systems consisting of a whole of organized data, human resources, techniques, and procedures (Marchi, 2003). They can be understood as part of a more general information systems and serve as information provider for decisions (Sutton and Arnold, 2002). The decision which is supported is the critical judgment on how managers exercise their discretion to mask (or to unveil) poor performance in financially distressed and non distressed companies.

description of the sample selection process. Section 4 applies the Beneish's approach on the sample and discusses the empirical results. Finally, an overview is given to derive further research steps in that topic.

STATE OF THE ART OF MODELS USED TO DETECT FINANCIAL DATA MANIPULATION

According to Giroux (2006), "earnings management includes the whole spectrum, from conservative through fraud, a huge range for accounting choices" (Giroux,2006: 6) Management perspectives on accounting issues can be conservative, suggesting transparency, as well as more aggressive or even fraudulent (Giroux, 2006).

The relation between bankruptcy and earnings management or fraud has been regarded before Deloitte's report already. Besides, not all research on that topic deals with the perspective of its recognition, but with legal aspects like Andersons (1997) analysis of English insolvency proceedings regarding fraudulent action. He states that fraud "is not a commonplace feature" (Anderson, 1997:3) in bankruptcies. Several studies tried to prove the relationship between earnings management and some kind of financial trouble. Sweeney (1994) analyzed the earning behavior of 130 firms that violated debt-covenant constraints within the period 1980-1989 and found out that managers of firms, which are approaching default, respond with income-increasing accounting changes. Kallunki and Martikainen (1999) used the changes in pension liabilities, reserves and depreciation as earnings management components of 47 financially failed (gone into liquidation or bankrupt) Finnish firms. The results of this latter study reported income-increasing earnings management for financially troubled firms during the last three years before default. Rosner (2003), used a sample of 51 SEC sanctioned during the period 1985-1997 and 242 non-sanctioned bankrupt firms. Within the non-sanctioned bankrupt firms she created subsamples of stressed bankrupt firms (SB) and non-stressed bankrupt firms (NSB). Analyzing financial statements over a five-year window, she found evidences of earnings overstatement in the NSB which "resemble SEC sanctioned fraud firms" (Rosner, 2003:401). In contrast , DeAngelo et al. (1994) used a sample of 76 firms with persistent losses and dividend reductions during the period 1980-1985. They found evidence on income-decreasing earnings management in the dividend reduction and subsequent three years; proving that "managers' accounting choices primarily reflect their firms' financial difficulties, rather than attempts to inflate income" (De Angelo et al., 1994:113).In Charitou et al. (2007a) 859 firms that filed for bankruptcy during the period 1984-2004 were analyzed. The results show that managers of distressed firms are generally engaged in negative earnings management behavior (decreasing earnings management), prior to bankruptcy filing. Charitou et al. (2007b)results confirm downwards earnings management choices one year prior to filing for bankruptcy as well. The empirical results of Leach and Newsom (2007) agreed with those determined by Charitou et al. (2007a). Leach and Newsom (2007) used a sample of 114 firms which voluntarily or involuntarily filed for Chapter 11 (United States' Bankruptcy Code) from 1980 to 2000. The results of this latter study show that in the two years prior to filing, companies adopt decreasing earnings management behavior. Finally, Lara et al.(2009) analyzed earnings quality for a sample of 264 failed firms (gone into administration, into receivership or were liquidated).in the four years prior to default. The findings show that earnings manipulation "starts four years prior to failure, and unravels in the year just before failure" (Lara et al.,2009:18). This studies analyzed earnings behavior prior to default, through time series of managers' accounting choices (analyzing

changes in accounting methods) (Sweeney,1994), abnormal accruals (DeAngelo et al., 1994), changes in pension liabilities, reserves and depreciation (Kallunki and Martikainen, 1999), a cross-sectional adaptation of the modified Jones model (1991) (Charitou et al. , 2007a; Leach and Newsom , 2007), and the Jones model (1991) for discretionary accruals and the abnormal cash flow model (Lara et al., 2009). As the Beneish's model (1997,1999,2012) has not been used in previous research, the study will test the power of this latter approach, to be able to analyze earnings behavior prior to default.

"There have been at least three attempts at defining earnings management" (Beneish, 2001:2) [2]. It can be defined as " the process of taking deliberate steps within the constraints of generally accepted accounting principles to bring about a desired level of reported earnings" (Davidson et al., 1987), or as "a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain" (Schipper, 1989) or "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 numbers." (Healy and Wahlen, 1999). The first definition relates, "to artificial earnings management, which encompasses both changes in accounting methods and classificatory choice" (Beattie et al.1994: 793). Regarding the last two definitions Dechow and Skinner (2000:238) argued that "although widely accepted, these definitions are difficult to operationalize directly using attributes of reported accounting numbers since they center on managerial intent, which is unobservable". More recently, Giroux defined earnings management as "using operating and discretionary accounting methods to adjust earnings to a desired outcome" (Giroux, 2003:280). Clear definitions of earnings management are hardly to identify in the practical literature as well. Statement on accounting standards No. 99 defines fraud as " an intentional act that results in a material misstatement in financial statements" (SAS No.99:165). The international standard on auditing No.240 defines fraud as " an intentional act by one or more individuals among management, those charged with governance, employees, or third parties, involving the use of deception to obtain an unjust or illegal advantage" (ISA No. 240: paragraph 11). The Association of Certified Fraud Examiners (ACFE) defines financial statement fraud as " the deliberate misrepresentation of the financial condition of an enterprise accomplished through the intentional misstatement or omission of amounts or disclosures in the financial statements to deceive financial statement users" (Fraud Examiners Manual, 2011:section I,1.303). Dechow's and Skinner's (2000) argument may be proposed for the practical literature as well as the three above mentioned definitions focus on individuals intent which is impalpable. Overall, there is no agreement on how the term earnings management should be defined.

