Ca' Foscari University of Venice
VENICE SCHOOL OF MANAGEMENT

Master's Degree
in Management – Accounting and Finance
in cooperation with university of Liège

Final Thesis

Earnings Management and Financial Reporting Integrity: An Empirical Analysis of EURO STOXX 50 Companies

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Academic Year
2023 / 2024

A heartfelt thank you to my supervisor, Prof. Carlo Marcon, for guiding and supporting me through this important phase of my academic career.
A special thanks to my family who has always been by my side and supported me by believing in me and supporting my every decision.
A further thank you to my fellow colleagues with whom I have shared wonderful moments during these years of study.
And finally, a big thank you to my friends and to all those who have been with me in some way along this journey.

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Introduction

The phenomenon of earnings management has for some years now become a widely discussed topic, following quite a few financial scandals in recent times. Understanding what it is and the reasons why it occurs is crucial for investors and all stakeholders in the company. In more detail, the main source of information for these stakeholders is the financial statements, through which corporate disclosure is made public, indispensable for them to build up a clear picture of the company of interest, its business and its economic-financial situation. Ideally, companies should select accounting methods and procedures to make estimates that reflect, as neutrally as possible, their performance.

However, the relationship between investors and managers is not, in most cases, characterised by transparency and this is where the possible presence of manipulation of financial statements comes into play, in order to meet investors' expectations and to the detriment of quality, truthful and reliable reporting. Figuring out which companies use manipulation is one of the most difficult tasks for analysts, and therefore numerous methods have been implemented to perform this examination. These methods very often do not aim at making decisive judgments as to the presence or absence of such a phenomenon, but more simply allow analysts to focus their attention on situations that might prove suspicious. This special attention is justified by the absolute necessity of deducing, from the limited information possessed, the real value of the company and its assets. From this point of view, the literature provides numerous models of analysis, both quantitative and qualitative, which, through an in-depth consultation of the financial statements, allow one to summarise the main aspects, in order to possibly recognise the presence of manipulation. In line with the objective of particular relevance just mentioned, this paper aims to investigate, through the application of a specific operational method, whether or not Earnings Management can be found within a sample of selected companies.

Chapter One first offers an examination of the long-standing and transversally widespread problem of earnings manipulation in the accounting literature. Through a theoretical-conceptual framing of the phenomenon of earnings management, all the fundamental stages of its evolutionary and doctrinaire path are retraced under the Italian and international business-economic perspective. By recognising to earnings quality measures the noble task of indicating whether and to what extent the economic result of

the financial year succeeds in accurately describing the current and prospective earnings capacity of the company, coherently with the perspective of the "usefulness of information for capital allocation decisions", we go back to the origins of earnings management, that is, to the pressure exerted by the opportunistic intentions of those who govern the company. By reviewing the multiple categorisations of earnings management and delving into the intrinsic characteristics of the various interpretative nuances, attention is focused on accruals, financial statement items which, given their natural exposure to the influence of subjective choices, easily lend themselves to being instruments of earnings manipulation.

Through the study of the discretionality inherent in the IAS/IFRS framework, which is constantly being updated, it is pointed out that there are real grey areas, which sometimes turn into loopholes in the accounting regulatory system, in which earnings management practices can lurk. In the same chapter, creative accounting is explained with the various forms of earnings management, each one helping to understand better the techniques used to manage financial results.

The second chapter is, in certain ways, more practical than the first one, constituted by the review of techniques and mathematic models created for the detection and measurement of earnings management. When earnings management is used, it is typically done so in a way that is difficult to see in the company's financial statements and to remain hidden. A company's competitiveness stems from having healthy finances and appropriate values for its financial metrics. Various statistical models have been established by research to process and combine specific accounting numbers in order to identify the existence of manipulations before their effects become obvious. In this paper, the more academically and professionally recognised methods are analysed, in particular Healey's model (1985), DeAngelo's model (1986), Jones' model (1991), Jones' modified model (1995) and Beneish's model (1999).

Chapter three is an empirical analysis on the companies listed in the EURO STOXX 50 index group, using the Beneish M-score model discussed at length in chapter two. This model has been widely recognized as accurate in the detection of earnings manipulation and hence forms the analytical tool to test whether such practices are prevalent among these prestigious European companies.

By undertaking a close analysis of the selected companies' financial statements, one may be able to find out how far earnings manipulation exists in the sample and provide a critical review of the quality of the financial reporting of the sample companies. If any

manipulation is detected, the investigation will further delineate the specific techniques of manipulations by these firms, thereby casting light on the variegated methods and tactics used for presenting distorted financial results. Moreover, the possible consequences of such manipulative activities for investors, regulators, and other participants will be analysed, hence providing a broader understanding of the risks associated with earnings manipulation in such major market players. This section will try to discuss how audit quality will affect earnings management in terms of discretionary accruals, while in Chapter 4, as identified in Chapter 1, managers often have more incentives to "manipulate" earnings to maximize the firm's or their own wealth.

These incentives arise both from explicit contracts that depend directly on reported earnings, such as management compensation plans and debt agreements, and from implicit contracts related to financial performance, such as those with customers and suppliers. In other cases, such as import relief negotiations, management buyouts, and proxy contests, reported earnings may play an influential role. Accordingly, the auditing process and the broader regulatory environment will be presented in detail by reviewing the relevant literature. This encompasses a review of the role of ethics within auditing, factors affecting audit quality, and the way auditing practices impact earnings management. This chapter concludes with analysing auditors of the sampled companies to gain an insight into how audit quality may shape financial reporting within those firms.

1. Creative Accounting: Fundamental Concepts

1.1 Purpose of financial statements

Financial statements are a structured representation of the financial position and financial performance of an entity. The objective of financial statements is to provide information about the financial position, financial performance, and cash flows of an entity that is useful to a wide range of users in making economic decisions. Financial statements also show the results of the management's stewardship of the resources entrusted to it. To meet this objective, financial statements provide information about an entity's:[1]

1. assets;
2. liabilities;
3. equity;
4. income and expenses, including gains and losses;
5. contributions by and distributions to owners in their capacity as owners; and
6. cash flows.

This information, along with other information in the notes, assists users of financial statements in predicting the entity's future cash flows and their timing and certainty.

The purpose of the financial statements is to provide economic and financial information about the company that enables current and potential investors, lenders, and other financiers to make decisions regarding the provision of resources to the company and thus decisions regarding the purchase, sale, and retention of equity and debt instruments as far as investors or potential investors are concerned, and decisions regarding the provision or termination of loans and other forms of financing as far as current and potential lenders and other financiers are concerned.[2] Making these decisions requires information that enables users to predict the entity's future cash flows and in particular their timing and certainty.

[1] IAS 1, paragraph 9.
[2] SOSTERO U., FERRARESE P., MANCIN M., MARCON C., *L'analisi economico-finanziaria di bilancio*, 2018, p.140.

The financial statements also need to set out the results of management by management and the resources entrusted to it.

According to IAS 1 therefore, the financial statements must give a true, fair, and clear representation of the financial position and must also provide relevant data on the company's true performance, useful to as many interlocutors as possible.

Considering the multifaceted nature of financial reporting, financial statements are designed to offer a holistic view of an entity's financial health. They go beyond merely presenting numbers; instead, they serve as a narrative of the entity's economic journey, reflecting its past performance and prospects. Through the disclosure of assets, liabilities, equity, income, expenses, and cash flows, financial statements provide stakeholders with valuable insights into the entity's strategic direction, risk profile, and operational efficiency. Moreover, the inclusion of supplementary notes enhances the comprehensibility and interpretability of financial information, enabling users to make more accurate assessments and forecasts. Thus, financial statements act as a conduit for transparent communication between the entity and its stakeholders, fostering trust, accountability, and informed decision-making in the financial marketplace.

Several studies, however, show how annual financial statements are not the primary channel used by investors to find information. The annual report is requested only 28.4 times in total by investors immediately after filing a 10-K on the SEC website. This lack of annual report requests suggests that investors generally don't do fundamental stock research. (Loughran and McDonald 2016)[3]

Three (official) financial sources contribute 28.5% of overall investor information when making financial decisions. On the contrary, 71.6% of the information came from multiple unidentified sources (the media, government statistics, etc.). (Ball and Shivakumar 2008[4]; Beyer et al. 2010[5]).

[3] Loughran, T., & McDonald, B. (2016). Textual analysis in accounting and finance: A survey. *Journal of Accounting Research*, *54*(4), 1187-1230.
[4] Ball, R., & Shivakumar, L. (2008). Earnings quality at initial public offerings. *Journal of accounting and economics*, *45*(2-3), 324-349.
[5] Beyer, A., Cohen, D. A., Lys, T. Z., & Walther, B. R. (2010). The financial reporting environment: Review of the recent literature. *Journal of accounting and economics*, *50*(2-3), 296-343.

One of the reasons for this is that within the IAS/IFRS accounting framework, discretion plays a significant role, in influencing accounting choices and allowing managers to exercise judgment beyond objective criteria. This discretion, increasingly central in accounting research, has raised concerns regarding the susceptibility of financial statements to manipulation. Despite the intent of international accounting standards to enhance comparability and transparency, the presence of discretionary space within these standards grants managers the ability to convey subjective managerial prospects, albeit with limitations, potentially impacting earnings quality. This communicative capacity, enabled by the IAS/IFRS framework, facilitates the transmission of private information to the market through the exploitation of discretionary space in accounting practices. Additionally, empirical evidence suggests that environmental factors and corporate characteristics significantly influence the use of discretion in accounting, irrespective of the accounting framework in place.

1.2 The IFRS accounting framework discretion

Accounting literature has traced the quality of earnings to heterogeneous factors, from business models to the characteristics of the environment in which the firm operates to the discretion present within the financial reporting accounting choices (Schipper & Vincent, 2003)[6]. In recent years, the presence within the IAS/IFRS accounting framework of a margin of discretion, which is reflected in accounting choices, and allows the manager to make judgments removed from objective criteria, has become increasingly central within accounting research, especially considering the widespread problems of manipulability of financial statements. The issue is not new at all. Several times, the realization of the weight of subjective assessments has raised the need to bring international attention and debate back to the effectiveness of accounting standards for reliable and transparent assessment of corporate performance (Barth et al., 2008)[7]. However, there is a belief that "such standards, issued by the International Accounting Standards Board (IASB), are designed to enhance the comparability of financial statements, to improve corporate transparency, and to increase the quality of financial reporting to benefit investors and to improve the functioning of financial markets" (Marra

[6] Schipper, K., & Vincent, L. (2003). Earnings quality. Accounting Horizons, 17(SUPPL.), 97-110.
[7] Barth, E., Landsman, W. and Lang, M. (2008) International Accounting Standards and Accounting Quality. Journal of Accounting Research, 46, 467-498.

et al., 2011)[8]. There was already theory in the past about the power granted to managers to implement the quality and informational scope of financial reporting through the use of specific accounting policies (Healy & Wahlen, 1998)[9]. The presence of discretionary space within the plots of the IAS/IFRS framework gives management the power to convey information about subjective managerial prospects for the company's future economic growth to the market, albeit with significant limitations, to the benefit of earnings quality (Ashbaugh & Pincus, 2001[10]; Ewert & Wagenhofer, 2005[11]; Daske & Gebhardt, 2006[12]). From this point of view, the implementation of the communicative capacity of financial statements, provided by the new IAS/IFRS accounting framework, enables the accounting system to transfer private information to the market through the exploitation of the discretionary space inherent in accounting recording practices (Daske et al., 2008[13]). Moreover, numerous empirical investigations have shown that the use of discretion in accounting is considerably influenced by a plurality of environmental factors and corporate characteristics, such as, for example, the structure of corporate governance systems, regardless of the nature of the relevant accounting framework (e.g., Ball, Kothari & Robin, 2000; Ball et al., 2003; Leuz, 2003; Ball & Shivakumar, 2005; Burgstahler, Hail & Leuz, 2006; Marra et al., 2011).

Italian business economics doctrine has also unanimously ascertained the role and relevance of discretionary evaluations in the representation of operating results. The presence of discretionary space has been recognized as a characteristic inherent in accounting practices, since financial statements are composed not only of certain values but also of estimated and conjectured values, which, by definition, are susceptible to subjective evaluations (Masini, 1961; Ferrero, 1965; Onida, 1970; Provasoli, 1974; Masini, 1979). From the perspective of financial statement formation logic, directors' discretion and exercise are intertwined aspects. Exercise, representing an abstract concept, involves

[8] Marra, Antonio & Mazzola, Pietro & Prencipe, Annalisa. (2011). Board Monitoring and Earnings Management Pre- and Post-IFRS. The International Journal of Accounting. 46. 205-230.

[9] Managers can then use their knowledge about the business and its opportunities to select reporting methods and estimates that match the firms' business economics, potentially increasing the value of accounting as a form of communication" (Healy & Wahlen, 1998, p.2).

[10] Ashbaugh, Hollis & Pincus, Morton. (2001). Domestic Accounting Standards, International Accounting Standards, and the Predictability of Earnings. Journal of Accounting Research.

[11] Ewert, R., & Wagenhofer, A. (2005). Economic effects of tightening accounting standards to restrict earnings management. *The Accounting Review*, *80*(4), 1101-1124.

[12] Daske, H., & Gebhardt, G. (2006). International financial reporting standards and experts' perceptions of disclosure quality. *Abacus*, *42*(3-4), 461-498.

[13] Daske, H., Hail, L., Leuz, C., & Verdi, R. (2008). Mandatory IFRS reporting around the world: Early evidence on the economic consequences. *Journal of accounting research*, *46*(5), 1085-1142.

isolating a portion of management's continuum for reporting purposes. This process, akin to a fiction, involves subjective elements that cannot be precisely objectified. Therefore, it can be argued that the discretion exercised by financial statement preparers is inherent in the conception of financial reporting (Pini, 1991)[14]. According to this interpretive perspective, although financial statement disclosures are the result of predominantly objective assessments, the margin of discretion constitutes a necessary tool for ensuring the reliability of period earnings, resulting from an inseparable mixture of accounting values and subjective managerial assessments, which is useful for estimating the actual current and prospective earnings capacity of the firm. The discretionary power inherent in some financial reporting policies is, therefore, a factor that does not in itself hinder the quality of earnings; rather, it is its misuse that can undermine its informational reliability (Pini, 1991). Therefore, only the presence of ethical behavior in managerial action guarantees the use of discretion in evaluations, aimed at transferring more timely and transparent information about corporate performance to stakeholders than an aseptic and mechanical process of recording accounting events that occurred during the fiscal year. At the same time, however, the presence of evaluative flexibility could lend itself to opportunities for financial statement manipulation (Marra et al., 2011)[15]. In fact, not infrequently the ultimate goal of managerial action seems to coincide with the presentation, addressed to shareholders and the market, of relatively homogeneous operating performance (Michelson et al., 2000)[16], concealing sudden surges that portend unstable earnings capacity. Therefore, it is reasonable to expect a deliberate and artificial normalization of income levels of adjacent administrative years, accomplished by exploiting the margin of discretion inherent in the IAS/IFRS accounting framework.

Financial statement items that are most amenable to subjective and discretionary assessments are recognized as accrual. The discretion present in the financial statements is partly attributable to the presence of accruals, but the reliability of operating income is not guaranteed by the absence of accruals. Accruals are components of income that are charged to the administrative year on an accrual basis but do not exert any impact on cash

[14] Pini M. (1991). Politiche di bilancio e direzione aziendale, Etas, Milano, p.6.
[15] "Reporting rules guided by the IFRS still leave considerable room for managerial judgments and for the use of private information, thus giving firms substantial reporting discretion" (Marra, Antonio & Mazzola, Pietro & Prencipe, Annalisa. (2011). Board Monitoring and Earnings Management Pre- and Post-IFRS. The International Journal of Accounting. p.209).
[16] Michelson, S.E., Jordan-Wagner, J., & Wotton, C.W. (2000). The Relationship between the Smoothing of Reported Income and Risk-Adjusted Returns. Journal of Economics and Finance, 24(2), 141-159.

flows for the period. These income components, although they do not enjoy a monetary manifestation in the fiscal year, allow the allocation of those costs and revenues that would otherwise be erroneously recognized in other periods. One characteristic of accruals is the impossibility of absolutely precise and definitive quantification, as is the case with all monetized income components. This is precisely why accruals can be subject to manipulation both when recognizing them and in defining their amount. The lack of monetary manifestation and the strictly economic nature expose accruals to the risk of being used not to ensure better credibility of financial statement reporting, but to carry out manipulation and concealment operations.