The Public Company Accounting Oversight Board (2000) observed that "the term earnings management covers a wide variety of legitimate and illegitimate actions by management that affect an entity's earnings" (PCOAB, 2000:77). Fraud is at the illegal end of the continuum, where someone clearly violates Generally Accepted Accounting Principles (GAAP). "However, determining whether or when the behavior in the earnings management continuum crosses the line from legitimacy to fraud in a specific situation is not always easy". (PCOAB, 2000:79) .Beneish defines earnings manipulation as "instance in which a company's managers violate generally accepted accounting principles (GAAP) to favorably represent the company's financial performance"(Beneish, 1999:24). Giroux defines earnings manipulation – the aggressive earnings management practices - as "the opportunistic use of earnings management to effectively

[2] Davidson *et al*. (1987), Shipper (1989) and Healy and Wahlen (1999) have been cited by Beneish (2001).

misstate earnings to benefit managers" (Giroux, 2003:280). However fraud can be interpreted as a much broader concept than just violating GAAPs, for our purpose, the concepts of fraud and earnings manipulation, as part of earnings management practices, are used as synonyms for this research, being both on the illegal end of the spectrum of accounting choices.

As suggested by Beneish (2001) the main approaches used by academics to evaluate the existence of earnings management are: 1. the aggregate accruals approach (Jones,1991); 2. the specific accruals approach (McNichols and Wilson, 1988; Beaver and McNichols, 1998); McNichols; 2000); 3. the investigation of discontinuities in the distribution of reported earnings approach (Burgstahler and Dichev, 1997; Degeorge et al., 1999)[3]. A different approach was introduced by Beneish in 1997. He relied on three sources to choose explanatory variables based on financial statement data . He constructed a model that included (Beneish,1999): (a) indicators of future performance (Beneish presumption is that earnings manipulation is more likely when firms' future prospects are poor); (b) variables based on cash flows and accruals and other variables that have been used in other research to detect earnings manipulation; and (c) variables that hypothesize contract-based incentives for earnings manipulation. Beneish's model is based on variables which "intended to capture incentives which may prompt firms to violate GAAP, the likelihood of detection, and distortions in financial data produced by GAAP violation" (Beneish, 1997:273). More recently other approaches have been adopted by academics to evaluate the existence of earnings management. Several studies (Skousen et al.,2004; Nigrini, 2005 ; Tilden and Janes , 2012)[4] have used Benford's Law other used data mining techniques to detect earnings management. A comprehensive literature review on application of data mining techniques to assess earnings quality is provided by Sharma and Panigrhai (2012). Miller (2009) developed a tool called Miller ratio (MR) to estimate earnings management components. However, he tested the ratio only on four companies and as he stated himself " a study of four companies does not establish the validity"(Miller, 2009:143) Finally, Dechow et al.(2010) analyzed, based on AAERs, five dimensional characteristics of fraud 'friendly' firms (accrual quality, financial performance, non financial measures, off-balance sheet activities and market-based measures) and developed three prediction model called F-scores to measure the likelihood of earnings misstatements. The first one is based on financial statements variables (Model 1), the second one adds off-balance sheet and non financial variables (Model 2)and the last one includes stock market-based variables (Model 3)[5].

As argued most of the previous research investigated the behavior of bankrupt or financially distressed companies' earnings management but as shown the results are ambiguous. Therefore, further evidence on the earnings behavior of troubled firms is obviously needed.

MODEL DEVELOPMENT

The following Beneish's unweighted model, as revised in 2012 (Beneish et al.,2012), is used to estimate the probability of manipulation.

M-Score (8-variables):	-4.84 + 0.920 (DSRI)+0.528 (GMI)+0.404 (AQI)+0.892 (SGI) + 0.115 (DEPI) -0.172 (SGAI) + 4.679 (TATA)- 0.327 (LEVI)

[3] The following authors have been cited by Beneish (2001): Jones(1991), McNichols and Wilson (1988), Beaver and McNichols (1998), McNichols (2000),Burgstahler and Dichev (1997), Degeorge et al., (1999).
[4]Skousen et al. (2004) and Nigrini (2005) have been cited by Tilden and Janes , (2012).
[5] Model 1 reported the highest rate (approximately 69 percent) of correct classification of misstating firms.

An M-Score greater than -1.78 indicates a strong likelihood of a firm being a manipulator[6]. Beneish, (1999) found that DSRI, GMI, AQI, SGI and TATA are associated with earnings manipulation and statistically significant while the remaining three (DEPI, SGAI, LEVI) are not. Wells (2001) developed an analytical explanation why Beneish's five of the eight presented key fraud detection ratio should work. Specifically for the Days Sales in Receivables Index (DSRI), the Gross Margin Index (GMI), Asset Quality Index (AQI), Sales Growth Index (SGI), and for Total Accruals to Total Assets (TATA). Harrington (2005) excluded TATA and included Sales General and Administrative Expenses Index (SGAI). Nevertheless, according to Grove and Cook (2004), auditors should expand their traditional ratio analyses to include key fraud detection ratios from Beneish's studies. These ratios can even be used as red flag variables. For each index, Beneish calculated the mean value over the sample for manipulators and non-manipulators as indicated in Table 1 (Appendix).

Unfortunately Beneish's 8 variables M-score could not be adapted to Italian GAAPs as the sales, general and administrative expenses items are not separated in the income statement. Similarly to Beneish (1999) and to overcome this drawback we set the SGAI to value of one. Thus, the 8-variables model in Beneish (1999; 2012) is used to estimate the likelihood to act fraudulent by assessing Small and Medium-sized enterprises (SMEs).

Most of the studies showed that failing companies resort to positive (negative) earnings management behavior in the years surrounding default, thus we will perform a test on a sample of Italian SMEs; 30 bankrupt and 30 non-bankrupt analyzing the three last available financial statements prior to bankruptcy-filing (investigation period: year n, n-1 and n-2) for each company. The purpose is to test Deloitte's stated thesis that companies facing a potential insolvency are three times more likely than non-bankrupt to act fraudulent; we thus should expect values of M-score higher than -1,78 as well as more red flags in the bankrupt group in year n and n-1. In order to calculate the indexes and the M-scores for year n-2 a fourth financial statement (year n-3) is needed. The proposed model is in an early development stage. Due to this reason, we will perform this analysis in the following step of our research.

We developed a prototype to support the calculation of Beneish's ratios. The data of financial statements got loaded into the system by using the eXtensible Business Reporting

[6] Where: Days Sales in Receivables Index (DSRI): days' sales in receivables index is calculated as the ratio of days' sales in receivables in year n to year n-1. Beneish argues that a large increase in days sales in receivables might be associated with a higher likelihood that revenues and earnings are overstated; Gross Margin Index (GMI): gross margin index is calculated as the ratio of gross margin in year n-1 to gross margin in year n. When GMI is greater than 1, it indicates that gross margins have deteriorated.; Asset Quality Index (AQI): Asset quality in a given year is the ratio of non-current assets other than property plant and equipment (PPE) to total assets and measures the proportion of total assets for which future benefits are potentially less certain. AQ in a given year was calculated as 1-(current assets + Net PPE/total assets). AQI is the ratio of asset quality in year n, relative to asset quality in year n-1.;Sales Growth Index (SGI): SGI is the ratio of sales in year n to sales in year n-1. Depreciation Index (DEPI): DEPI is the ratio of the rate of depreciation in year n-1 versus the corresponding rate in year n. The depreciation rate in a given year is equal to depreciation/(depreciation + net property plant and equipment). Sales General and Administrative Expenses Index (SGAI): SGAI is calculated as the ratio of Sales General and Administrative Expenses (SGA) to sales in year n relative to the corresponding measure in year n-1; Leverage Index (LVGI): LVGI is the ratio of total debt to total assets in year n relative to the corresponding ratio in year n-1. Total Accruals to Total Assets (TATA): Total accruals are calculated as the change in working capital accounts except of cash less depreciation.

Language (XBRL)[7]as a data exchange format. It supports the identification of the relevant data to be able to calculate the necessary ratios in an automated manner to gain an increased, reliable and fast decision support in context of fraud analysis. Tables 2-6 (Appendix) show the relevant financial statement items (XBRL tags for the Italian taxonomy) which were used to calculate the ratios:

Sample selection

According to Watson and Everett (1993) it is important that the definition of <<failure>> adopted in any bankruptcy prediction study must be clearly stated. This study reviewed 127 SMEs, as defined in EU law recommendation 2003/361[8], that filed a bankruptcy petition (Fallimento) or started a pre-bankruptcy agreement (Concordato preventivo) under the Italian Bankruptcy law (Royal Decree n. 267 of 16 March 1942.) during the period 2011-2012. Bankruptcy data came from fallcoweb.it[9]. None of the chosen bankruptcy firms was officially charged with fraud by May 31, 2012. For each company we reviewed the last three financial statements available before default. Financial statements were directly downloaded from the official business register of the Italian Chambers of Commerce.

Thirty-seven companies that used the condensed form of the Italian annual report[10] within the meaning of Article 2435-bis of the Italian Civil Code and twenty-six companies with no financial data available for years 2011, 2010 and 2009 (ergo without eXtensible Business Reporting Language (XBRL) data[11]) were then removed from the list. The resulting population of 64 companies is further classified by EU NACE Rev.2 codes as shown in Table 7 (Appendix). Companies were also grouped by number of employees, as expressed in annual work units (AWU), by annual turnover, determined by calculating the income of the enterprise received during the year in question from its sales and services after any rebates have been paid out and

[7] XBRL is a standard for electronic reporting, which gets more and more mandated across the world in the recent years (http://xbrlplanet.org/index.php)

[8] Staff headcount and financial ceilings determining enterprise categories. The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million. Within the SME category, a small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million. Within the SME category, a microenterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million. A firm which is part of larger grouping may need to include employee/turnover/balance sheet data from that grouping too. Partner enterprise, must add a proportion of the other enterprise's staff headcount and financial details to their own data when determining eligibility for SME status. This proportion will reflect the percentage of shares or voting rights ,whichever is the higher, that are held. . *Extract of Article 2 and 6 of the Annex of Recommendation 2003/361/EC*.

[9] Fallcoweb.it (Portale dei Fallimenti) it's a free to access daily updated database where data from forty-four Italian Bankruptcy Courts is stored.