Although it is not reasonable to demonize the use of accruals in financial reporting to the advantage of cash flows, recognizing the former's noble task of ensuring a true and reliable representation of the year's economic performance (IASC, 1989)[17], it should also not be forgotten that accruals have been widely used in different historical eras and socio-economic contexts to carry out manipulations of financial statement disclosures, specifically to pursue earnings management policies. Accounting literature has investigated the characteristics of accruals and divided them into two broad macro categories: non-discretionary accruals and discretionary accruals. The former are considered "normal" components of operating income, because they are not favoured to pursue policies of financial statement manipulation, while the latter, being more exposed to subjective reporting choices, are conceived as manipulative tools, negatively impacting the quality of earnings and the reliability of the information scope of financial statements (Dechow et al., 1995[18]; 1996[19]).

The correct recognition of accruals, by managers, in a specific fiscal year, contributes to the achievement of the goal of reliable expression of operating earnings. Therefore, their erroneous or fraudulent imputation results in a true alteration of the economic impact of the management events that occurred in the fiscal year, causing an alteration in the amount of earnings and its informativeness (i.e., earnings quality). Accounting research has reserved particular interest for earnings management strategies developed through the use of accruals because of a triplicity of factors: the presence of accruals in the

[17] IASC stands for International Accounting Standards Committee.
[18] Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *Accounting review*, 193-225.
[19] Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary accounting research*, *13*(1), 1-36.

accounting methodologies provided by the General Accepted Accounting Principles (GAAP), the possibility of monitoring the nature of accounting choices, and the indispensable weight in terms of information that earnings possess, with the consequent influences in strategic choices in the capital market (Watts & Zimmermann, 1990[20]; Beneish, 2001[21]).

Among the major categories of accruals that are most likely to be manipulated for earnings management purposes are depreciation and amortization, accruals, impairment losses, accounting treatment of inventories, sales revenue, capitalization of deferred charges, and capitalization of development costs.

When the provision for product warranty is not proportional to the change in sales revenue, it can be assumed that a policy of manipulation of financial statements aimed at increasing or decreasing the level of earnings for the year. Similarly, the charging to the administrative year of deferred cost portions (depreciation allowances) that are anomalous to previous depreciation allowances or to the possible transfer of utility of the asset to which they refer could be a signal for financial statement manipulation, which can be detected from the appearance of higher or lower values than reasonably expected. However, it should be reiterated that, as of today, there is not universally valid and accepted rule for charging depreciation allowances to the fiscal year, since the development of the asset depreciation schedule is part of the operations subject to managerial discretion. In addition, the variables to be considered in establishing the depreciation allowance are so heterogeneous and independent that it is difficult to ascertain the actual correctness of charging a depreciation allowance to the fiscal year.

Inventory accounting strategies can also conceal opportunistic purposes. When the value of the change in inventories is found to be non-proportional or abnormal to the change in sales revenue, it would always be advisable to investigate the causes to avert financial statement manipulation. If these anomalies cannot be traced to business issues, then accounting manipulation can be assumed to have taken place. The amount of capitalized

[20] Watts, R. L., & Zimmerman, J. L. (1990). Positive accounting theory: a ten year perspective. *Accounting review*, 131-156.
[21] Beneish, M. D. (2001). Earnings management: A perspective. *Managerial finance*, *27*(12), 3-17.

costs can also be a tool to change the profit for the year, especially when these costs are inconsistent with the total capital stock assets (Prencipe et al., 2008)[22].

The above budget items are accruals that can be used within policies geared toward deflating the profit for the year. But there are also other budget items that, if manipulated, can affect profits, namely, revenues from sales of products and services. Anticipating or postponing the recognition of revenues to their proper accrual basis contributes to increasing or decreasing the overall level of operating income, respectively, in a manner consistent with specific disclosure purposes. The recognition and allocation of revenue to the income statement, in a specific fiscal year, is regulated in a timely and strict manner by the IAS/IFRS framework through IAS 18 - Revenue Recognition. Even though the latter does not leave room from an accounting standpoint for policies to manipulate income on the balance sheet, empirical evidence has repeatedly shown that the use of certain business strategies, such as promotional trade policies, allows managers to "choose" the exact timing of the allocation of income from the sale of goods and services to opportunistically increase or decrease the actual level of period earnings (Nelson et al., 2002[23]; Prencipe, 2006). One of the ways used to date to intercept a potential contractible manipulation of revenues from the sale of goods and services is to compare the annual amount of revenues with the annual amount of trade receivables (Prencipe, 2006)[24]. Likewise, the recognition of revenues that have not yet fully accrued, their deferral during a contract, and estimates of the counter value received when buying and selling represent actual accounting opportunities to engage in earnings management transactions (Nelson et al., 2002)[25].

Over time, the market has also come to recognize the potential instrumentality of accruals for financial statement manipulation transactions. Indeed, empirical investigations conducted in recent years have shown that investors tend to react negatively to the

[22] Prencipe, A., Markarian, G., & Pozza, L. (2008). Earnings management in family firms: Evidence from R&D cost capitalization in Italy. Family Business Review, 21(1), 71-88.
[23] Nelson, M. W., Elliott, J. A., & Tarpley, R. L. (2002). How are earnings managed? Examples from auditors. *Examples from auditors)*.
[24] Prencipe, A. (2006). Earnings quality. Principi e metodi di analisi della qualità degli earnings in una prospettiva internazionale. Pearson Education.
[25] For the sake of completeness, earnings management policies that involve intervention in revenue items also include the recognition, either in advance or deferred, of income from financial assets and related-party transactions, income arising from the estimation of the percentage of completion of work when evaluating multi-year contracts, and, finally, income subjected to a change in valuation criteria as a result of updated accounting standards (Nelson, Mark & Elliott, John & Tarpley, Robin. (2002). How Are Earnings Managed? Examples from Auditors. Accounting Horizons. 17.)

presence of abnormal accruals, since, regardless of the correctness/appropriateness of the imputation accounting transactions, they express a potential alteration of the bottom line (Sloan, 1996)[26]. When, on the other hand, the amount of accruals is deemed "normal," the market and stock price reflections are positive (Sloan, 1996). It has been shown that abnormal accruals are strongly correlated with earnings management incentives (Xie, 1998)[27]. The type of approach to assessing earnings quality adopted by market participants is reflected in the "Cash Flow Statement Approach" theory of Hribar and Collins (2002)[28]. The rationale behind the interpretation of the two scholars assumes that the higher the impact of accruals on earnings for the year, the lower the earnings quality. Since the purpose of management is often to show shareholders and the market relatively consistent year-to-year performance, without sudden swings that portend unstable earnings capacity, managers may perform a deliberate and artificial normalization of the income levels of adjacent administrative years through accruals, decompressing earnings when too high and inflating them when too low (Beidleman, 1973)[29] to increase stock returns (Michelson et al., 2000)[30]. Dechow and Skinner stated that "managers have become increasingly sensitive to the level of their firms' stock prices and their relation to key accounting numbers such as earnings. Consequently, their incentives to manager earnings to maintain and improve those valuations have also increased, which arguably explains why earnings management has received so much recent attention"[31]. Therefore, although accruals are a relevant component of financial statements to ensure transparency and reliability of financial statement disclosure, their easy manipulability to cash flows has negatively affected investors' evaluations. The issue of the correct timing

[26] Sloan, R.G. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings? The Accounting Review, 71(3), 289-315.
[27] Xie, H. (1998). Are discretionary accruals mispriced? A reexamination. Working paper, University of Iowa.
[28] Hribar, P., & Collins, D. W. (2002). Errors in estimating accruals: Implications for empirical research. *Journal of Accounting research*, *40*(1), 105-134.
[29] "Smoothing of reported earnings may be defined as the intentional dampening of fluctuations about some level of earnings that is currently considered to be normal for a firm. In this sense smoothing represents an attempt on the part of the firm's management to reduce abnormal variations in earnings to the extent allowed under sound accounting and management principles. [...] To the extent that the observed variability about a trend of reported earnings influences investors' subjective expectations for possible outcomes of future earnings and dividends, management might be able favorably to influence the value of the firm's shares by smoothing earnings" (Beidleman, 1973, p.653-654).
[30] Michelson, S.E., Jordan-Wagner, J., & Wotton, C.W. (2000). The Relationship between the Smoothing of Reported Income and Risk-Adjusted Returns. *Journal of Economics and Finance*, 24(2), 141-159.
[31] Dechow, P. M., & Skinner, D. J. (2000). Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting horizons*, *pag. 237.*

and amount of accruals to avert earnings management practices still arouses great interest in Accounting studies.

The international doctrine has addressed in numerous writings the issue of whether there is a measure of the optimal amplitude of subjective judgments in estimates and guesses when preparing financial statements since this freedom can be exploited for opportunistic purposes (Healy & Wahlen, 1998)[32]. Empirical evidence has shown that the only way to check whether there is indeed manipulation of financial statements through the leverage of discretionary accrual is to monitor the extent and recurrence of specific discretionary accruals over time, checking their consistency with business practices, business characteristics, and the economic environment. The assessment of consistency must be made based on the characteristics of the industry to which the company under consideration belongs, the type of business operating activity, the functioning of the market, daily business practices, past economic performance, and the particular characteristics of the relevant macroeconomic environment. Those analysing the content of financial statements can never be certain of the correct and necessary recognition in the year of specific accruals unless they obtain timely information from the manager about the process of making estimates and judgments (Bava, 2019)[33]. To date, however, there is still no absolute and universally accepted yardstick for the normality/abnormality of accruals recognized in the year.

1.3 From Agency Theory to managerial opportunism: the origins of Earnings manipulation

Investigations conducted on the subject of earnings management developed from two theoretical assumptions, widely debated within Agency Theory (Jensen & Meckling, 1976; Fama, 1980; Lambert, 1984): the asymmetry of purpose between managers and shareholders and the inherently opportunistic attitude of the former.[34] Two U.S.

[32] Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting horizons*, *13*(4), 365-383.
[33] Bava, F. (2019). La revisione del bilancio. Risk Approach: Pianificazione, Revisione delle voci di bilancio e verifica del Going Concern, Seconda edizione, Giuffrè Francis Lefebvre, 1-472.
[34] The "principal agent theory" suggests that the existence of a clear separation between the roles and interests of members who are part of the corporate ownership structure (i.e., shareholder) and those attributable to those who hold control of the firm (i.e, managers), with the specifics of information asymmetry, is instrumental in the emergence of a divergence of purpose, where the former wish to maximize equity value, while the latter intend to maximize economic and noneconomic benefits (i.e., compensation, bonuses, and reputation) from their position within the firm.

economists, Adolf Berle, and Gardiner Means, first expressed their views on the role of managers within corporations in the first half of the 20th century.

Berle and Means, in their book "Modern Corporation and Private Property," published in 1932, posited for the world's attention a view of corporate governance antinomian to that advocated by free-market theories, noting how managers' actions are oriented toward obtaining personal profit rather than pursuing the interests of the enterprise. According to the two economists, managers possess greater power than shareholders, who are regarded as passive and apathetic owners, because they can determine day-to-day business management choices with a relatively wide margin of autonomy. This separation of power and control means that the former can opportunistically administer the enterprise to protect personal interests to the detriment of the latter. Berle and Means' theses paved the way for theorizing on the corporate governance consequences of the modern widely held company (i.e., widely held company), where there is a separation between shareholders, who contribute venture capital, and managers, whose job it is to administer the enterprise. While the former claim the right of residual return on the income produced and have an interest in wealth maximization, the latter claim the right of control and possess the power, de facto, to sacrifice corporate profit maximization to pursue goals related to the personal utility function.

The theories of Berle and Means made a valuable contribution to the later development of Agency Theory, which attributes perfectly rational and conscious behavior to shareholders (principals) and managers (agents), each aimed at maximizing their utility function. Their position within the corporate structure means that principals, despite having all the rights associated with ownership, cannot exercise managerial power, thus entrusting it to agents, who are responsible for the creation of shareholder value. At the same time, the direct unobservability of managerial actions by members of the ownership structure creates the conditions that allow the former to engage in balance sheet manipulation operations for opportunistic purposes (i.e., income smoothing), resulting in harm or disadvantage to the latter (Lambert, 1984)[35]. Empirical evidence has shown that

[35] "When the shareholders of a firm delegate decision-making tasks to management, management has an incentive to select actions which maximize its own expected utility, even if these actions are not in the best interests of shareholders. It has been suggested that management can increase its own welfare by engaging in smoothing behavior" (Lambert, Richard A. "Income Smoothing as Rational Equilibrium Behavior." The Accounting Review, vol. 59, no. 4, 1984, p.604).

managers tend to protect private interests and maximize the remuneration of their work, "making shareholders happy" (Monsen & Downs, 1965)[36].

The "narrow conception of corporate governance" is the corporate governance system that best suits the context in which accounting manipulation takes place, precisely because of the clear separation of power and control and the potential presence of a conflict of interest[37]. Positive accounting theory is based on the assumption that managers are oriented toward enhancing and protecting personal benefits and that accounting choices can be a useful tool in pursuit of their goals.

The literature to date has dwelt extensively on the connection between managers' personal interests and earnings management operations and, with corroboration from empirical evidence, has shown that when firms' economic performance is higher and/or stable over time, sometimes as a result of earnings management or income smoothing policies, earnings for managers become higher (e.g., Holthausen & Leftwich, 1983; Healy, 1985; Watts & Zimmerman, 1986; McNichols & Wilson, 1988; Gaver et al., 1995; Holthausen et al., 1995; Guidry et al., 1999).

Studies have confirmed that managers are under very strong pressure to present economic results at the end of the financial year that are perfectly consistent with those expected/desired by the market, to influence the prices of the company's shares, and respond to the incentives linked to debt covenants, rating credit and intrinsically reputational needs (e.g., Watts & Zimmerman, 1978, 1990). To date, much of the international accounting and governance literature maintains that Earnings Management operations are profoundly conditioned by the individual characteristics of the chief executive officers (CEO), such as CEO duality, CEO nationality, and CEO age (Zhang & Wiersema, 2009; Bozanic et al., 2013)

The use of accounting manipulation policies and, more precisely, earnings management, by managers which leads to damage to the reliability and quality of financial statement information, is a phenomenon that has always aroused particular interest for accounting

[36] Monsen Jr, R. J., & Downs, A. (1965). A theory of large managerial firms. Journal of Political Economy, 73(3), 221-236.

[37] On the "narrow conception of corporate governance" refer to studies including Berle A. & Means G. (1932). The Modern Corporation and Private Property, New York, MacMillan; Pratt J., & Zeckhauser R. (1985). Principals and agents: The structure of business, Boston, Harvard Business School Press; Smith A., (1991). The wealth of nations, New York, Prometheus Books.

scholars, whose origin is to be placed in a historical moment very far from today's. As Arthur Levitt, the chairman of the Security Exchange Commission (SEC), declared in his speech "The numbers game" in 1998, companies too often resort to earnings management operations through "cookie jars", "big baths", anticipated revenues and other extra-accounting entries, manipulating the profits made and threatening the reliability of financial statements (Levitt, 1998)[38]. The scandals of the time, caused by Enron, WorldCom, Parmalat, Tyco International, and other international giants, denounced the use of financial statements as "marketing tools" rather than as a transparent and reliable information practice regarding the financial, equal, and economic operating result of the company (Fox, 1997).

The inefficiencies of the internal control and risk management systems, guilty of having created a context favourable to manipulation, also contributed to these scandals, which certainly can be traced back to the manipulative choices of opportunistic managers. A broad line of Accounting and Auditing research, thanks to the support of numerous empirical evidence, has repeatedly confirmed that the existence of integrated and efficient control systems within the company is negatively correlated to information manipulation operations budget (Dechow et al., 1996; Wild, 1996; Baxter & Coter, 2009; Arens et al., 2010; Alzoubi, 2019; Salem et al., 2020).

According to the empirical analysis of Healy and Wahlen (1998), earnings management operations are more likely to occur in correspondence with inefficiencies within the company's internal control system[39].

Today, as then, the socio-economic context in which management is called upon to operate, the pressure to achieve strategic and result objectives, and the desire to protect one's interests are factors that have remained unchanged. Indeed, in some ways, the evolutionary leap in competition, at a local, national, and international level, the technological revolution, which has made products and services (almost) immediately available in every part of the world, and the extreme volatility of the markets have exasperated results orientation. Since earnings are expressive of the economic success of the company's management strategically planned management, displaying high and/or

[38] Levitt Jr, A. (1998). The numbers game. The CPA Journal, 68(12), 14.
[39] "However, because auditing is imperfect, management's use of judgement also creates opportunities for 'earnings management', in which managers choose reporting methods and estimates that do not adequately reflect their firms' underlying economics" (Healy & Wahlen, 1998, p. 2).

stable earnings levels in the financial statements is equivalent to sending reassuring messages to the market on the good current and prospective earnings capacity of the company and the efficiency of managerial management. Likewise, a low and fluctuating level of earnings over time reveals to the market a lack of stability in company profitability, excessive volatility of results, and managerial inability. To protect one's position of strength within the company and ensure image and economic advantages (think for example of the benefits granted upon reaching specific profitability thresholds) or, in some cases, to create advantageous conditions company, managers could be encouraged to exploit the discretionary space present in the regulatory framework, which regulates accounting and the preparation of financial statements, to modify earnings, controlling their information content.

Accounting research, which investigated the regulatory conditions capable of creating space in the balance sheet that can be exploited for earnings management operations, recognized the discretion of some accounting practices (for example, when preparing estimates and conjectures), guaranteed by the framework of IAS/IFRS principles, a crucial role for understanding the methods and tools useful for financial statement manipulations.

1.4 Creative accounting

1.4.1 Definition of creative accounting

The impartiality and reliability of financial statements have come under criticism, especially in recent years during which numerous accounting frauds have come to light that has affected, all over the world, seemingly sound, prosperous, and profitable companies, which, through the practice of illicit and illegal ways, have altered and manipulated their financial statements.

Financial accounting is not an exact science, and it involves making significant judgments to present the company's financial situation in the fairest manner. In particular, both assets and liabilities may be of uncertain value, and the attribution of gains and losses across accounting periods may be open to interpretations. Almost nothing in accounting is black and white, and many of the things that are included in the company accounts could

plausibly have been accounted for differently. The accounts of a corporation can never be a perfect or unique representation (Gill, 2009)[40].

Areas, where judgment is key, are numerous in financial accounts and include sensitive decisions and in cases where judgment is required, and depending on their current situation, firms might be tempted to 'manage' their result and 'make up the numbers' so that they match with what they would like to show to the market stakeholders.

The question therefore is: why might companies be tempted to adapt their judgments opportunistically?

Before we delve into examples of creative accounting or fraud, we will define the terms as their terminology varies between countries. The US has a wider definition and includes fraud in creative accounting whereas the UK sees creative accounting as 'using the flexibility in accounting within the regulatory framework to manage the measurement and presentation of the accounts so that they give primacy to the interests of the preparers, not the users'. Creative accounting is thus seen in the UK as working within the regulatory system and is thus not considered to be illegal. Companies using creative accounting are not breaking the law but are using flexibility (exploiting loopholes) in accounting to serve their interests.

We will use the preferred definitions retained by Michael Jones (2011) in his book 'Creative Accounting, fraud and international scandals[41]:

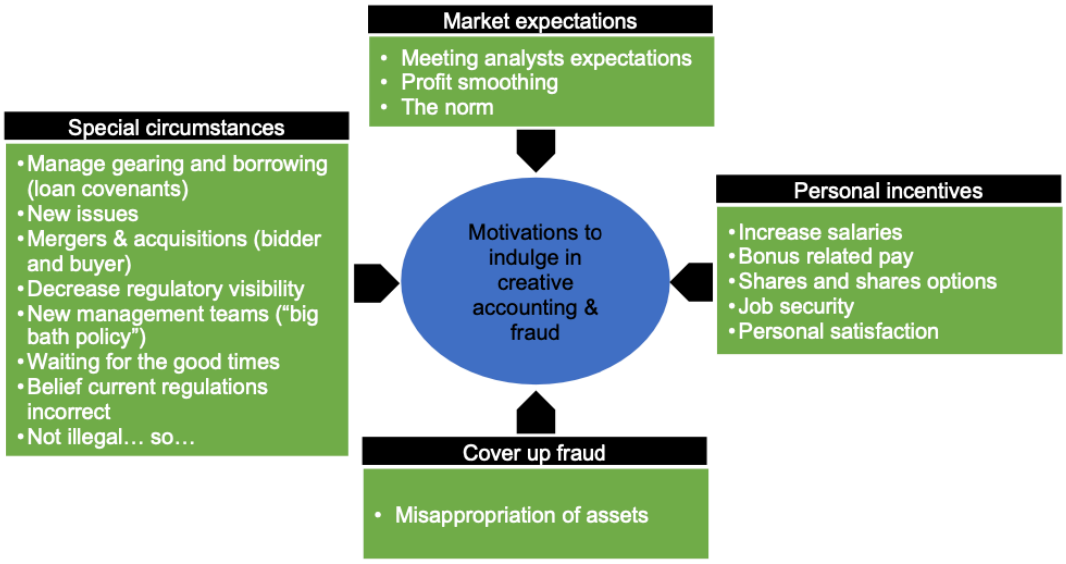
'Creative accounting means using the flexibility in accounting within the regulatory framework to manage the measurement and presentation of the accounts so that they give primacy to the interests of the preparers, not the users'.

'Fraud means the use of fictitious transactions or those prohibited by generally accepted accounting principles giving the presumption of fraud and which become proved after an administrative court proceeding'.

[40] Gill, A., Biger, N., Mand, H. S., & Mathur, N. (2013). Earnings management, firm performance, and the value of Indian manufacturing firms. International Research Journal of Finance and Economics, 116(1), 121-131.
[41] Jones, M. J. (2011). *Creative accounting, fraud and international accounting scandals*. John Wiley & Sons.

Michael Jones (2011) listed four main categories of motivation to indulge in creative accounting or fraud: personal incentives, market expectations, special circumstances, and cover-up fraud.

Figure 1.1: Motivation to indulge in creative accounting and fraud



Source: Creative Accounting, Fraud and International Accounting Scandals, Michael Jones (Editor), 2011

1.4.2 Personal incentives

Many stakeholders may have a personal interest, direct or indirect, to show a favourable financial picture of the company. Examples of incentives to show a flattering financial picture include the following situations: CEO's compensation includes a significant variable component that is mechanically linked to individual financial metrics or a combination of several (level of profits, top-line growth rate, cost reduction targets, share price evolution, ...). Even if there is no direct link to the remuneration of executives, they may feel that their prestige or personal satisfaction is deemed higher if they can demonstrate that they work in a profitable company and not in a loss-making one, or that their job security is higher.

However, incentives will not always work in the same direction. It is not unusual to see companies exploring the opportunity of a management change to 'clean the accounts' and operate what is known as 'the big bath policy' (*see 'Special circumstances'*). The rationale is the following: the worse the financial results are when the new management team

comes in and 'inherits' this poor financial situation, the higher the probability that future results will contrast positively and will benefit the new management team. In this instance, management might be tempted to take overly prudent assumptions to show low or negative results at the outset to maximize chances to improve the situation in the future.

1.4.3 Market expectations

Public companies are under the obligation (and if not under constant pressure) to regularly report on their earnings (quarterly reporting in the US) and financial analysts scrutinize those reports and expect companies to hit their target ('earnings guidance' as expected based on previous quarter results). Missing the target, even by a tiny percentage, often results in a significant and disproportionate negative impact on the stock's price. Shareholders (and senior executives themselves who often hold important quantities of stocks or options) naturally dislike such situations and this puts a lot of pressure to 'try and hit the numbers' and sometimes leads to the use of creative accounting, such as smoothing results (trying to keep profits growing year-on-year, so very profitable years lead such companies to be 'overly prudent' in their accounting policies so as tole to compensate when less profitable years will arise). Worse cases could involve deliberately setting up unauthorized accounting schemes to artificially justify continuous growth, which would qualify as outright fraud.

As an example, General Electric reported increased earnings for 50 straight quarters before 2000 but by the time the business was no longer growing as in the past it had, it became overly creative from an accounting perspective in the way it positively valued interest rate swaps. Based on ex-post analysis, the Securities and Exchange Commission ('SEC') confirmed in 2009 the existence of profit smoothing before 2000 and deliberate creative accounting after 2000 to show a better picture than reality.

1.4.4 Special circumstances

There are many specific circumstances where the risk of potential creative accounting is increased. A context of potential merger or acquisition may lead both the potential acquirer and the potential target to try to artificially manage their earnings upwards. Indeed, the more profitable a target seems to be, the more its value will tend to increase.

Similarly, the potential acquirer planning to buy its target through a share exchange might try to limit the number of shares he will need to issue, hence looking for ways to increase the individual value of its shares (increasing accounting profits usually leads to an increase in the share price).

The existence of strict loan covenants may also increase the risk of earnings management, or creative accounting in compliance with the strict ratios included in the covenants. For example, if the company that took the loan from a bank needs to ensure at all times that its net equity always exceeds 30% of its total balance sheet (otherwise the bank will be entitled to full and immediate reimbursement of the loan), it might be tempted to 'creatively' increase its net equity, or to 'creatively' reduce the size of its balance sheet.

On the contrary, industries subject to intense public scrutiny (e.g. banks after the massive financial crisis of 2008) might be tempted to creatively reduce the level of their published profits to mitigate the perception that 'they privatize profits but make their losses borne by the collectivity'.

1.4.5 Cover up fraud

Unfortunately, financial history has a long list of accounting scandals which very often had as a starting basis at least some of the above components. However, even though accounting is not an exact science and leaves some room for creative interpretations while staying within the remit of the law, some companies have engaged in clearly illegal schemes before ultimately exploding and falling rapidly into bankruptcy when the fraudulent scheme was uncovered.

Enron (2001) and Worldcom (2002) are among the most famous frauds. Those scandals had a devastating effect on many stakeholders (investors, employees, suppliers, stock analysts). It also destroyed Arthur Andersen, the audit firm at the time of those two companies, which collapsed very quickly in 2002 because its other audit clients lost trust in its ability to perform as a respectable audit firm, and unilaterally terminated their audit mandate.

1.5 Earnings Management

1.5.1 Definition of earnings management

As with creative accounting, there are different definitions of earnings management as well.

Purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (Schipper, 1989)[42]

The choice by a manager of accounting policies, or real actions, to achieve some specific objective (Scott, 2015)[43].

Earnings management can be viewed from both a financial reporting and a contracting perspective.

- financial reporting perspective: managers may use earnings management to avoid reporting losses, to meet analysts' earnings forecasts, and to obtain bonuses.
- Contracting perspective: Report a stream of smooth and growing earnings over time. Given securities market efficiency, this requires management to draw on its inside information. Thus, earnings management can be a vehicle for the communication of management's inside information. Income smoothing leads to the interesting, and perhaps surprising, conclusion that some earnings management can be useful from a financial reporting perspective.

As such, earnings management can be divided into:

- Accounting-related policies: While the dividing line is not clear-cut, it is convenient to divide accounting policy choices into two categories:
    - choice of accounting policies: as straight-line versus declining-balance amortization, or policies for revenue recognition.
    - discretionary accruals: such as provisions for credit losses, warranty costs, inventory values, and timing and amounts of low-persistence special items such as write-offs.

[42] Schipper, K. (1989). Earnings management. *Accounting horizons*, *3*(4), 91.
[43] Scott, W. R. (2015). Financial Accounting Theory. Second Edition. Scarborough, Ontario: Prentice Hall Canada Inc.

- Real actions: Giving heavy discounts to make more sales in December to achieve earnings targets. Postponing investments to increase the available cash-at-hand in any given year. Those are deviations from optimal business practices.

So, accounting-related earnings management uses accruals reversal and thus is a temporary accounting artifact and is more easily detectable while real activities earnings management is not ex-ante detectable and for their nature, they are more likely to have long-term consequences.

In this paper, we will focus on Accounting-related earnings management.

1.5.2 Forms of earnings management

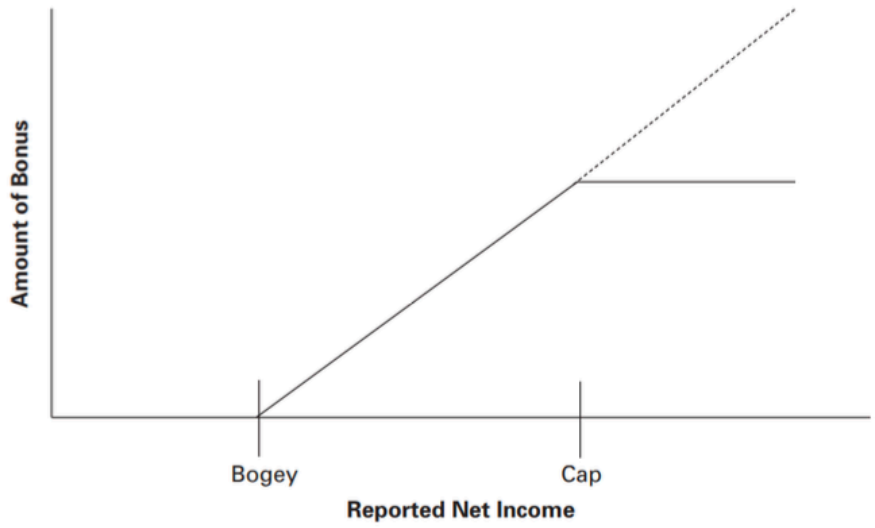
The main forms of earnings management are the following:

- Taking a bath: If a firm must report a loss, management may feel it might as well report a large one, it has little to lose at this point. Consequently, it will take a "big bath" by writing off assets, providing for expected future costs, and generally "clearing the decks". Because of accrual reversal, this enhances the probability of future reported profits.
- Income minimization: This is similar to taking a bath but less extreme. Such a pattern may be chosen by a politically visible firm during periods of high profitability, or when firms seek legislation to protect themselves from foreign competition.
- Income maximization: From contract theory, managers may engage in a pattern of maximization of reported net income for bonus purposes, providing this does not put them above the cap. Firms that are close to debt covenant violations may also maximize income.
- Income smoothing: From a contracting theory perspective, risk-averse managers prefer a less variable bonus stream, other things equal. This can reduce the volatility and thus the risk associated with the firm.

1.5.3 Accounting-related earnings management

In 1985, Paul Healy published a very important academic paper: "The Effect of Bonus Schemes on Accounting Decisions"[44]. Healy observed that managers have inside information on the firm's net income before earnings management. Since outside parties, including the board itself, may be unable to learn what this number is, he predicted that managers would manage net income to maximize their bonuses under their firms' compensation plans.

Figure 1.2: Incentives for earnings management



Source: Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. Journal of accounting and economics, 7(1-3), 85-107.

If net income is low (that is, below the bogey), the manager has an incentive to lower it even further (that is, to take a bath). If no bonus is to be received anyway, the manager might as well adopt accounting policies to further reduce reported net income. In so doing, the probability of receiving a bonus the following year is increased since current write-offs will reduce future amortization charges.

[44] Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. Journal of accounting and economics, 7(1-3), 85-107.

Similarly, if net income is high (above the cap), there is motivation to adopt income minimization policies, because a bonus is permanently lost on reported net income greater than the cap. If net income is between the bogey and cap, the manager is motivated to adopt accounting policies to increase reported net income.

Healy assumed that accruals were the predominant way in which such net income is managed. That is, Net income = Cash flow from operations + Net accruals or differently,

Net income = Cash flow from operations + Net non-discretionary accruals + Net discretionary accruals

Figure 1.3: Example of usage of net accruals

Cash flow, as per cash flow statement		**1000**
Less: Amortization expense	-50	
Add: Increase in net accounts receivable during the year	40	
Add: Increase in inventory during the year	100	
Add: Decrease in accounts payable and accrued liabilities during the year	30	120
Net income, as per income statement		**1120**

As you can see the table above shows an example you can see how the net income increased by 12% using net accruals, and more specifically net non-discretionary accruals (Changing the amortization policy) and net discretionary accruals (doubtful accounts, increase inventory to spread overhead costs over multiple items and assuming less warranty claims).

While Healy (1985) wasn't able to differentiate between discretionary and non-discretionary accruals, he looked at the total accruals that were observed. He then observed significantly different behavior depending on where the manager is located with regard to compensation structure. From the analysis conducted by Healy, 91 per cent managers who are below bogey go to implement policies to increase profits, managers who are above bogey go in 90 per cent to implement policies to decrease profits. If they are in between, the situation is stable with managers who prefer to increase and managers who prefer to decrease profits, depending on other variables.

Figure 1.4: Proportion of Firm Years with income increasing

	Proportion of Firm Years with Income-Increasing		Number of Observation	Average Accruals
	Income-Increasing	**Income-Decreasing**		
Below the bogey	0,09	0,91	22	-0,0671
In between	0,46	0,54	281	0,0021
Above the cap	0,10	0,90	144	-0,0536
			447	

Source: Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. Journal of accounting and economics, 7(1-3), 85-107.

1.5.4 Real activities earnings management

According to Healy and Wahlen (1999), ‘‘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.’’ A number of studies discuss the possibility that managerial intervention in the reporting process can occur not only via accounting estimates and methods, but also through operational decisions. Healy and Wahlen (1999), Fudenberg and Tirole (1995), and Dechow and Skinner (2000) point to 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.