[10] An abridged format of balance sheet and a reduced number of notes are allowed for small companies not exceeding - for two consecutive financial years - two of the three size thresholds mentioned in art. 2435-bis of the Italian Civil Code. For our purpose the information reported in such a balance sheet are not enough .

[11] "XBRL is a language for the electronic communication of business and financial data which is revolutionizing business reporting around the world. It provides major benefits in the preparation, analysis and communication of business information. It offers cost savings, greater efficiency and improved accuracy and reliability to all those involved in supplying or using financial data. ... It is one of a family of 'XML' languages which is becoming a standard means of communicating information between businesses and on the internet" (XBRL 2010). Since March 2008, Italian companies (most of the non listed one) must file their annual financial statements to the Italian Chamber of Commerce in an XBRL format.

by total assets to determine whether the companies are micro, small or medium-sized (Table 8, Appendix).

Recognizing that this group is not completely homogeneous, due to industrial classification and size differences, a careful selection of non-bankrupt firms has been performed. The non-bankrupt group consisted of a sample of 64 SMEs- according to the EU staff headcount criterion- chosen from the database "Bilanci di Marca Awards"[12]. For each control firm we downloaded from the Italian official business register the last three financial statements available. Neither one of the chosen control firms filed a bankruptcy petition or started a pre-bankruptcy agreement by May 31, 2012[13] nor reported for two or more consecutive years a negative EBIT value. The latter criterion is to ensure a financially not to highly distressed state of the company according to (Kawai et al., 1996).The border for an exclusion from the sample could have been reduced to one or more consecutive years of operational losses. But in challenging times like the financial crises that border might be too strict.

According to Taffler (1982) the control sample should include only non distressed firms because "a continuing firm is not necessarily financially healthy. […]. Consequently, not all the members of the samples of non-failed firms…are necessarily distinct from the respective failed sets"(Taffler,1982:343). At that time, we did not know whether the obtained control sample included << non-failed firms but financially distressed firms>> (Keasey and Watson, 1991). Nevertheless, we believe that in order to do such analysis the follow up financial statements (2012-2013) are needed. As suggested by Wang and Campbell (2010) the selection of the control sample is based upon paired-sample design. For each bankrupt firm in the sample, a non-bankrupt firm with same AWU and same industry was selected. If the exact match of AWU could not be found, the firm which had the closest AWU was chosen (Table 9 & 10, Appendix). The mean asset size (year n) for bankrupt companies is approximately 23.4 million Euros and 22.7 million Euros for non-bankrupt ones. Table 11 (Appendix) gives descriptive statistics for the bankrupt and the non-bankrupt companies.

Up to now we have analyzed approximately 50 percent of the companies. Therefore, in this paper are presented the results of the first 30 bankrupt (30 non-bankrupt) companies analyzed (180 financial statements).

Prototypical implementation

Accounting Information systems are a part of the more general IS discipline (Sutton and Arnold 2002). IS is supposed to support humans in fulfilling their tasks. Tasks are defined by organizations or by context of humans. Mertens states that there should be a meaningful automization of IS. (Mertens 1995) A meaningful automization is especially related to highly repetitive processes like for example assessing fraud or the risk of an insolvency of a company. Our developed IS concept contains three stages:

[12] Bilanci di Marca is a project developed by three Italian University (University of Macerata, University of Ancona, University of Urbino), coordinated by Professor Antonella Paolini, Professor Stefano Marasca and Professor Massimo Ciambotti. A team composed by academics reviews the financial statements of a sample of companies-operating in the Marche Region (Italy)annually. The companies are grouped by turnover and employees. This award aims at improving financial reporting in Italy and assessing on how entities have complied with the requirements of Generally Accepted Accounting Principles (GAAP). More information on Bilanci di Marca Awwards can be found on www.bilancidimarca.it

[13] Last access on fallcoweb.it: May 31, 2012.

- data import: the first stage enables an automated import of the financial data of a company by the usage of the Data transmission format XBRL;
- data storage: the second stage enables a storage of the imported data in a database;
- data analysis: the third stage enables an analysis of the provided data.

The concept was implemented as a prototype. A prototype is a constructivistic research IS method (Budde 1992). It provides a fast available and concerning its basic functions already executable version of the IS (Wilde and Hess 2006). It is regarded as a fully reliable research method as long as an evaluation takes place. For the presented research a prototype was implemented and evaluated by using the described sample.

Stage one: XBRL is in an increasing number of countries defined as the obligate format for the transmission of financial data to authorities by legal requirements. Therefore the accounting data is available in a digital way and annotated with semantic information which enables a fully automated import into a company balance sheet database.

Stage two: The resulting database basically contains business information on companies like the ones of commercial vendors (e.g. Bloomberg) but the data was acquired by extracting data from the free available XBRL statements. Basically, the database can be compared to the online database EDGAR from the Securities and Exchange Comission. The database which was implemented in a prototypical way differs from EDGAR by the different taxonomies which can be loaded and therefore financial statement from different GAAPs can be analyzed.

Stage three: The last stage was the implementation of the Beneish approach as a method to analyze the financial data being available in the database. Therefore the tool implemented Beneish ratios.