Roychowdhury defines real activities manipulation as departures from normal operational practices, motivated by managers’ desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations. These departures do not necessarily contribute to firm value even though they enable managers to meet reporting goals.[45] Certain real activities manipulation methods, such as price discounts and reduction of discretionary expenditures, are possibly optimal actions in certain economic circumstances. However,

[45] Managers engage in these activities either because they perceive private benefits to meeting the reporting goals or because they are acting as agents in value-transfers amongst stakeholders. An example of the latter would be earnings management to avoid debt covenant violation or to avoid governmental intervention.

if managers engage in these activities more extensively than is normal given their economic circumstances, with the objective of meeting/beating an earnings target, they are engaging in real activities manipulation according to the definition given by Roychowdhury.

Graham et al. (2005)[46] executed an interesting survey with top managers and found that CEOs/CFOs generally prefer real activities manipulation over accruals manipulation, as a way to manage earnings for three reasons:

- Involve current or future cash flows.
- Tougher to be challenged by auditors.
- Less regulatory scrutiny

Roychowdhury (2006)[47] argues that firms try to avoid losses in three ways:

- boosting sales through accelerating timing and/or generating additional unsustainable sales through increased price discounts or more lenient credit terms.
- overproducing and allocating more overhead to inventory and less to the cost of goods sold.
- reducing aggregate discretionary expenses (Research and development, Advertising and Selling, General and Administrative expenses) to improve margins.

1.5.5 Share Buybacks

Over the last decades, one form of activity manipulation has become quite prominent: share buybacks.

In an effort to align the interests of managers and shareholders, the majority of publicly traded U.S. corporations compensate top management for meeting performance targets. These interests are thought to be best served at many large corporations by tying CEO

[46] Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of accounting and economics*, *40*(1-3), 3-73.
[47] Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of accounting and economics*, *42*(3), 335-370.

success to measures derived from the stock price of the company as well as earnings per share.

These indicators could not, however, accurately represent a business's operational performance. Stock repurchases have the potential to influence them, and they frequently do. Buybacks raise demand for a company's shares in addition to reducing the number of outstanding shares, which raises EPS. This raises the share price, which in turn influences other performance indicators.

Rising CEO compensation linked to EPS and other short-term performance metrics is driving allegations that executives are exploiting stock repurchases as a means of personal enrichment at the expense of capital investment, employment, and long-term corporate health as corporate America embarks on an unprecedented buyback spree.

A Reuters[48] analysis of the companies in the Standard & Poor's 500 Index found that 255 of those companies' reward executives in part by using EPS, while another 28 use other per-share metrics that can be influenced by share buybacks. In addition, 303 also uses total shareholder return, essentially a company's share price appreciation plus dividends, and 169 companies use both EPS and total shareholder return to help determine pay. EPS and share-price metrics underpin much of the compensation of some of the highest-paid CEOs, including those at Walt Disney Co., Viacom Inc., 21st Century Fox Inc., Target Corp, and Cisco Systems Inc.

Fewer than 20 of the S&P 500 companies disclose in their proxies whether they exclude the impact of buybacks on per-share metrics that determine executive pay.

So, for example, managers at information technology company EMC Corp hit their EPS target for 2014 of $1.90 with the help of $3.7 billion in share repurchases. Based on the share count before the buybacks, EPS last year would have been only $1.81, little changed from $1.80 a year earlier, according to a Reuters calculation. The EPS target accounted for half of CEO Joseph Tucci's annual $1.01 million bonus. It also is used to determine 45 percent of bonus share awards for the company's future three-year targets.

[48] "Stock buybacks enrich the bosses even when business sags" By Karen Brettell, David Gaffen and David Rohde. https://www.reuters.com/investigates/special-report/usa-buybacks-pay/

In conclusion, the prominence of share buybacks as a form of activity manipulation has raised concerns about their impact on executive compensation and long-term corporate health. While buybacks can artificially inflate metrics like earnings per share (EPS) and share price, their influence on executive pay remains significant, with many CEOs rewarded based on these metrics. The lack of disclosure regarding the exclusion of buybacks from per-share metrics further underscores the need for transparency and accountability in corporate governance practices.

2. Detection methods for earnings manipulation

2.1 Different accruals methods

Usage of earnings management usually wants to be invisible, to be undetected, and also it is difficult to detect it from the firms´ financial statements. Appropriate values of financial indicators and financial health are the basis of a company's competitiveness. Research has developed different statistical models that process and combine certain accounting quantities to detect the presence of manipulations before the effects of those manipulations become overt. There are mainly two different categories of models are identified:

1. **Total or aggregate accruals methods**: The difference in earnings and operating cash flow will result in total accruals. Total accruals include discretionary and non-discretionary accruals. The adjustments stipulated by the rules of accounting are known as non-discretionary accruals; and when managers opt for the adjustments, those are discretionary accruals. In other words, due to the flexibility of accounting rules, discretionary accruals could be employed by managers as a method of exercising their inclination toward accounting approaches and estimates that allow earnings manipulation (Dechow 1994[49]).
2. **Single accruals methods:** Unlike the total accruals method, the single accruals method focuses on specific accruals. Much research has sought to demonstrate earnings management through specific accruals. A statistical model focusing on single accruals originated from a study conducted by Beneish in 1999[50] on a sample of profit-manipulating firms. By studying balance sheet data, this model can detect distortionary effects or warning signs and symptoms of manipulation.

The most popular models of earnings management detection are:

- Healey Model (1985);
- De Angelo Model (1986);
- Jones Model (1991);
- Modified Jones Model (1995);

[49] Dechow, Patricia M. "Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals." *Journal of accounting and economics* 18.1 (1994): 3-42.
[50] Beneish, Messod D. "The detection of earnings manipulation." Financial Analysts Journal 55.5 (1999): 24-36.

- Beneish (1999).

2.2 Mathematical detection models

2.2.1 The Healy Model

The pioneer in discretionary accruals' estimation is Healy (1985)[51]. This model defines estimated discretionary accruals in a period as total accruals scaled by lagged total assets. In this method, total accruals are estimated through the variance in earnings and cash flow in operation. This implies that non-discretionary accruals are expected to be zero.

Healy is the first researcher to use total accruals to research the phenomenon of earnings management. In the academic paper of 1985, he develops the theses set out in the 1983 dissertation with the intention to test and expand on the claims of Watts (1977)[52] and Watts & Zimmerman (1978)[53] regarding the opportunistic behaviour of CEOs. CEOs. The two researchers observed that the remuneration schemes of top management provide an incentive for managers to select ways of accounting and estimate items in the financial statements to increase the present value of their fees. The publication by Healy (1985) illustrates and tests a hypothetical behavioural scheme according to which managers carry out accounting manipulations in contexts characterised by a declared relationship between the remuneration paid to them and the profits earned by the company.

The author, unconcerned about the motivation for which managers are remunerated according to such schemes, is intent on observing whether there is evidence of the conjectured opportunistic behaviour.

Healy investigates the validity of his theory by basing the empirical research on a sample consisting of 94 companies observed over a time interval of fifty years (1930-1980). The actual data used are for 'firm-year' pairs for which the researcher has detailed information about the remuneration components of managers.

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[51] Healy, Paul M. "The effect of bonus schemes on accounting decisions." Journal of accounting and economics 7.1-3 (1985): 85-107.
[52] Watts, Ross L. "Corporate financial statements, a product of the market and political processes." *Australian journal of management* 2.1 (1977): 53-75.
[53] Watts, Ross L., and Jerold L. Zimmerman. "Towards a positive theory of the determination of accounting standards." Accounting review (1978): 112-134.

The most widely used remuneration scheme, net of additional trappings of various kinds, assumes the payment of a supplementary bonus if profits are earned in an amount at least equal to a predetermined threshold. The additional remuneration is often calculated as a fixed percentage of the share exceeding the predetermined threshold, and sometimes a further limit binds the bonus to a ceiling.

Excluding for obvious reasons several considerations and assumptions extensively explored in the original essay, the opportunistic behaviour of managers assumed by Healy is shown through a graphical representation in the publication. Assuming that the accounting distortion is operated by acting solely on the accruals and that the only motive is to increase the present value of the beneficiaries' remuneration, the illustration proposed by the researcher shows the hypothetical path of discretionary accruals as a function of non-manipulable earnings (i.e. the sum of operating cash flows and non-discretionary accruals). Borrowing the typical jargon of game theory, it can be said that Healy's graph shows the 'optimal response' of managers regarding the accounting of discretionary accruals.

If managers were not able to reach the threshold for receiving the bonus, even by upward accounting manipulations, they would reasonably account for negative discretionary accruals in order to improve the future performance of the company from a big-bath-oriented perspective. If the sum of non-discretionary accruals and operating cash flows would instead identify an intermediate point between the threshold for access to the bonus and the maximum threshold beyond which no additional remuneration would be obtained, managers would be incentivised to book positive discretionary accruals and thus increase the surplus receivable at the end of the year.

Above the upper threshold, the incentive changes sign again as the wish to defer to the future an otherwise uncollectable additional remuneration takes shape.

Healy's model is therefore:

$$NDA_\tau = \frac{\sum_t TA_t}{T}$$ [54]

Kaplan (1985)[55] primarily contests the failure to separate discretionary accruals from non-discretionary accruals in a publication, Healy's, in which this difference is formally enshrined and rigorously supported. He also emphasises that non-discretionary accruals are closely linked to further economic-financial aspects and that therefore their amount not only cannot be disregarded but also cannot be considered constant between separate financial years.

Despite the innovative features to be found in Healy's publication, the model he used to test the hypotheses set out in it appears to be flawed from the outset and with ample room for improvement; and the reinterpretation proposed by Dechow et al. (1995)[56] is not sufficient to eliminate the most significant problems.

2.2.2 The De Angelo Model

The year after Healy's publication, an interesting academic essay by De Angelo analyses the possible connection between balance sheet policies and management buyout operations. In the first part of the publication, the author clarifies the common ways in which the voluntary delisting of a company takes place and recalls previous articles in which opportunistic behaviour of managers (as well as probable future entrepreneurs) is hypothesised in order to simplify or reduce the costs of the operation. What is immediately apparent is the incentive of top management to reduce the value of shares in order to reduce the disbursements necessary for the acquisition of the entire capitalisation (go private). To protect the outside (outsider) shareholders, however, the law requires the involvement of the competent public authority to ensure that transactions take place without prejudice to the 'expropriated' counterparties. The authority, often assisted by an independent bank, assesses the fairness of compensation

[54] NDA = Estimated non discretionary accruals;
TA = total accruals scaled by lagged total assets;
t = 1, 2,...T is a year subscript for years included in the estimation period; and
τ = a year subscript indicating a year in the event period.
[55] Kaplan, Robert S. "Evidence on the effect of bonus schemes on accounting procedure and accrual decisions." Journal of Accounting and Economics 7.1-3 (1985): 109-113.
[56] Dechow, Patricia M., Richard G. Sloan, and Amy P. Sweeney. "Detecting earnings management." Accounting review (1995): 193-225.

by looking at a variety of factors, including the market value of the shares and the profits earned by the company over time.

By engaging in accounting manipulations to suppress profits in the years leading up to the management buyout, managers may be able to distort not only the market price but also a significant portion of the information on which the authority relies to grant approval.

DeAngelo (1986)[57] presumed that the accruals' variance between the present and previous periods is the result of discretionary accruals' changes where non-discretionary accruals could remain fixed over the years so that non-discretionary accruals follow a random walk and uses the change in the aggregate accruals from year t-1 to year t to represent the discretionary component.

The De Angelo model for non-discretionary accruals is:

$$NDA_{\tau} = TA_{\tau} - 1$$

Interestingly, the model employed by DeAngelo can be considered a particular version of Healy's model, and since both models assume non-discretionary accruals constant over the survey period, Kaplan's criticism of Healy's model can be extended to DeAngelo's model.

2.2.3 The Jones Model

Jones' 1991[58] publication focuses on an entirely new context. The academic study in which the most famous earnings management research model is presented is oriented towards ascertaining the possible use of balance sheet policies in conjunction with investigations by the ITC (United States International Trade Commission), based on which the central government evaluates the enactment of protectionist measures.

The author sets the context of her research by first describing the reasons for and manner in which the ITC investigations are conducted. Since the United States is configured globally as an open economy, under laws and treaties regulating trade with other

[57] DeAngelo, L. E. (1986). Accounting Numbers as Market Valuation Substitutes: A Study of Management Buyouts of Public Stockholders. The Accounting Review, 61, 400-420.
[58] Jones, Jennifer J. "Earnings management during import relief investigations." Journal of accounting research 29.2 (1991): 193-228.

countries, free trade and the transfer of foreign goods into the American market are made possible.

Despite the lawfulness of imports, under certain conditions, they can be particularly harmful to the domestic economy. If there were to be an excessive mismatch in quality and/or production costs between domestic and foreign products, the competitiveness of US companies would be compromised, and serious repercussions would be felt in terms of employment and the economic well-being of the nation. To avoid such scenarios, special laws allow companies in the industrial sectors most adversely affected by imports to request intervention and protectionist measures from the central government.

The decision on the legal safeguards is, however, subject to in-depth investigations by the ITC, the authority in charge of verifying the economic conditions and alleged suffering of domestic producers. In accordance with legal regulations, the ITC conducts its analyses by first observing the book values of companies that are plausibly unable to face foreign competition. If the data collected finds a generally distressed situation in the sector under investigation, the authority issues a verdict in favour of the introduction of protectionist measures; conversely, if the results obtained do not support the arguments put forward by the companies requesting central government intervention, the ITC's verdict results in a nullity.

From the point of view of the companies involved, there is an interest in obtaining a ruling of actual injury, after which protectionist measures are likely to be introduced for their benefit.

The context described by the author clearly shows the incentive for the downward manipulation of profits during the period of the investigation.

To corroborate or discredit the stated hypotheses, the author relies on the empirical analysis of a sample of 23 companies from five industries that were subjected to at least one investigation by the ITC between 1980 and 1985.

Jones conducts an initial analysis following precisely the pattern found in DeAngelo's academic research. Although the results obtained were in line with the manipulation

hypothesis, the author recalls Kaplan's (1985)[59] criticism of Healy's model and illustrates valid reasons to distrust the quality of the evidence obtained. Due to the nature of the context analysed, the increased competitive pressure to which producers in the sectors under investigation are subjected constitutes a non-negligible element for the estimation of non-discretionary accruals.

Jones' model was born precisely to re-examine the hypothesis of the hypothesis of the temporal immutability of non-discretionary accruals, which was not considered credible for the scope of the study.

for the scope of the study. The dependence of the non-discretionary accruals on the total accruals was examined using a regression study.

Looking at the Jones model from the point of view of Dechow et al. (1995)[60], it can be summarised through the following expression:

$$NDA_{\tau} = \alpha_1 \left(\frac{1}{A_{\tau}-1}\right) + \alpha_2 \left(\frac{\Delta\ \mathrm{REV}_{\tau}}{A_{\tau}-1}\right) + \alpha_3 \left(\frac{\mathrm{PPE}_{\tau}}{A_{\tau}-1}\right) + \varepsilon_{\tau}$$[61]

Jones (1991) believes that the variations in revenue would bring variations in operating capital, causing a change in accruals, and the depreciation on fixed assets would decrease the accruals. Because of this, Jones uses variance of revenue (∆ REV) and fixed asset (PPT), as independent variables to predict the discretionary accruals.

The author of the model under review uses the change in revenue and production-related fixed assets to also allocate the component due to changes in the company's economic conditions to the non-discretionary accruals.

2.2.4 The Modified Jones Model

[59] Kaplan, Robert S. "Evidence on the effect of bonus schemes on accounting procedure and accrual decisions." Journal of Accounting and Economics 7.1-3 (1985): 109-113.
[60] Dechow, Patricia M., Richard G. Sloan, and Amy P. Sweeney. "Detecting earnings management." Accounting review (1995): 193-225.
[61] ΔREVt = revenues in year τ less revenues in year τ-1 scaled by total assets at τ-1
PPEt = gross property plant and equipment in year τ scaled by total assets at τ-1
Aτ-1 = total assets at τ-1; and
α1, α2, α3 = firm-specific parameters

Dechow, Sloan, and Sweeney in their paper "Detecting Earnings Management" published in 1995 analyse the models previously listed in this paragraph and propose a variant of the Jones model, the so-called “Modified Jones Model (1995)”. Their work proposes the standardisation of the mathematical and statistical procedures contained in the academic papers of interest, followed by an in-depth comparative analysis of the techniques used. From an operational point of view, the researchers test the discriminatory capacity of the models by applying them to specific, specially constructed samples.

As part of the research, a variant of the Jones model is formulated. It is designed with the aim of eliminating source distortions if accounting manipulations are also implemented on revenue items.

In the modified Jones model (so-called by the authors themselves), non-discretionary accruals are estimated using the following formulation:

$$NDA_{\tau} = \alpha_1 \left(\frac{1}{A_{\tau}-1}\right) + \alpha_2 \left(\frac{\Delta\ \mathrm{REV}_{\tau} - \Delta\ \mathrm{REC}_{\tau}}{A_{\tau}-1}\right) + \alpha_3 \left(\frac{\mathrm{PPE}_{\tau}}{A_{\tau}-1}\right)$$ [62]

The only appreciable difference between the model proposed by the three researchers and Jones' original model concerns the second term of the equations. In order to loosen the original assumption that alterations on revenues are absent, the authors hypothesise that such manipulations take place only with regard to the companies' receivables. They justify this assumption by arguing that managers are primarily induced to alter revenues by acting on credit items rather than through cash flows.

It is worth noting that the limitations of Jones' model are only partly removed by Dechow et al. (1995)[63]; in fact, if alterations based on accruals are implemented in conjunction with direct balance sheet policies, the measure of earnings management provided by the modified model is still compromised. In particular, estimates of discretionary accruals are

[62] ΔREVt = revenues in year τ less revenues in year τ-1 scaled by total assets at τ-1
PPEt = gross property plant and equipment in year τ scaled by total assets at τ-1
Aτ-1 = total assets at τ-1; and
α1, α2, α3 = firm-specific parameters
ΔRECt = net receivables in year τ less net receivables in year τ-1 scaled by total assets at τ-1

[63] Dechow, Patricia M., Richard G. Sloan, and Amy P. Sweeney. "Detecting earnings management." Accounting review (1995): 193-225.

distorted in the same direction as discussed for the Jones model, although the magnitude of the inaccuracies is now lower.

2.2.5 The Beneish Model

The Beneish model was developed in 1999 by Professor Messod D. Beneish[64]. It consists of eight indices that capture discrepancies in financial statements that may arise from profit manipulation or other fraudulent activities. Current data in the financial statements form the basis for the calculation of indices, which generate an overall M-score, characterizing the degree of possible manipulation or fraudulent activities such as concealment or fraud.

The total accruals models have been the subject of much criticism since the results obtained from the application of linear regression are unable to distinguish accruals that result from the exercise of managerial discretion from those that result from changes in the firm's economic performance, McNicholos (2000)[65]. Within this, one is inclined to assert that discretionary accruals estimates have considerable inaccuracies and that the model in question randomly decomposes earnings into the discretionary and nondiscretionary components.

A second criticism advanced against Jones' model arises concerning the company-specific model used to estimate the relationship between total accruals and their explanatory factors. To estimate company-specific parameters, a time sample covering at least ten years is required, thus going so far as to exclude growth companies with no historical memory.

To overcome, at least in part, these limitations, research has proposed models based on individual accruals or sets of specific accruals deemed relevant to a given sector.

Again, we are not talking about perfect models since the choice to base one's judgment on individual or a few accruals is constrained by the assumption that these indicators are

[64] Beneish, Messod D. "The detection of earnings manipulation." Financial Analysts Journal 55.5 (1999): 24-36.
[65] McNichols, Maureen F. "Research design issues in earnings management studies." Journal of accounting and public policy 19.4-5 (2000): 313-345.

capable of reflecting all or much of the discretion used by management to manipulate accounting results. In addition, an element to be taken into consideration is the need to possess a deep knowledge of individual sectors of economic activity; to which is also added the knowledge that for some sectors significant accruals are numerous.

Despite the various aspects to be taken into consideration, it is generally agreed that the method of single accruals as a whole is the most accurate and advantageous among those considered so far. Because of these evaluations, the model that Beneish proposes is thought to be the best at spotting early indicators of potential manipulation.

2.3 The Beneish model in detail

In 1999, Messod D. Beneish, Professor at the Kelly School of Business (Indiana University) in his paper "The detection of Earnings Manipulation" proposed a model for detecting accounting manipulations on financial statement data based on the systematic relationship, which he identified, between the probability of manipulation and financial statement variables.[66]

Beneish defines earnings manipulation as an instance where management violates Generally Accepted Accounting Principles (GAAP) to beneficially represent the firm's financial performance.[67]

He created variables using financial statement data to capture the impacts of manipulation and the circumstances that would lead businesses to partake in it. He discovered that factors that account for the concurrent raising in asset accounting have predictive content since manipulation usually entails artificial inflation of revenues or deflation of expenses. Additionally, he discovered that sales growth possesses discriminatory power since sample manipulators are characterized by strong growth before times in which manipulation is in effect.

The model promoted by Beneish stems from comparing the characteristics of a sample of manipulative companies with a group of non-manipulative companies belonging to the

[66] M. D. BENEISH, *The Detection of Earnings Manipulation*, Financial Analyst Journal, 1999
[67] M. D. BENEISH, *The Detection of Earnings Manipulation*, Financial Analyst Journal, 1999 page. 3

same industries. From the comparison of the two samples, it was possible to extrapolate the qualitative differences that characterize the presence of accounting fraud.

Beneish discovered that sample manipulators frequently inflate their profits by falsely reporting income that is unclear or undeserved, creating phony inventories, or capitalizing expenses incorrectly.

The model was estimated by Beneish to detect earnings manipulation by utilizing a dataset comprising both sample manipulators and industry-matched firms spanning from 1982 to 1988. Subsequently, the performance of the model was evaluated on a separate holdout sample covering the years 1989 to 1992. Notably, the model was designed to effectively differentiate between manipulative and non-manipulative firms, achieving pseudo-R2 values of 30.6% and 37.1% through two distinct estimation approaches. The findings underscored that the likelihood of manipulation heightened in instances characterized by:

- abnormal surges in receivables;
- declining gross margins;
- diminished asset quality, as per later delineations;
- rapid sales expansion;
- escalating accruals.

When financial statement manipulations extend beyond earnings to encompass various other indicators relied upon by investors and analysts, the discriminatory capability of accounting data is compromised. Consequently, this scenario may skew the outcomes, making it challenging to reject the null hypothesis concerning the coefficients of the variables, thus constraining the effectiveness of utilizing accounting information in detecting earnings manipulation. In the absence of a comprehensive economic theory of manipulation, three primary sources serve as the basis for selecting explanatory variables derived from financial statement data. Firstly, signals regarding prospects, as documented in academic and practitioner literature, are taken into account. The underlying assumption posits that instances of earnings manipulation are more prevalent when firms face bleak prospects. Secondly, variables grounded in cash flows and accruals,

as outlined by Healy (1985)[68] and Jones (1991)[69], are considered. Lastly, variables originating from positive theory research, which postulates contract-based incentives for earnings management as elucidated by Watts and Zimmerman (1986)[70], are also included in the analysis.

The Beneish model is based on the study of eight variables constructed based on different balance sheet items. These variables, in turn, focus on different aspects inherent in the company's performance; specifically:

- DSRI, GMI, and TATA are variables predisposed to studying the company's ability to generate cash and profits through its operations.
- SGI and LVGI seek to detect the presence of conditions and incentives that could encourage management to apply accounting standards to its advantage, crossing the boundary of legality;
- AQI, DEPI, and SGAI are indicators that allow for the assessment of the company's investment in assets and its ability to manage costs.

The m-score model is a mathematical model that was created by Professor Messod Beneish. Using eight variables related to financial ratios, Beneish (1999) developed a powerful tool for distinguishing earnings manipulators and non-manipulators. Since the introduction of the original M-score, the model has been widely used in many financial statements and academic research articles directed at auditors, certified fraud examiners, and investment professionals (Anh & Linh, 2016)[71]. Beneish, (1999) built a set of eight indicators (DSRI, GMI, AQI, SGI, DEPI, SGAI, LVGI, and TATA) which allow us to identify the probability of earnings management.

The model is measured by the following equation:

$$Mscore = -4{,}840 + 0{,}920\ DSRI + 0{,}528\ GMI + 0{,}404\ AQI + 0{,}892\ SGI + 0{,}115\ DEPI - 0{,}172\ SGAI - 0{,}327\ LVGI + 4{,}679\ TATA$$

[68] Healy, Paul M. "The effect of bonus schemes on accounting decisions." Journal of accounting and economics 7.1-3 (1985): 85-107.
[69] Jones, Jennifer J. "Earnings management during import relief investigations." Journal of accounting research 29.2 (1991): 193-228.
[70] Watts, Ross L., and Jerold L. Zimmerman. "Towards a positive theory of the determination of accounting standards." Accounting review (1978): 112-134.
[71] N.H. Anh, N.H. Linh / VNU Journal of Science: Economics and Business, Vol. 32, No. 2 (2016) 14-23

Below, the measurement of each variable is discussed along with the anticipated impact on the likelihood of manipulation.

1. DSRI = Days sales in receivables index.

$$DSRI = \frac{\frac{Receivables\ (t)}{Sales\ (t)}}{\frac{Receivables\ (t-1)}{Sales\ (t-1)}}$$

DSRI is the ratio of days sales in receivable in the first year in which earnings manipulation is uncovered (year t) to the corresponding measure in year t-1. This variable gauge whether receivables and revenues are in or out-of-balance in two consecutive years. A substantial surge in days sales in receivables might stem from a shift in credit policy aimed at stimulating sales amid heightened competition. However, if the increase in receivables outpaces the growth in sales disproportionately, it could suggest potential revenue inflation. Therefore, it is anticipated that a significant increase in days sales in receivables would correlate with a heightened likelihood of revenue and earnings overstatement.

2. GMI = Gross margin index.

$$GMI = \frac{\frac{Sales\ (t-1) - Cost\ of\ Goods\ Sold\ (t-1)}{Sales\ (t-1)}}{\frac{Sales(t)\ -\ Cost\ of\ Goods\ Sold\ (t)}{Sales\ (t)}}$$

GMI is the ratio of the gross margin in year t-1 to the gross margin in year t. When GMI is greater than 1, it indicates that gross margins have deteriorated. Lev and Thiagarajan (1993)[72] suggest that gross margin deterioration is a negative signal about firms' prospects. Given that firms with poorer prospects are presumed to be more inclined towards engaging in earnings manipulation, it is anticipated that there would be a positive

[72] Lev, Baruch, and S. Ramu Thiagarajan. "Fundamental information analysis." Journal of Accounting research 31.2 (1993): 190-215.

correlation between GMI (Gross Margin Index) and the likelihood of earnings manipulation.[73]

3. AQI = Asset quality index

$$AQI = \frac{\frac{1 - \ Current\ Assets\ (t) + PPE\ (t)}{Total\ Assets\ (t)}}{\frac{1 - \ Current\ Assets\ (t-1) + PPE\ (t-1)}{Total\ Assets\ (t-1)}}$$

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. AQI is the ratio of asset quality in year t, relative to asset quality in year t-1. AQI is an aggregate measure of the change in the asset realization risk analysis suggested by Siegel (1991). If AQI is greater than 1 it indicates that the firm has potentially increased its involvement in cost deferral.[74]
Hence, a positive correlation between AQI (Asset Quality Index) and the probability of earnings manipulation is expected. An increase in asset realization risk signifies an elevated propensity towards capitalization, consequently deferring costs.

4. SGI = Sales growth index

$$SGI = \frac{\text{Sales (t)}}{\text{Sales (t} - 1)}$$

SGI is the ratio of sales in year t to sales in year t-1. Growth does not imply manipulation, but growth firms are viewed by professionals as more likely to commit financial statement fraud because their financial position and capital needs put pressure on managers to achieve earnings targets (National Commission on Fraudulent Financial Reporting (1987)[75], National Association of Certified Fraud Examiners (1993)). In addition,

[73] It is possible that manipulation of inventories and other production costs can lead to increasing gross margins. This would suggest that either increased or decreased gross margins can increase the likelihood of manipulation.
[74] It's possible that acquisitions involving Goodwill are somewhat responsible for the increase. Sample manipulators do, however, rarely make acquisitions; when they do, it's usually through stock-for-stock trades that are settled by pooling of interests.
[75] Reporting, Fraudulent Financial. "Report of the National Commission on Fraudulent Financial Reporting." (1987).

concerns about controls and reporting tend to lag behind operations in periods of high growth (National Commission on Fraudulent Financial Reporting (1987), Loebeckke et al. (1989)). If growth firms face large stock price losses at the first indication of a slowdown, they may have greater incentives to manipulate earnings. To this effect, Fridson (1993, pp. 7-8) states: "Almost invariably, companies try to dispel the impression that their growth is decelerating, since that perception can be so costly to them."
Consequently, a positive correlation between SGI (Sales Growth Index) and the probability of earnings manipulation is anticipated.

5. DEPI = Depreciation Index

$$DEPI = \frac{\frac{Depreciation\ (t-1)}{Depreciation\ (t-1) + PPE\ (t-1)}}{\frac{Depreciation\ (t)}{Depreciation(t)\ +\ PPE\ (t)}}$$

DEPI is the ratio of the rate of depreciation in year t-1 vs the corresponding rate in year t. The depreciation rate in a given year is equal to depreciation/ (depreciation + net PPE). A DEPI greater than 1 indicates that the rate at which assets are depreciated has slowed down raising the possibility that the firm has revised upwards the estimates of asset's useful lives or adopted a new method that is income increasing. Thus, a positive correlation between DEPI (Depreciation Index) and the probability of manipulation is anticipated.

6. SGAI = Sale, General and Administrative expenses (SG&A) index

$$SGAI = \frac{\frac{Sales,\ General\ and\ Administrative\ expense\ (t)}{Sales\ (t)}}{\frac{Sales,\ General\ and\ Administrative\ expense\ (t-1)}{Sales\ (t-1)}}$$

SGAI is calculated as the ratio of SGA to sales in year t relative to the corresponding measure in year t-1. The variable is used following Lev and Thiagarajan‘s (1993)[76] suggestion that analysts would interpret a disproportionate increase in sales as a negative signal about a firm's prospects. Accordingly, a positive correlation between SGAI (Sales

[76] Lev, Baruch, and S. Ramu Thiagarajan. "Fundamental information analysis." Journal of Accounting research 31.2 (1993): 190-215.

General and Administrative Expenses Index) and the probability of manipulation is expected.

7. LVGI = Leverage index

$$\text{LVGI} = \frac{\frac{Long\ term\ Debt\ (t) + Current\ liabilities\ (t)}{Total\ Assets\ (t)}}{\frac{Long\ term\ Debt\ (t-1) + Current\ liabilities\ (t-1)}{Total\ Assets\ (t-1)}}$$

LVGI is the ratio of total debt to total assets in year t relative to the corresponding ratio in year t-1. An LVGI greater than 1 indicates an increase in leverage. The variable is included to capture debt covenant incentives for earnings manipulation. Assuming that leverage follows a random walk, LVGI implicitly measures the leverage forecast error. The change in leverage in firms' capital structure is utilized, drawing upon evidence from Beneish and Press (1993), which suggests that such changes are associated with the stock market effect of default.

8. TATA = Total accruals to total assets

$$TATA = \frac{\begin{array}{c} \Delta Current\ Assets\ (t) - \Delta\ Cash\ (t) - \Delta Current\ Liabilities\ (t) \\ - \Delta Current\ maturities\ of\ LTD\ (t) \\ -\Delta\ Depreciations\ and\ amortization\ (t) \end{array}}{Total\ Assets(t-1)}$$

Total accruals are calculated as the change in working capital accounts other than cashless depreciation. Either total accruals or a partition thereof has been used in prior work to assess the extent to which managers make discretionary accounting choices to alter earnings (see for example Healy (1985), and Jones (1991). Total accruals to total assets are employed as a proxy for the extent to which cash underlies reported earnings. It is anticipated that higher positive accruals (indicating less cash) would be associated with a heightened likelihood of earnings manipulation. The index is a red flag for analysts when it takes on a positive value because, since accruals are not a real resource existing in the company, if their value is higher than that of total assets then earnings are the result of forecasts and estimates; consequently, the risk of balance sheet manipulation increases.

The value expected from TATA may be negative or zero; in these cases, operating cash flow exceeds or equals assets, and, therefore, assets consist entirely of cash values and not accruals.

In applying the model as a tool for identifying manipulative firms, the choice of the cut-off value against which to discriminate assumes a key role.

To identify this cut-off value, Beneish starts from the assumption that the model is probabilistic and that, consequently, misclassification error is ineradicable.

The errors can be of two types:

- *Type I error*: it can classify a firm as a non-manipulator when it manipulates;
- it can classify a firm as a manipulator when it does not manipulate.