EMPIRICAL RESULTS AND DISCUSSION

According to the described elements (Tables 2-6, Appendix) the Beneish M-score (Table 12, Appendix) and the ratios (Table 13, Appendix) became calculated on each financial statement. The M-score classified in year n-1 (year n) five (one) bankrupt companies out of 30 and three (three) non- bankrupt companies in year n-1 (year n) as manipulators. Only one bankrupt company was classified as manipulator in both years. The five bankrupt companies classified as manipulator in year n-1 presented alarming values for DEPI, AQI, GMI, SGI, LEVI and TATA. The only bankrupt company classified as manipulator in year n shows values higher than the mean for manipulator calculated by Beneish in DSRI, LEVI and TATA. In year n-1 (year n) the three (three) non-bankrupt companies reported values higher than the mean for manipulator in GMI, AQI, DEPI and TATA (AQI, DEPI and TATA). The bankrupt sample reported 1.6 times more red flags than the non-bankrupt one.

Overall, the TATA is the most frequent ratio that reports alarming values. The bankrupt group presents less red flags than the non-bankrupt one. In year n-1 (year n) eight (three) bankrupt companies out of 30 and 14 (nine) non-bankrupt companies out of 30 practiced aggressive accounting techniques. Additionally, a comparison of the amount of red flags found in the bankrupt group in year n-1(eight) and in year n (three) unveils, in the latter year, an inversion of income behavior although “instinctively one would expect upward earnings behavior among highly distressed firms” (Charitou et al., 2007a:272). Confirming DeAngelo et al. (1994) findings, it seems to be that managers’ accounting choices are primarily directed to reflect their firms financial difficulties, rather than to inflate incomes. It seems to be a legitimate exercise of

accounting discretion to reveal companies' financial condition. The second most frequent ratio is the LEVI. The bankrupt group reported in year n-1 (year n) five (24) red flags while the non-bankrupt only two (two) in year n-1 (year n). The huge difference between bankrupt and non-bankrupt companies is certainly not surprising as it is commonly acknowledged that "a high degree of leverage increases the probability of bankruptcy" (Baxter, 1967:402). Furthermore, in the seminal work of Beaver (1966), the total debt to total assets ratio calculated in the year before failure showed a strong ability to predict bankruptcy. The third most frequent ratio is the AQI. The results show that overall the bankrupt companies (16 red flags) as well as the non-bankrupt ones (15 red flags) are engaged in cost deferral. The high rate of red flags in the non-bankrupt sample is unusual. It seems to be that in challenging times, like the financial crises, companies are more likely to defer costs as "managers have incentives to increase reported earnings in attempts to keep their jobs" (DeAngelo et al., 1994:114). In other words, it seems that managers exercise discretion opportunistically to obscure the underlying financial distress (Beaver et al., 2012). Nevertheless, further research should analyze this aspect. Follows the GMI. In year n the amount of bankrupt (non-bankrupt) companies reporting a red flag is 11 (three) and in year n-1 it is ten (five). The results seem to confirm Lev and Thiagarajan (1993) findings. They discussed that a gross margin deterioration is a negative signal about firms' prospects. The DEPI presents values higher than the mean for manipulators in 13 (ten) bankrupt (non-bankrupt) companies. This red flag indicates that the rate at which assets are depreciated has slowed down, raising the possibility that the firm has revised upwards the estimates of assets useful lives or adopted a new method that is income increasing (Beneish, 1999). A deeper analysis unveils that only 3 out of 13 red flags found in the bankrupt group appear in year n suggesting an income decreasing behavior (instead of an income increasing behavior) and confirming the results of prior research (DeAngelo et al., 1994; Charitou et al., 2007a; Leach and Newsom, 2007). DSRI shows five (four) red flags in the bankrupt (non-bankrupt) sample in year n-1 and five (zero) in year n. The bankrupt sample is more likely to inflate revenues confirming Beneish (1997; 1999). He observed that the likelihood that a company inflates revenues raises "with a disproportionate increase in receivables" (Beneish, 1997:289). Lastly, the SGI reported values higher than the mean calculated by Beneish for manipulator two times only in year n-1 in the bankrupt sample.

Although the bankrupt (non-bankrupt) companies reported 102 (64) red flags, 47 (35) in year n-1 and 55 (29) in year n, there is still no prove of a direct relationship between earning manipulation and companies approaching bankruptcy, this especially in the last year prior to bankruptcy.

As shown in table 14 (Appendix) by considering only the five ratios which are statistically significant (DSRI, GMI, AQI, SGI and TATA) in detecting earnings manipulation the differences between bankrupt and non-bankrupt companies become blurred. The bankrupt (non-bankrupt) sample reported overall 60 (50) total red flags. In year n-1 the bankrupt (non-bankrupt) companies reported 32 (28) and in year n 28 (22) red flags. The bankrupt sample reported 1.2 times more red flags than the non-bankrupt one. Both samples (bankrupt and non-bankrupt) show a decrease of the number of total red flags from year n-1 to year n. Regarding only the bankrupt companies it seems to be that in the last year prior to default (year n) managers of bankruptcy firms respond with income-decreasing accounting changes and not with income-increasing accounting changes. The likelihood to manipulate data decreases in the year prior to the bankruptcy-filing year[14]. Furthermore the total amount of red flags for the AQI, DEPI and the

[14] Charitou et al. (2007) provides an interesting review of the main hypotheses which have been proposed by literature supporting earnings decreasing behavior prior to bankruptcy filing.

TATA in year n is higher in the non-bankrupt sample compared to the bankrupt one. As the purpose of the test was to reject or fail to reject Deloitte's stated thesis that companies facing a potential insolvency are three times more likely than non-bankrupt to act fraudulent we can conclude by rejecting Deloitte's thesis on the following result:

a) overall the bankrupt sample reported 1.6 times more red flags (it dwindles to 1.2 by considering only statistically significant ratios) than the non-bankrupt one and not 3 times more;

b) regarding the statistically significant ratios calculated for bankrupt companies the results show a decrease of the number of total red flags from year n-1 to year n and not an increase.