Considering that Type I error imposes a higher cost on an investor, Beneish determined the cut-off value by calculating a score for each different combination of the probabilities of the two types of errors occurring, until reaching a cut-off value that minimizes the costs associated with misclassification errors. The author estimates that the relative cost of the two types of errors (Type I to Type II) for an investor falls within a range of 20:1 to 40:1. This estimation is based on the assumption that a firm discovered to be manipulative loses approximately 40% of its market value on a risk-adjusted basis in the quarter when the discovery of falsification occurs, whereas normally this same measure tends to grow by 1-2% each quarter. From this, it is inferred that between 20 and 40 non-manipulative companies in an investor's portfolio are needed to offset any losses resulting from the discovery of fraud in a manipulative company in the portfolio.

Taking this ratio into account, Beneish estimates that the model, with a ratio of 20:1 (where every twenty companies in the portfolio include one manipulative), correctly identifies 74% of manipulators while erroneously identifying 13.8% of non-manipulators as manipulators. The cut-off level obtained from these considerations is -1.78.

Alternatively, if a ratio of 40:1 is chosen, the value of the M-score is -1.89, capable of identifying 76% of manipulative firms but misclassifying 17.5% of non-manipulators.

It is evident, therefore, that as the threshold value (in absolute terms, but still negative) increases, the model improves its ability to correctly identify manipulative firms but loses accuracy in correctly identifying non-manipulative firms.

Beneish's chosen cut-off value for his model is -1.78, but despite this, the commonly accepted standard value in the literature is -2.22, which is identified as the symbolic threshold above which the probability of the company having manipulated its financial statements is high.

Finally, it is important to underline that, after having overcome the threshold, investigators should not stop at the first appearance of fraud but have to make further in-depth analysis. This is because changes in the economic context-in such cases, an acquisition during the period analyzed or a change in the company's strategy-could distort accounting values without necessarily underlining the presence of financial statement manipulation.

3. Empirical Analysis of Earnings Management in EUROSTOXX 50 Companies: Application of the Beneish M-Score Model

In this chapter, we would provide the empirical analysis using the Beneish M-score model, as outlined in the previous chapter for those companies constituting the EURO STOXX 50 index. The Beneish model has been one of the leading analytical tools in studying earnings manipulation and will be applied in testing selected European leading companies. This study, therefore, checks if the selected firms bear the presence and magnitude of earnings manipulation in the sample by analyzing their financial statements. We will dive into which specific techniques the companies used, given that some manipulation is found, and discuss implications for investors and other stakeholders involved.

3.1 Sample presentation

The empirical analysis was carried out using companies in the EUROSTOXX 50 stock index as the analysis sample. The Euro Stoxx 50 is a stock index developed by Stoxx, a company which designs, provides, and maintains the indices of Deutsche Börse and SIX Group, consisting of Eurozone stocks. It comprises 50 of the largest and most liquid stocks from eleven Eurozone countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. The index serves as a proxy to investors who want an indication of what goes on with the largest companies in the Eurozone. The constituents on the index represent diverse industries, ranging from technology to finance and from healthcare to consumer goods. Major names are there in this index, which are multinational giants. They are known to form the backbone of the economy of the Eurozone and their market capitalization is appreciable.
Whereas the index originally included fifty firms, thirteen have been excluded since they operate financial and/or insurance activities. This means that they belong to a different accounting discipline, therefore being compared to the other companies is quite hard and meaningless.

From the initial fifty companies in the EUROSTOXX 50[77] index, 13 companies are excluded because they engage in financial and or insurance activities and are therefore subject to a

[77] The list was obtained from the official site of EUROSTOXX50, https://stoxx.com.

different accounting discipline that makes comparison with the other companies complicated and meaningless.

Figure 3.1: EUROSTOXX 50 Companies

COMPANY	**Country**	**Sector**	**Included in the analysis**
VOLKSWAGEN AG	DE	Transport Manufacturing	YES
TOTALENERGIES SE	FR	Mining & Extraction	YES
STELLANTIS N.V.	NL	Transport Manufacturing	YES
BAYERISCHE MOTOREN WERKE AG	DE	Transport Manufacturing	YES
MERCEDES-BENZ GROUP AG	DE	Transport Manufacturing	YES
ENEL SPA	IT	Utilities	YES
DEUTSCHE TELEKOM AG	DE	Communications	YES
AXA SA	FR	Banking, Insurance & Financial Services	NO
ENI S.P.A.	IT	Mining & Extraction	YES
KONINKLIJKE AHOLD DELHAIZE N.V.	NL	Retail	YES
LVMH MOET HENNESSY LOUIS VUITTON	FR	Textiles & Clothing Manufacturing	YES
DEUTSCHE POST AG	DE	Transport, Freight & Storage	YES
SIEMENS AG	DE	Computer Software	YES
BASF SE	DE	Chemicals, Petroleum, Rubber & Plastic	YES
VINCI	FR	Construction	YES
AIRBUS SE	NL	Transport Manufacturing	YES

BANCO SANTANDER SA	ES	Banking, Insurance & Financial Services	NO
ANHEUSER-BUSCH INBEV SA/NV	BE	Food & Tobacco Manufacturing	YES
IBERDROLA SA	ES	Utilities	YES
BAYER AG	DE	Chemicals, Petroleum, Rubber & Plastic	YES
SANOFI	FR	Chemicals, Petroleum, Rubber & Plastic	YES
BNP PARIBAS	FR	Banking, Insurance & Financial Services	NO
L'OREAL	FR	Chemicals, Petroleum, Rubber & Plastic	YES
SCHNEIDER ELECTRIC SE	FR	Industrial, Electric & Electronic Machinery	YES
INDUSTRIA DE DISENO TEXTIL S.A.	ES	Textiles & Clothing Manufacturing	YES
BANCO BILBAO VIZCAYA ARGENTARIA SA	ES	Banking, Insurance & Financial Services	NO
MUNCHENER RUCKVERSICHERUNGS-GESELLSCHAFT AKTIENGESELLSCHAFT IN MUNCHEN	DE	Banking, Insurance & Financial Services	NO
CRH PLC	IE	Leather, Stone, Clay & Glass products	YES
SAP SE	DE	Industrial, Electric & Electronic Machinery	YES

L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE	FR	Chemicals, Petroleum, Rubber & Plastic	YES
DANONE	FR	Food & Tobacco Manufacturing	YES
ASML HOLDING N.V.	NL	Industrial, Electric & Electronic Machinery	YES
INTESA SANPAOLO S.P.A.	IT	Banking, Insurance & Financial Services	NO
UNICREDIT SPA	IT	Banking, Insurance & Financial Services	NO
ESSILORLUXOTTICA	FR	Industrial, Electric & Electronic Machinery	YES
SAFRAN	FR	Transport Manufacturing	YES
ING GROEP NV	NL	Business Services	NO
NOKIA OYJ	FI	Communications	YES
ADIDAS AG	DE	Textiles & Clothing Manufacturing	YES
KERING	FR	Retail	YES
INFINEON TECHNOLOGIES AG	DE	Industrial, Electric & Electronic Machinery	YES
FLUTTER ENTERTAINMENT PUBLIC LIMITED COMPANY	IE	Travel, Personal & Leisure	YES
HERMES INTERNATIONAL	FR	Textiles & Clothing Manufacturing	YES
PERNOD RICARD	FR	Food & Tobacco Manufacturing	YES
NORDEA BANK ABP	FI	Banking, Insurance & Financial Services	NO
PROSUS NV	NL	Communications	NO
VONOVIA SE	DE	Property Services	YES

DEUTSCHE BOERSE AG	DE	Banking, Insurance & Financial Services	NO
ADYEN N.V	NL	Banking, Insurance & Financial Services	NO
ALLIANZ SE	DE	Banking, Insurance & Financial Services	NO

The companies excluded from the index are:

- AXA SA;
- BANCO SANTANDER SA;
- BNP PARIBAS;
- BANCO BILBAO VIZCAYA ARGENTARIA SA;
- MUNCHENER RUCKVERSICHERUNGS-GESELLSCHAFT AKTIENGESELLSCHAFT IN MUNCHEN;
- INTESA SANPAOLO S.P.A.;
- UNICREDIT SPA;
- ING GROEP NV;
- NORDEA BANK ABP;
- PROSUS NV;
- DEUTSCHE BOERSE AG;
- ADYEN N.V;
- ALLIANZ SE.

All engaged in financial, insurance, or related activities.

The companies included in the analysis are:

Figure 3.2: Companies composing the analysed sample

COMPANY	Last avail. Year	Operating revenue (Turnover)th EUR Last available year	Market capitalisation EUR Last available year
VOLKSWAGEN AG	2023 [78]	331,771,000	34,614.04
TOTALENERGIES SE	2023	198,610,771	148,594.71
STELLANTIS N.V.	2023	189,544,000	66,846.33
BAYERISCHE MOTOREN WERKE AG	2023	156,056,000	60,669.08
MERCEDES-BENZ GROUP AG	2023	155,395,000	66,971.82
ENEL SPA	2023	144,015,000	51,138.40
DEUTSCHE TELEKOM AG	2023	126,067,000	108,081.49
ENI S.P.A.	2023	95,267,000	51,813.89
KONINKLIJKE AHOLD DELHAIZE N.V.	2023	89,149,000	24,775.79
LVMH MOET HENNESSY LOUIS VUITTON	2023	86,153,000	368,302.69
DEUTSCHE POST AG	2023	83,652,000	55,571.81
SIEMENS AG	2023	78,169,000	108,240.00
BASF SE	2023	70,711,000	43,470.29
VINCI	2023	70,055,000	67,964.02
AIRBUS SE	2023	65,689,000	110,490.42
ANHEUSER-BUSCH INBEV SA/NV	2023	54,377,351	101,487.06
IBERDROLA SA	2023	50,159,000	75,377.80
BAYER AG	2023	49,056,000	33,107.69
SANOFI	2023	47,048,000	113,527.57
L'OREAL	2023	41,182,500	240,974.03
SCHNEIDER ELECTRIC SE	2023	36,167,000	104,130.11
INDUSTRIA DE DISENO TEXTIL S.A.	2023	35,948,000	123,762.25
CRH PLC	2023	31,628,040	37,764.29

[78] The latest available cash-flow statement on the Orbis database is the 2022.

SAP SE	2023	31,207,000	171,499.20
L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE	2023	27,910,500	92,244.20
DANONE	2023	27,619,000	39,771.73
ASML HOLDING N.V.	2023	27,558,500	274,819.45
ESSILORLUXOTTICA	2023	25,416,000	82,416.24
SAFRAN	2023	24,849,000	68,130.97
NOKIA OYJ	2023	22,312,000	17,371.37
ADIDAS AG	2023	21,577,000	33,217.20
KERING	2023	19,649,000	49,244.89
INFINEON TECHNOLOGIES AG	2023	16,501,000	41,064.69
FLUTTER ENTERTAINMENT PUBLIC LIMITED COMPANY	2023	13,588,364	28,411.38
HERMES INTERNATIONAL	2023	13,437,000	202,566.59
PERNOD RICARD	2023	12,155,000	51,739.86
VONOVIA SE	2023	6,266,700	23,364.02

The top five companies in terms of capitalisation are 'LVMH MOET HENNESSY LOUIS VUITTON', a leader in the fashion industry, with a capitalisation of EUR 368 billion, followed by 'ASML HOLDING N.V.', a manufacturer of chip-making equipment, with a capitalisation of EUR 274 billion. In third place was 'L'OREAL' with 240 billion, followed by another French company 'HERMES INTERNATIONAL' with 202 billion, and in fifth place 'SAP SE' with 171 billion.

Within the index, the most represented sector is 'Transport Manufacturing' with six companies, a sector that includes the automotive segment (Volkswagen, BMW, Mercedes, Stellantis) but also aviation (Airbus, Safran). The second most represented sector is 'Chemicals, Petroleum, Rubber & Plastic' tied with 'Industrial, Electric & Electronic Machinery' both with five companies.

Figure 3.3: Sectors composing the analysed sample

Sector[79]	Companies
Transport Manufacturing	6
Chemicals, Petroleum, Rubber & Plastic	5
Industrial, Electric & Electronic Machinery	5
Textiles & Clothing Manufacturing	4
Food & Tobacco Manufacturing	3
Communications	2
Mining & Extraction	2
Retail	2
Utilities	2
Computer Software	1
Construction	1
Leather, Stone, Clay & Glass products	1
Property Services	1
Transport, Freight & Storage	1
Travel, Personal & Leisure	1

The most represented nationalities within the sample are undoubtedly France and Germany with thirteen and twelve companies respectively.

Figure 3.4: Nations composing the analysed sample

Nation	Company
France	13
Germany	12
Netherlands	4
Spain	2
Ireland	2
Italy	2
Belgium	1
Finland	1

[79] The classification by sector is extracted from the Orbis database.

3.2 Assumptions and methodology of analysis

3.2.1 Differences between US GAAP and IFRS

Before proceeding with the presentation and analysis of the results obtained, it is necessary to clarify how the models were implemented in the present work.

As previously announced, the model devised by Beneish was constructed based on the US economic context, whereas, in the present study, the European economic context will be analysed, with its relative differences. Given the differences in regulation between the US and Europe, the individual components of the indices comprising the Manipulation Score do not perfectly overlap. US financial statements are prepared on principles of US GAAP, while European companies present statements on principles of IFRS. The major issues where US GAAP and IFRS diverge include:

1. GAAP is rules-based, while IFRS is principles-based: The most important difference between GAAP and IFRS perhaps has something to do with the difference in methodology, with GAAP being rules-based, while IFRS are principles-based. While rules are more rigid and leave less room for judgment, principles are more general and provide a flexible framework for financial statements.
2. Various inventory valuation methods are permitted: The three various methods of inventory valuation that are permitted by Generally Accepted Accounting Principles (GAAP) include the weighted average cost method; first in, first out (FIFO); and last in, first out (LIFO). With the FIFO method of managing stock, goods obtained first should be sold or consumed first. On the other hand, LIFO requires that goods acquired last are sold or used first.

Although all of the above inventory valuation methods are accepted under the GAAP, LIFO is incompatible with IFRS standards.

3. Inventory Write-down Reversals: To write off inventory, both GAAP and IFRS require the company if the cost exceeds the realizable value of inventory. However, from time to time, inventory of an entity may be increased. So, it has the potential for reversal of inventory written down under the principles of IFRS. It may be possible to make such reversals during the period when it occurs, which, in turn,

is limited up to the extent of original write off amount. But such reversals of inventory written down are not possible as per GAAP.

4. Balance sheet format: Although both GAAP and IFRS have the same balance sheet categories, including assets, liabilities, and equity, GAAP and IFRS do require these categories to be presented in a different order on the balance sheet of a company. Under GAAP, the balance sheet order is assets, liabilities, and equity. Under IFRS, the balance sheet order is assets, equity, and liabilities.
5. Investment reporting: According to GAAP, an organization needs to list the most liquid assets and liabilities on top of the balance sheet. Under IFRS, however, companies are required to list those assets that are less liquid first. Moreover, according to GAAP, the most recent assets are listed first while under IFRS, the first listed assets are non-current ones.
6. Difference in classification of interest and dividends in the cash flow statement: as discussed above, the rules in GAAP are more rigid as compared to the principles in IFRS. Therefore, according to IFRS, interest received, and dividend received can be classified as operating or investing activity. However, in case of GAAP, it should strictly come under operating activities only.
7. Asset revaluation differences: Asset revaluation means the re-measurement of an asset's current value within an organization. This could be useful for two reasons - first, it might be used to finance the replacement costs at the end of their lives and, secondly, it presents to investors a truer picture of the business. Whereas GAAP will permit valuation only in the case of marketable securities like investments and stocks, IFRS permits on wider scale plants, property, equipment, inventories, intangible assets, and investment in marketable securities.
8. Capitalized and amortized development costs: With regard to the costs of development, there are differences in terms of their capitalization as well as amortization. For instance, for GAAP, the development costs are normally all expensed as incurred. However, in IFRS, such costs can be capitalized when certain criteria are met. For that matter, it also encompasses internal costs and interest from acquisition or construction of such qualifying assets. Consequent upon this fact, such differential treatments may give rise to non-comparability of EBIT under the two standards.
9. Disability write-downs: Some of the big differences between U.S. and international accounting rules involve how impairment losses are booked. Under U.S. Generally

Accepted Accounting Principles, an impairment loss is determined in a two-step approach. First, an impairment has occurred when a company can determine that the carrying amount of an asset is greater than the undiscounted sum of the estimated future cash flows that are expected to result from the asset. Second, the impairment loss is the amount by which the carrying amount of the asset exceeds its fair value.