CONCLUSIONS

It was the paper's goal to demonstrate the existence of the relationship discovered by Deloitte and to test Deloitte's stated thesis that companies facing a potential insolvency are three times more likely than non-bankrupt to act fraudulent. Since our results do not confirm the proposition this thesis has to be rejected. Furthermore, regarding only the five key fraud detection ratios for bankrupt companies, the results show a decrease of the amount of total red flags from year n-1 to year n and not an increase. Unfortunately there is still no prove of a direct relationship between earning manipulation and companies approaching bankruptcy. The number of red flags reported by those variables which are associated with earnings manipulation show a significant decrease In the last year prior to default managers of bankruptcy firms, respond with income-decreasing accounting changes and not with income-increasing accounting changes confirming the results of prior research.

On the other hand, the developed prototype, which supports an effort reduction, and some evidences provided in the present study, can be useful to bankruptcy courts, certified public accountant, auditors and to other parties, who use accounting numbers as well, such as banks, analysts, creditors and researchers by enabling a judgment on how managers exercise their discretion to mask (or to unveil) poor performance in financially distressed and non distressed companies.

Finally, we explore and provide new evidence, although admittedly limited due to the sample size on an important aspect that has not been analyzed in detail by prior research. Bankrupt companies as well as the non-bankrupt ones reported, approximately, the same number of AQI red flags (16 for the bankrupt and 15 for the non-bankrupt). Thus, both are engaged in cost deferral. Furthermore the total amount of red flags for AQI, DEPI and TATA in year n is higher in the non-bankrupt sample compared to the bankrupt one. As the investigation period goes from 2009 to 2011 it could be that during a financial crises companies are more likely to defer costs, to manage aggressively earnings, to revise upwards the estimates of assets useful lives and/or to adopt a new income increasing deprecation method supporting Tilden and Janes (2012) findings of increased financial statement manipulation during economic recessions. However, this is an issue that requires further research to obtain direct evidence.

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APPENDIX

Table 1: mean values for non-manipulators and for manipulators (adapted from Beneish, 1999)

Beneish's Ratios	Mean for non-manipulators	Mean for manipulators
DSRI	1.031	1.465
GMI	1.014	1.193
AQI	1.039	1.254
SGI	1.134	1.607
DEPI	1.001	1.077
SGAI	1.054	1.041
TATA	0.018	0.031
LVGI	1.037	1.111

Table 2: financial statement items and XBRL tags used to calculate Beneish's ratios

Financial statement item	XBRL tag (Italian taxonomy 2011and 2009)
Financial fixed assets, receivables due from, subsidiary companies, due within the following year	itcc-ci: ImmobilizzazioniFinanziarieCreditiVersoImpreseControllateEsigibiliEntroEsercizioSuccessivo
Financial fixed assets, receivables due from, associated companies, due within the following year	itcc-ci: ImmobilizzazioniFinanziarieCreditiVersoImpreseCollegateEsigibiliEntroEsercizioSuccessivo
Financial fixed assets, receivables due from, parent companies, due within the following year	itcc-ci: ImmobilizzazioniFinanziarieCreditiVersoControllantiEsigibiliEntroEsercizioSuccessivo
Financial fixed assets, receivables due from, third parties, due within the following year	itcc-ci: ImmobilizzazioniFinanziarieCreditiVersoAltriEsigibiliEntroEsercizioSuccessivo
Total tangible fixed assets	itcc-ci:TotaleImmobilizzazioniMateriali
Total inventories	itcc-ci:TotaleRimanenze
Inventories, raw, ancillary and consumable materials	itcc-ci:RimanenzeMateriePrimeSussidiarieConsumo
Inventories, work in progress and semi-finished products	itcc-ci:RimanenzeProdottiCorsoLavorazioneSemilavorati
Inventories, finished products and goods for resale	itcc-ci:RimanenzeProdottiFinitiMerci
Receivables, trade accounts, total trade accounts	itcc-ci:CreditiVersoClientiTotaleCreditiVersoClienti

Table 3: Financial statement item XBRL tag (Italian taxonomy 2011and 2009)	
Receivables, trade accounts, due within the following year	itcc-ci:CreditiVersoClientiEsigibiliEntroEsercizioSuccessivo
Receivables, due from subsidiary companies, total receivables due from subsidiary companies	itcc-ci: CreditiVersoImpreseControllateTotaleCreditiVersoImpreseControllate
Receivables, due from subsidiary companies, due within the following year	itcc-ci: CreditiVersoImpreseControllateEsigibiliEntroEsercizioSuccessivo
Receivables, due from associated companies, total receivables due from associated companies	itcc-ci: CreditiVersoImpreseCollegateTotaleCreditiVersoImpreseCollegate
Receivables, due from associated companies, due within the following year	itcc-ci: CreditiVersoImpreseCollegateEsigibiliEntroEsercizioSuccessivo
(table 2 continues)	
Receivables, due from parent companies, total receivables due from parent companies	itcc-ci: CreditiVersoControllantiTotaleCreditiVersoControllanti
Receivables, due from parent companies, due within the following year	itcc-ci: CreditiVersoControllantiEsigibiliEntroEsercizioSuccessivo
Receivables, due from tax authorities, due within the following year	itcc-ci: CreditiCreditiTributariEsigibiliEntroEsercizioSuccessivo
Receivables, advances on tax payments, due within the following year	itcc-ci: CreditiImposteAnticipateEsigibiliEntroEsercizioSuccessivo
Receivables, due from third parties, due within the following year	itcc-ci:CreditiVersoAltriEsigibiliEntroEsercizioSuccessivo
Total financial current assets	itcc-ci: TotaleAttivitaFinanziarieNonCostituisconoImmobilizzazioni
Total liquid funds	itcc-ci:TotaleDisponibilitaLiquide