On the other hand, IFRS utilizes a one-step approach in which an impairment loss is recorded if the carrying amount of an asset exceeds its recoverable amount, the higher of the asset's fair value less costs to sell and value in use. More significantly, whereas impairment losses are not allowed to be reversed under GAAP, reversals are allowed by IFRS under certain conditions.

10. Investment property: Under the GAAP, investment properties are accounted for at historical cost less depreciation. However, IFRS provides a flexible approach to accounting for investment property, whereby investment properties-which involve properties held for either rental income or for capital appreciation-may be measured at cost or valued at fair value with changes recognized in profit or loss.
11. Lease Accounting: Although both GAAP and IFRS require most leases to be carried on the balance sheet of lessees as assets and liabilities, their classifications differ. For example, under GAAP, leases are classified as either a capital lease or an operating lease, depending on a set of criteria.

However, IFRS simplifies this approach by considering all leases as "finance leases" and thus eliminating the need for classification. Another key difference exists in the treatment of intangible assets. While IFRS includes leases for some types of intangible assets, GAAP excludes categorically the lease for all types of intangible assets.

12. Recognition of revenue: According to GAAP, revenues should be recognized at the time when they are realized or realizable and earned. In contrast, IFRS principles are more general and permit recognition when the risks and rewards of ownership are transferred, the buyer has control of the goods, and the revenue amount can be measured with reasonable reliability.
13. Classification of Liabilities: Under GAAP, a liability is classified as current because it is due for settlement within one year or the operating cycle, whichever is longer.

IFRS takes a more subtle approach. It allows liability classification as non-current though due within 12 months if the company has an unconditional right to defer the settlement for at least 12 months after the reporting period. This means that under IFRS, some short-term obligations may be classified as non-current, which would not be possible under GAAP.

Financial statements prepared in accordance with IAS/IFRS do not provide for a rigid structure in the balance sheet format (IAS 1), leaving the preparer of the financial statements' wide discretion in the inclusion of additional items or sub-classifications. It is common to find in companies of considerable sizes - such as the one under study - particularly concise balance sheet layouts, characterised by a few items and hardly broken down into sub-classifications. Furthermore, at the level of IAS/IFRS, the distinction of balance sheet items between current and non-current is made based on the financial criterion - similar to the Italian standards - except that the maturity does not only concern the administrative period but also the operating cycle.

The same flexible logic is used in the preparation of the income statement, where costs can be classified either by their nature or by their allocation within the company.

3.2.2 Financial statement's structure

To make the analysis more uniform and comparable, the financial statements used were downloaded from the Orbis [80]database in Excel format, all reclassified according to the same structure below.

Profit and loss Statement

[80] Orbis (Bureau van Dijk) is a major publisher of business information, and specialises in private company data combined with software for searching and analysing companies. It is a Moody's Analytics company. Orbis is Bureau van Dijk's flagship company database.

Figure 3.5: Profit and loss Statement format used

Profit & loss account

Total Revenues		
∟ Gross Sales		
∟ Adjustments to gross sales		
∟ Net Sales		
∟ Other Revenues		
Cost of goods sold		
Research & development expenses		
Other operating income (expense)		
EBITDA		
Total depreciation, amortization & depletion		
∟ Depreciation		
∟ Amortization & depletion		
Operating income after depreciation, amortization & depletion		
Unusual & exceptional income (expenses)		
Earnings before interest & tax (EBIT)		
∟ Financial revenue		
∟ Financial expenses		
Financial profit (loss)		
Other non-operating and financial income (expenses)		
Profit (loss) before tax (PBT)		
Income tax expense		
Profit (loss) after tax (PAT)		
Minority interest		
Other after-tax adjustments		
Extraordinary items after tax		
Preferred Dividends		
Net profit		

Balance Sheet

Figure 3.6: Balance Sheet Statement format used

Assets

Total current assets		
∟ Net inventory		
∟ Raw materials		
∟ Work in progress		
∟ Finished goods		
∟ Inventory prepayment and other adjustments		
∟ Net accounts receivable		
∟ Accounts receivable		
∟ Doubtful accounts & allowances		
∟ Total others current assets		
∟ Other current assets		
∟ Prepaid expenses & advances		
∟ Deferred charges		
∟ Total cash & short-term investments		
∟ Cash and cash equivalents		
∟ Short-term investments		
Non-current assets		
∟ Net property, plant & equipment		
∟ Land		
∟ Accumulated depreciation on land		
∟ Net land		
∟ Buildings		
∟ Accumulated depreciation on buildings		
∟ Net buildings		
∟ Plant & machinery		
∟ Accumulated depreciation on plant & machinery		
∟ Net plant & machinery		
∟ Transportation equipment		
∟ Accumulated depreciation on transportation equipment		
∟ Net transportation equipment		
∟ Leased assets		
∟ Accumulated depreciation on leased assets		
∟ Net leased assets		
∟ Other property, plant & equipment		
∟ Accumulated depreciation on other property, plant & equipment		
∟ Net other property, plant & equipment		
∟ Accumulated depreciation - No breakdown		
∟ Intangible assets		
∟ Goodwill		
∟ Other intangible assets		
∟ Total other non-current assets		
∟ Exploration		
∟ Long-term receivables		
∟ Investments		

∟ Investment in associated companies		
∟ Investment in real estate		
∟ Other non-current assets		
Total assets		

Liabilities

Total current liabilities		
∟ Loans & Borrowings		
∟ Current portion of long-term debt		
∟ Current loans & overdrafts		
∟ Trade creditors		
∟ Total other current liabilities		
∟ Other short-term debt		
∟ Other creditors		
∟ Income tax payable		
∟ Social expenditure payable		
∟ Dividends payable		
∟ Other current liabilities		
Non-current liabilities		
∟ Total long-term interest-bearing debt		
∟ Bank loans		
∟ Debentures & convertible debt		
∟ Lease liabilities		
∟ Other long-term interest-bearing debt		
∟ Total other non-current liabilities		
∟ Pension fund provisions		
∟ Deferred taxes		
∟ Provisions		
∟ Deferred revenue		
∟ Other long-term non-interest-bearing liabilities		
∟ Minority interest		
Total liabilities		
Total shareholders' equity		
∟ Share capital		
∟ Common stock/shares		
∟ Participation shares		
∟ Preferred shares		
∟ Redeemable preferred shares		
∟ Other shareholders' funds		
∟ Share premiums		
∟ Treasury shares		
∟ Revaluation reserves		
∟ Retained earnings		
∟ Other shareholders' reserves		
Total liabilities and equity		

Cash Flow Statement

Figure 3.7: Cash Flow Statement format used

Operating cash flows		
∟ Net Income/Starting Line		
∟ Depreciation, Depletion & Amortization		
∟ Depreciation and Depletion of Fixed Assets		
∟ Amortization of Intangible Assets		
∟ Deferred Income Taxes & Investment Tax Credit		
∟ Other Cash Flow Items		
∟ **Funds from Operations before Working Capital changes & Extraordinary Items**		
∟ Decrease/Increase in Receivables		
∟ Decrease/Increase in Inventories		
∟ Increase/Decrease in Accounts Payable		
∟ Increase/Decrease in Other Accruals		
∟ Decrease/Increase in Other Assets/Liabilities		
∟ Extraordinary Items		
∟ Fund from Other Operating Activities		
∟ Net Cash from Operating Activities		
Investing cash flows		
∟ Additions to Fixed Assets		
∟ Increase/Decrease in Other Long Term Assets		
∟ Increase/Decrease in Investments		
∟ Net Cash from Investing Activities		
Financing cash flows		
∟ Increase/Decrease in Short Term Borrowings		
∟ Increase/Decrease in Long Term Borrowings		
∟ Net Proceeds from Sale/Issue Common & Preferred Stock		
∟ Shareholders' Equity Reserve		
∟ Common Dividends (Cash)		
∟ Preferred Dividends (Cash)		
∟ Cash Dividends Paid - Total		
∟ Other Source/Use - Financing Activities		
∟ **Net Cash from Financing Activities**		
Balance		
∟ Effect of Exchange Rate on Cash		
∟ Increase/Decrease in Cash & Short Term Investments		
∟ Cash & Cash Equivalents at the Beginning of Period		
∟ Cash & Cash Equivalents at the End of Period		

3.2.3 Implementing the Beneish M-score model: adjustments to ratio calculation

Given the above, adjustments and assumptions were made in this empirical investigation, which will be described below in order to illustrate how the indices were calculated from the balance sheet items available to the writer. Specifically, the table below shows the

formulas used to calculate the Beneish indices from the balance sheet items in the above-mentioned balance sheet structures and their weights in the calculation of the M-score.

Figure 3.8: Adaptation Beneish model calculation

Ratio	Full name	Formula	Weights in M-Score
DSRI	Day Sales in Receivables Income	(Net account receivables 2023 / Net Sales 2023) / (Net account receivables 2022 / Net Sales 2022)	0,920
GMI	Gross Margin Index	((Net Sales 2022 - Cost of Goods Sold 2022) / Net sales 2022) / ((Net Sales 2023 - Cost of Goods Sold 2023) / Net sales 2023)	0,528
AQI	Asset Quality Index	((1 - Total Current assets 2023 + Net Property, Plant & Equipment 2023) / Total Assets 2023) / ((1 - Total Current assets 2022 + Net Property, Plant & Equipment 2022) / Total Assets 2022)	0,404
SGI	Sales Growth Index	Net Sales 2023 / Net Sales 2022	0,892
DEPI	Depreciation Index	(Depreciation 2022 / (Depreciation 2022 + Net Property, Plant & Equipment 2022)) / (Depreciation 2023 / (Depreciation 2023 + Net Property, Plant & Equipment 2023))	0,115
SGAI	Sales, General and Administrative expenses (SG&A) index	(Other operating expenses 2023 / Net sales 2023) / (Other operating expenses 2022 / Net sales 2022)	-0,172
TATA	Total Accruals to Total Assets	(EBITDA 2023 - Net cash from operating activities 2023) / Total Assets 2023	4,679
LVGI	Leverage Index	((Total current liabilities 2023 + Total non-current liabilities 2023) / Total Assets 2023) / ((Total	-0,327

		current liabilities 2022 + Total non-current liabilities 2022) / Total Assets 2022)	

The items that compose the first index, the DSRI are trade receivables and revenues. The value of trade receivables has been identified under the item "Net account receivables", of the Aggregated account " Current Assets', in the asset section of the Balance Sheet. The value of revenues, on the other hand, coincides with the item "Net Sales" in the Profit and Loss statements.

The second index, the GMI, is composed of the values for revenues and cost of sales. Also in this case, as in the first index, the reperformance is accurate and was done using the "Net Sales" and "Cost of goods sold" items in the Profit and Loss Statement.

The third index, AQI, involves identifying the value of total assets, current assets, and tangible assets represented by property, plant, and equipment (so-called PPE). Also, in this case, the identification of values was not particularly complicated since all information was already present within the asset section of the balance sheet.

It should be noted that, in the preparation of financial statements under IFRS, the amounts of financial fixed assets due within one year are already allocated within the macro-class of current assets, so there is no need to add to what is already entered as the total of this item.

The SGI is required to relate the revenues of two financial years, the values of which were obtained from the item 'Net Sales' in the Profit and Loss Account.

The DEPI was restated without changes using the 'Depreciation' item in the income statement, considering only the depreciation of tangible fixed assets and consequently the 'Property, Plant and Equipment' item in the balance sheet.

The SGAI index requires the values of selling, general and administrative expenses, and sales revenue. The latter are obtained in the same way as for the previous indices, while the selling, general, and administrative expenses were instead the result of a reworking of the data available in the financial statements. In particular, since the item 'Selling,

general and administrative expenses' was not present, the item considered closest in content, namely 'Other operating expenses', was considered instead. This item contains all operating expenses not contained in the cost of sales.

The TATA index involves identifying the value of income from continuing operations, cash flow from operating activities, and total assets. The latter are obtained in the same way as for the previous indices, while for income from continuing operations, EBITDA was considered as operating income before non-cash items (depreciation, amortization, and depletion) and Net Cash from Operating activities as Cash flow from operating activities.

The LVGI debt ratio involves the identification of total liabilities and total assets in the balance sheet and the distinction between current and non-current liabilities which is present in the balance sheet as given.

3.3 Results of the analysis

3.3.1 General presentation of the results of the Beneish M-score model application

By applying the Beneish model, taking into account the premises and precautions carefully explained in the previous paragraph, and using the cut-off values provided in the tables below, namely -1.78 as indicated by the original Beneish model (a threshold above which a company is classified as a 'Likely Manipulator') and -2.22 as the generally accepted threshold below which a company can be defined as 'Unlikely Manipulator', companies with M-scores between these two threshold values (-1.78 and -2.22) are identified as 'Possible Manipulators'.

Figure 3.9: M-scores cut-off values

Unlikely Manipulator	Possible Manipulator	Likely Manipulator
>-2,22	Between -2,22 and 1,78	>-1,78

The analysis revealed the presence of three probable manipulators, twelve possible manipulators, and twenty-two unlikely manipulators.

Figure 3.8: Summary of analysis results

Likely Manipulator	3
Possible Manipulator	12
Unlikely Manipulator	22

The table below shows the M-score results of the companies analysed in the sample in more detail.

Figure 3.10: M-score results in detail

Company	**M-Score**	**Results**
VOLKSWAGEN AG	-2,098	Possible Manipulator
TOTALENERGIES SE	-3,039	Unlikely Manipulator
STELLANTIS N.V.	-2,040	Possible Manipulator
BAYERISCHE MOTOREN WERKE AG	-2,311	Unlikely Manipulator
MERCEDES-BENZ GROUP AG	-2,179	Possible Manipulator
ENEL SPA	-1,655	Likely Manipulator
DEUTSCHE TELEKOM AG	-2,131	Possible Manipulator
ENI S.P.A.	-10,479	Unlikely Manipulator
KONINKLIJKE AHOLD DELHAIZE N.V.	-2,478	Unlikely Manipulator
LVMH MOET HENNESSY LOUIS VUITTON	-2,304	Unlikely Manipulator
DEUTSCHE POST AG	-2,332	Unlikely Manipulator

SIEMENS AG	-2,392	Unlikely Manipulator
BASF SE	-2,910	Unlikely Manipulator
VINCI	-2,342	Unlikely Manipulator
AIRBUS SE	-2,307	Unlikely Manipulator
ANHEUSER-BUSCH INBEV SA/NV	-2,223	Unlikely Manipulator
IBERDROLA SA	-2,582	Unlikely Manipulator
BAYER AG	-2,354	Unlikely Manipulator
SANOFI	-2,468	Unlikely Manipulator
L'OREAL	-2,281	Unlikely Manipulator
SCHNEIDER ELECTRIC SE	-2,210	Possible Manipulator
INDUSTRIA DE DISENO TEXTIL S.A.	-1,793	Possible Manipulator
CRH PLC	-1,662	Likely Manipulator
SAP SE	-2,224	Unlikely Manipulator
L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE	-2,408	Unlikely Manipulator
DANONE	-2,525	Unlikely Manipulator
ASML HOLDING N.V.	-2,100	Possible Manipulator

ESSILORLUXOTTICA	-2,009	Possible Manipulator
SAFRAN	-2,167	Possible Manipulator
NOKIA OYJ	-2,434	Unlikely Manipulator
ADIDAS AG	-3,048	Unlikely Manipulator
KERING	-2,558	Unlikely Manipulator
INFINEON TECHNOLOGIES AG	-2,126	Possible Manipulator
FLUTTER ENTERTAINMENT PUBLIC LIMITED COMPANY	-2,558	Unlikely Manipulator
HERMES INTERNATIONAL	-1,836	Possible Manipulator
PERNOD RICARD	-2,060	Possible Manipulator
VONOVIA SE	0,911	Likely Manipulator

As can be seen from the table above, the three companies with an M-score greater than -1.78 are:

- Enel S.p.A.;
- CRH PLC;
- Vonovia SE.

Based on the result of the M-score these three companies can be defined as "Likely manipulator", Enel S.p.A with an M-score of -1,665, CRH PLC with a result of -1,662, and Vonovia SE with 0,911

The twelve companies that, based on the Beneish model, can be defined as “Possible manipulators”, so with an M-score between -1,78 and -2,22, are:

- VOLKSWAGEN AG;
- STELLANTIS N.V.;
- MERCEDES-BENZ GROUP AG;
- DEUTSCHE TELEKOM AG;
- SCHNEIDER ELECTRIC SE;
- INDUSTRIA DE DISENO TEXTIL S.A.;
- ASML HOLDING N.V.;
- ESSILORLUXOTTICA;
- SAFRAN;
- INFINEON TECHNOLOGIES AG;
- HERMES INTERNATIONAL;
- PERNOD RICARD.