Table 4: Financial statement item XBRL tag (Italian taxonomy 2011and 2009)	
Accrued income and prepayments	itcc-ci:AttivoRateiRiscontiTotaleRateiRisconti
Total assets	itcc-ci:TotaleAttivo
Revenues sales and services	itcc-ci:ValoreProduzioneRicaviVenditePrestazioni
Raw, ancillary and consumable materials and	itcc-ci: CostiProduzioneMateriePrimeSussidiarieConsumoMerci

goods for resale	
Use of third party assets	itcc-ci:CostiProduzioneGodimentoBeniTerzi
Total payroll and related costs	itcc-ci:CostiProduzionePersonaleTotaleCostiPersonale
Amortisation of intangible fixed assets	itcc-ci: CostiProduzioneAmmortamentiSvalutazioniAmmortamentoImmobilizzazioniImmateriali
Depreciation of tangible fixed assets	itcc-ci: CostiProduzioneAmmortamentiSvalutazioniAmmortamentoImmobilizzazioniMateriali
Other amounts written off fixed assets	itcc-ci: CostiProduzioneAmmortamentiSvalutazioniAltreSvalutazioniImmobilizzazioni
Payables, bonds, due within the following year	itcc-ci: DebitiObbligazioniEsigibiliEntroEsercizioSuccessivo
Payables, bonds, due beyond the following year	itcc-ci: DebitiObbligazioniEsigibiliOltreEsercizioSuccessivo
Payables, convertible bonds, due within the following year	itcc-ci: DebitiObbligazioniConvertibiliEsigibiliEntroEsercizioSuccessivo
Payables, convertible bonds, due beyond the following year	itcc-ci: DebitiObbligazioniConvertibiliEsigibiliOltreEsercizioSuccessivo
Payables, due to partners for financing, due within the following year	itcc-ci: DebitiDebitiVersoSociFinanziamentiEsigibiliEntroEsercizioSuccessivo
Payables, due to partners for financing, due beyond the following year	itcc-ci: DebitiDebitiVersoSociFinanziamentiEsigibiliOltreEsercizioSuccessivo
Payables, due to banks, due within the following year	itcc-ci: DebitiDebitiVersoBancheEsigibiliEntroEsercizioSuccessivo
Payables, due to banks, due beyond the following year	itcc-ci: DebitiDebitiVersoBancheEsigibiliOltreEsercizioSuccessivo
Payables, due to other providers of finance, due within the following year	itcc-ci: DebitiDebitiVersoAltriFinanziatoriEsigibiliEntroEsercizioSuccessivo
Payables, due to other providers of finance, due beyond the following year	itcc-ci: DebitiDebitiVersoAltriFinanziatoriEsigibiliOltreEsercizioSuccessivo

Table 5: Financial statement item XBRL tag (Italian taxonomy 2011and 2009)	
Payables, advances, due within the following year	itcc-ci:DebitiAccontiEsigibiliEntroEsercizioSuccessivo
Payables, advances, due beyond the following year	itcc-ci:DebitiAccontiEsigibiliOltreEsercizioSuccessivo
Payables, trade accounts, due within the following year	itcc-ci: DebitiDebitiVersoFornitoriEsigibiliEntroEsercizioSuccessivo
Payables, trade accounts, due beyond the following year	itcc-ci: DebitiDebitiVersoFornitoriEsigibiliOltreEsercizioSuccessivo
Payables, payables represented by credit instruments, due within the following year	itcc-ci: DebitiDebitiRappresentatiTitoliCreditoEsigibiliEntroEsercizioSuccessivo
Payables, payables represented by credit instruments, due beyond the following year	itcc-ci: DebitiDebitiRappresentatiTitoliCreditoEsigibiliOltreEsercizioSuccessivo
Payables, due to subsidiary companies, due within the following year	itcc-ci: DebitiDebitiVersoImpreseControllateEsigibiliEntroEsercizioSuccessivo
Payables, due to subsidiary companies, due beyond the following year	itcc-ci: DebitiDebitiVersoImpreseControllateEsigibiliOltreEsercizioSuccessivo
Payables, due to associated companies, due within the following year	itcc-ci: DebitiDebitiVersoImpreseCollegateEsigibiliEntroEsercizioSuccessivo
Payables, due to associated companies, due beyond the following year	itcc-ci: DebitiDebitiVersoImpreseCollegateEsigibiliOltreEsercizioSuccessivo
Payables, due to parent companies, due within the following year	itcc-ci: DebitiDebitiVersoControllantiEsigibiliEntroEsercizioSuccessivo
Payables, due to parent companies, due beyond the following year	itcc-ci: DebitiDebitiVersoControllantiEsigibiliOltreEsercizioSuccessivo
Payables, due to tax authorities, due within the following year	itcc-ci:DebitiDebitiTributariEsigibiliEntroEsercizioSuccessivo
Payables, due to tax authorities, due beyond the following year	itcc-ci:DebitiDebitiTributariEsigibiliOltreEsercizioSuccessivo
Payables, due to social security and welfare	itcc-ci: DebitiDebitiVersoIstitutiPrevidenzaSicurezzaSocialeEsigibiliEn

institutions, due within the following year	troEsercizioSuccessivo
Total liabilities and shareholders' equity	itcc-ci:TotalePassivo
Total shareholders' equity	itcc-ci:TotalePatrimonioNetto

Table 6: Financial statement item XBRL tag (Italian taxonomy 2011and 2009)	
Payables, due to social security and welfare institutions, due beyond the following year	itcc-ci: DebitiDebitiVersoIstitutiPrevidenzaSicurezzaSocialeEsigibiliOltreEsercizioSuccessivo
Payables, other payables, due within the following year	itcc-ci:DebitiAltriDebitiEsigibiliEntroEsercizioSuccessivo
Payables, other payables, due beyond the following year	itcc-ci:DebitiAltriDebitiEsigibiliOltreEsercizioSuccessivo
Total payables	itcc-ci:TotaleDebiti
Accrued liabilities and deferred income, total accrued liabilities and deferred income	itcc-ci:PassivoRateiRiscontiTotaleRateiRisconti

Table 7: EU NACE code of bankrupt companies

40	C-Manufacturing
15	G-Wholesale and retail trade; repair of motor vehicles and motorcycles
1	A - Agriculture, forestry and fishing
1	M - Professional, scientific and technical activities
3	F – Construction
1	J - Information and communication
1	N - Administrative and support service activities
1	H – Transporting and storage
1	I - Accommodation and food service activities
Total companies : 64	

Table 8: SME categories of bankrupt companies

company size	number of companies
micro	9
small	24
medium-sized	31
Total SMEs	64

Table 9: EU NACE classification of the initial sample of bankrupt and non-bankrupt companies

Number of companies		
bankrupt	non-bankrupt	NACE code
21	21	C-Manufacturing
8	8	G-Wholesale and retail trade; repair of motor vehicles and motorcycles
1	1	I - Accommodation and food service activities
Total: 30	30	

Table 10: SME categories of the initial sample of bankrupt and non-bankrupt companies

	bankrupt	non-bankrupt
small	9	9
medium-sized	21	21
Total SMEs	30	30

Table 11: descriptive statistics in Euros (year n) for bankrupt and non-bankrupt companies

bankrupt companies	mean	min	max	sta.dev.	median
Ebit	- 6.176.344	-42.491.266	3.023.171	8.666.146	- 3.435.559
Ebitda	-5.295.030	-35.400.341	4.244.066	7.716.888	-2.602.095
Retained earnings	-787.103	-18.049.904	7.562.800	4.291.952	6.272
Total Liabilities	27.547.210	7.209.640	108.825.397	26.318.413	17.709.252
Book value of equity	-4.140.880	-49.890.406	9.582.376	10.538.409	-1.699.573
Total Assets	23.406.331	1.621.102	87.201.080	22.879.984	14.584.857
Current Assets	14.239.432	1.348.536	76.534.767	17.549.091	€ 8.002.228
Current Liabilities	18.745.404	0	81.257.291	19.554.860	10.722.421
Working capital	-4.505.972	-31.735.323	3.293.518	6.628.601	-3.581.739
non-bankrupt companies	mean	min	max	sta.dev	median
Ebit	1.422.641	-321.499	4.816.954	1.523.241	784.943
Ebitda	1.932.819	156.991	5.789.105	1.539.166	1.661.566
Retained earnings	3.959.582	213.652	13.411.767	3.442.082	2.925.065
Total Liabilities	14.981.345	3.922.192	40.356.363	8.078.702	12.927.565
Book value of equity	7.711.067	677.506	20.630.070	4.714.232	8.231.982
Total Assets	22.692.412	6.073.512	52.478.906	10.564.874	20.567.274
Current Assets	16.697.115	1.408.360	36.410.931	9.249.809	15.033.523
Current Liabilities	12.183.539	1.655.778	28.703.852	7.247.634	10.301.400
Working capital	4.513.576	-2.461.442	17.127.411	4.249.205	3.320.568

Table 12: M-score calculated over the investigation period of three years

	bankrupt			non-bankrupt		
	n	n-1	Tot.	n	n-1	Tot.
M-Score ≤ -1,78	29	25	54	27	27	54
M-Score > -1,78	1	5	6	3	3	6

Table 13: Beneish's ratios calculated over the investigation period of three years.

Ratios	bankrupt			non-bankrupt		
	n	n-1	Tot.	n	n-1	Tot.
DSRI	5	5	10	0	4	4
GMI	11	10	21	3	5	8
AQI	9	7	16	10	5	15
SGI	0	2	2	0	0	0
DEPI	3	10	13	5	5	10
TATA	3	8	11	9	14	23
LEVI	24	5	29	2	2	4
Tot. number of Red Flags	55	47	102	29	35	64

Table14: Beneish's statistically significant ratios calculated over the investigation period of three years

Ratios	bankrupt			non-bankrupt		
	n	n-1	Tot.	n	n-1	Tot.
DSRI	5	5	10	0	4	4
GMI	11	10	21	3	5	8
AQI	9	7	16	10	5	15
SGI	0	2	2	0	0	0
TATA	3	8	11	9	14	23
Tot. number of Red Flags	28	32	60	22	28	50