To better understand the results of the analysis, the table below shows the M-score values (already weighted according to the Beneish model) of the eight variables that compose the model.

Figure 3.11: M-scores values of the eight components

Company	**DSRI** [81]	**GMI**	**AQI**	**SGI**	**DEPI**	**SGAI**	**TATA**	**LVGI**
VOLKSWAGEN AG	0,937	0,549	0,409	1,030	0,133	-0,164	0,176	-0,327
TOTALENERGIES SE	1,064	0,537	-0,218	0,727	0,115	-0,196	0,076	-0,304
STELLANTIS N.V.	1,137	0,512	0,412	0,940	0,107	-0,168	0,178	-0,318
BAYERISCHE MOTOREN WERKE AG	0,851	0,495	0,395	0,973	0,120	-0,163	0,185	-0,327
MERCEDES-BENZ GROUP AG	0,810	0,538	0,425	0,911	0,117	-0,158	0,335	-0,317

[81] All values are already weighted in the M-score (See the M-score weights in previous paragraph).

ENEL SPA	1,443	0,281	1,094	0,592	0,084	-0,244	0,246	-0,311
DEUTSCHE TELEKOM AG	0,906	0,496	0,424	0,873	0,142	-0,164	0,349	-0,317
ENI S.P.A.	1,037	0,543	-7,592	0,631	0,097	-0,160	0,126	-0,320
KONINKLIJKE AHOLD DELHAIZE N.V.	0,960	0,529	0,352	0,909	0,097	-0,176	0,022	-0,331
LVMH MOET HENNESSY LOUIS VUITTON	0,939	0,529	0,128	0,971	0,128	-0,173	0,332	-0,318
DEUTSCHE POST AG	0,914	0,470	0,679	0,772	0,112	-0,205	0,095	-0,329
SIEMENS AG	0,897	0,504	0,436	0,964	0,118	-0,174	0,027	-0,325
BASF SE	1,007	0,486	0,225	0,704	0,104	-0,222	-0,041	-0,334
VINCI	0,845	0,519	0,404	0,996	0,137	-0,172	0,091	-0,324
AIRBUS SE	0,788	0,636	0,397	0,993	0,152	-0,141	0,021	-0,313
ANHEUSER-BUSCH INBEV SA/NV	1,070	0,531	0,388	0,885	0,109	-0,179	0,127	-0,313
IBERDROLA SA	0,947	0,426	0,429	0,816	0,115	-0,232	0,071	-0,313
BAYER AG	0,888	0,473	0,437	0,837	0,083	-0,219	0,327	-0,340
SANOFI	0,919	0,533	0,341	0,894	0,132	-0,185	0,063	-0,331
L'OREAL	0,915	0,517	0,432	0,960	0,081	-0,176	0,171	-0,342

SCHNEIDER ELECTRIC SE	0,978	0,512	0,446	0,937	0,124	-0,172	0,124	-0,319
INDUSTRIA DE DISENO TEXTIL S.A.	0,879	0,524	0,447	0,983	0,121	-0,167	0,584	-0,325
CRH PLC	0,929	0,289	0,210	0,902	0,003	-0,153	1,356	-0,357
SAP SE	0,927	0,532	0,512	0,902	0,139	-0,159	0,057	-0,294
L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE	0,984	0,478	0,429	0,823	0,119	-0,187	0,099	-0,313
DANONE	0,822	0,536	0,493	0,891	0,138	-0,177	-0,043	-0,345
ASML HOLDING N.V.	0,575	0,531	0,361	1,161	0,126	-0,167	0,440	-0,288
ESSILORLUXOTTICA	0,966	0,534	0,671	0,925	0,122	-0,172	0,100	-0,316
SAFRAN	0,865	0,544	0,454	1,081	0,127	-0,169	0,095	-0,324
NOKIA OYJ	0,913	0,549	0,383	0,797	0,121	-0,183	0,141	-0,315
ADIDAS AG	0,728	0,530	0,362	0,849	0,118	-0,178	-0,295	-0,323
KERING	0,934	0,509	0,159	0,858	0,133	-0,190	0,234	-0,355
INFINEON TECHNOLOGIES AG	0,846	0,514	0,354	1,023	0,137	-0,155	0,289	-0,295
FLUTTER ENTERTAINMENT	0,566	0,535	0,470	1,392	-0,038	-0,181	-0,076	-0,386

PUBLIC LIMITED COMPANY								
HERMES INTERNATIONAL	0,892	0,519	0,417	1,036	0,117	-0,172	0,489	-0,293
PERNOD RICARD	1,061	0,534	0,377	1,010	0,107	-0,178	0,200	-0,332
VONOVIA SE	4,852	0,339	0,592	0,623	0,058	-0,405	0,026	-0,334

The table below shows some descriptive statistics that help to better understand the data.

Index	**Media**	**Minimum**	**Median**	**Maximum**	**Standard deviation**
DSRI	1,027	0,566	0,919	4,852	0,662
GMI	0,503	0,281	0,524	0,636	0,069
AQI	0,193	-7,592	0,412	1,094	1,329
SGI	0,907	0,592	0,909	1,392	0,150
DEPI	0,110	-0,038	0,118	0,152	0,037
SGAI	-0,185	-0,405	-0,174	-0,141	0,043
TATA	0,184	-0,295	0,126	1,356	0,259
LVGI	-0,323	-0,386	-0,323	-0,288	0,019

3.3.2 Analysis of "Likely manipulator"

The analysis will now focus its attention more on the three 'Likely manipulator' companies, Enel S.p.A., CRH PLC, and Vonovia SE.

Enel S.p.A.

Enel S.p.A. operates as an integrated operator in the electricity and gas industries worldwide. It generates, distributes, transmits, and sells electricity; transports and markets natural gas; and constructs and operates generation plants and distribution grids. The company also provides energy management services; e-vehicle charging infrastructure for public and private customers; and engages in the energy commodities

business. It operates wind, thermal, hydroelectric, nuclear, solar photovoltaic, and geothermal power plants. The company was founded in 1962 and is headquartered in Rome, Italy.[82] Net sales are distributed geographically as follows: Italy (42.8%), Europe (36.5%), America (20.4%) and other (0.3%).

Ratio	Ratio Value	Weights in M-Score	Value in M-Score
DSRI	1,569	0,920	1,443
GMI	0,533	0,528	0,281
AQI	2,708	0,404	1,094
SGI	0,663	0,892	0,592
DEPI	0,728	0,115	0,084
SGAI	1,419	-0,172	-0,244
TATA	0,053	4,679	0,246
LVGI	0,951	-0,327	-0,311

M-Score	-1,655

Key Financial Data

Profit & Loss	2023	2022
Net Sales	95.417.000,00	139.215.000,00
Cost of good sold	-50.355.000,00	-104.190.000,00
Other operating expense	-22.818.000,00	-23.466.000,00
EBITDA	24.883.000,00	16.359.000,00
Depreciation	-6.119.000,00	-4.474.000,00
Balance sheet		
Total current assets	50.535.000,00	72.212.000,00
Net accounts receivable	17.590.000,00	16.360.000,00
Net Property, plant & equipment	89.801.000,00	88.521.000,00
Total assets	195.224.000,00	219.618.000,00
Total current liabilities	59.115.000,00	75.658.000,00
Non current liabilities	91.000.000,00	101.878.000,00
Total liabilities and equity	195.224.000,00	219.618.000,00
Cash flow		
Net cash from operating activites	14.620.000,00	8.674.000,00

Analysing the various results of the M-score indices and comparing them with the average values of the sample in the table in the previous paragraph, it can be seen that the indices

[82] https://finance.yahoo.com/quote/ENEL.MI/profile/

that deviate the most from the mean and median values are AQI (1,094 vs. 0,193 mean and 0,412 median), DSRI (1,443 vs. 1,027 mean and 0,919 median), SGI (0,592 vs. 0,907 mean and 0,909 median) and GMI (0,281 vs 0,503 mean and 0,524 median).

As previously stated, the AQI index can be considered as a cumulative measure of the changes in the asset realization risk analysis; a value greater than one, in this case 1,094, suggests that the company may have increased its use of cost deferral. Therefore, it is projected that the likelihood of earnings manipulation and the Asset Quality Index (AQI) will positively correlate. A higher risk of asset realization indicates a greater inclination to capitalize and, as a result, postpone expenses.

In this case, as can be seen from the key financial data shown in the table above, it can be seen that the index result is due to a decrease in "total current assets" and in particular in the item "total other current assets" including the items:

- Other current assets;
- Prepaid expense & advances[83];
- Cash and cash equivalents;
- Short-term investments.

Analysing the notes to Enel's annual financial statement,[84] it can be seen that the most significant reductions within these items are attributable to a reduction in:

- Derivatives;
- Current portion of long-term financial receivables;
- Securities at FVOCI[85];
- Cash collateral and other financial receivables for derivative transactions;
- Other[86]

The second index is the DSRI, Day sales in receivables index, a variable that measures whether receivables and revenues are in or out of balance in two consecutive years. In this case, it can be seen that despite a clear reduction in sales revenue (-30%), the value

[83] the amount of this item has not changed significantly;
[84] Enel annual report 2023.
[85] Fair value through other comprehensive income;
[86] reduction of financial receivables related to the sale of tax credits ('ecosismabonus') and sale of Celg Distribuição SA - Celg-D (Enel Goiás), of Enel Brazil.;

of trade receivables remains unchanged and even increases slightly. The strong reduction in revenues mainly concerns Electricity Sales and Sales of commodities from contracts with physical delivery, which decreased in total by about 40,000,000, this is mainly due to the lower volumes sold in a regime of decreasing electricity sales prices. Concerning trade receivables, no particular reason for the increase is given in the notes.

With regard to the third index that clearly deviates from the average of the sample, the SGI, Sales Growth index, the causes are quite clear, the clear reduction in sales revenue, and therefore the above-mentioned comments on the reduction in sales revenue apply.

The GMI index, which compares the gross margin with that of the previous year, is lower than the sample average. This is due to the fact that despite the clear reduction in sales revenue, explained above, the gross margin increased sharply from the previous year, from 28% in 2022 to 57% in 2023. The reasons for this are the sharp reduction in prices for the purchase of electricity and gas, but also a reduction in purchase volumes.

To find out more, the M-score was recalculated for the time interval 2013-2023 in order to have more detailed information and to understand whether this is an exception or whether the M-score is so high over the entire time interval.

Figure 3.12: Enel's M-scores recalculation for the time interval 2013-2023

Year	DSRI[87]	GMI	AQI	SGI	DEPI	SGAI	TATA	LVGI	M-Score
2023	1,443	0,281	1,094	0,592	0,084	-0,244	0,246	-0,311	-1,655
2022	0,571	0,821	0,341	1,528	0,205	-0,112	0,164	-0,332	-1,654
2021	0,922	0,774	0,131	1,200	0,099	-0,109	0,113	-0,351	-2,060
2020	1,048	0,849	0,435	0,923	0,171	-0,098	0,180	-0,334	-1,666
2019	0,833	0,522	0,419	0,765	0,057	-0,170	0,196	-0,334	-2,552
2018	0,851	0,277	0,395	0,897	0,147	-0,424	0,136	-0,350	-2,140
2017	1,030	0,561	0,380	0,948	0,123	-0,164	0,151	-0,328	-2,849
2016	0,965	0,307	0,477	0,796	0,149	-0,559	0,175	-0,319	-2,099
2015	0,983	0,527	0,486	0,889	0,212	-0,199	0,163	-0,320	-2,849
2014	0,967	0,471	0,274	0,867	0,050	-0,172	0,169	-0,334	-2,099
2013	0,977	0,496	0,427	0,816	0,144	-0,177	0,273	-0,318	-2,550

[87] All values are already weighted in the M-score (See the M-score weights in previous paragraph)

As can be seen from the table above, Enel S.p.A.'s classification as a 'likely manipulator' is only temporary. By analysing the results over the entire period, it becomes clear that the M-score is consistently below the cut-off threshold of -1,78, and in most cases, even below the cut-off threshold of -2,22. A more detailed analysis reveals that the M-score has been highest in the last two years (in 2023, -1,655, and in 2022, -1,654). Focusing on the individual components of the M-score, it is noticeable that the most anomalous values are in the DSRI, SGI, and GMI. All these indices are closely related to sales revenue, which saw an anomalous increase of 65% in 2022 compared to 2021, only to decrease by 30% in 2023 compared to 2022, returning to levels similar to those in 2021.

The anomalous increase in revenues in 2022 is primarily due to the pricing context, but also to higher energy volumes and increasing quantities sold, especially in Italy and Spain. Revenues also benefited from exchange rates. The figure also includes proceeds from the sale of transmission assets in Chile (€1.1 billion), the stake held in Ufinet and Gridspertise, and some companies in the Mooney Group.[88]

This sharp increase in revenues therefore inevitably made the DSRI and SGI values anomalous.

Another component with anomalous values is the GMI, which had very high values in the three-year period 2020-2022 and then dropped sharply in 2023. This is because the gross margin from 2020 to 2023 decreased significantly year on year due to the sharp price increases and the reduction in sales volumes also due to COVID-19. In 2023 the situation improved markedly, thus leading to the gross margin increasing and returning to pre-2020 levels, resulting in a lower GMI value.

CRH PLC

CRH plc, together with its subsidiaries, provides building materials solutions in Ireland and internationally. It operates through four segments: Americas Materials Solutions, Americas Building Solutions, Europe Materials Solutions, and Europe Building Solutions. The company provides solutions for the construction and maintenance of public infrastructure and commercial and residential buildings; and produces and sells aggregates, cement, ready mixed concrete, and asphalt, as well as provides paving and

[88] https://www.milanofinanza.it/news/enel-nel-2022-i-ricavi-decollano-a-140-miliardi-64-202302092041078193

construction services. It also manufactures, supplies, and delivers solutions for the built environment in communities across North America; and offers building and infrastructure solutions serving complex critical utility infrastructure, such as water, energy, transportation, and telecommunications projects, and outdoor living solutions for enhancing private and public spaces. In addition, the company combines materials, products, and services to produce a wide range of architectural and infrastructural solutions for use in the building and renovation of critical utility infrastructure, commercial and residential buildings, and outdoor living spaces for the built environment. The company was founded in 1936 and is headquartered in Dublin, Ireland.[89]

Ratio	Ratio Value	Weights in M-Score	Value in M-Score
DSRI	1,010	0,920	0,929
GMI	0,548	0,528	0,289
AQI	0,519	0,404	0,210
SGI	1,011	0,892	0,902
DEPI	0,026	0,115	0,003
SGAI	0,891	-0,172	-0,153
TATA	0,290	4,679	1,356
LVGI	1,091	-0,327	-0,357

M-Score	-1,662

[89] https://finance.yahoo.com/quote/CRH/profile/

Key Financial Data

Profit & Loss	**2023**	**2022**
Net Sales	31.628.040,10	31.284.470,29
Cost of good sold	-7.866.964,80	-18.410.847,01
Other operating expense	-6.774.657,59	-7.520.161,12
EBITDA	16.986.417,72	5.353.462,16
Depreciation	-13.504.971,31	-1.516.970,54
Balance sheet		
Total current assets	15.280.536,13	13.876.811,46
Net accounts receivable	3.747.509,63	3.671.481,23
Net Property, plant & equipment	17.314.924,36	17.739.554,73
Total assets	42.958.351,76	42.366.418,23
Total current liabilities	9.061.534,39	8.333.962,37
Non current liabilities	14.631.667,64	13.090.199,42
Total liabilities and equity	42.958.351,76	42.366.418,23
Cash flow		
Net cash from operating activites	4.540.269,46	3.707.108,47

Analysing the results of the M-score calculation, the index that deviates the most from the average sample values is the TATA, Total accruals to Total assets, calculated using the formula given in the previous paragraph, i.e. Income from continuing operations less non-cash items (EBITDA is used in this calculation) - net cash from operating activities / Total assets. This index as already explained in the previous chapter is a measure to approximate accruals to total assets. If the result of this ratio is high then the probability of discretionary accounting choices increases, resulting in higher accruals and a higher probability of manipulation.

DEPI and GMI also take values that deviate slightly from the mean and median values of the sample. DEPI is an index that relates the value of depreciation to EPPs and in particular aims to verify depreciation rates. In this case, it can be seen that depreciation costs increase significantly from 2022 to 2023.

Analysing the balance sheet in the annual report it can be seen that CRH PLC reclassifies the profit and loss account in a way that does not give a clear indication of the depreciation costs, in the notes to the financial statements, however, it can be seen that the amount of depreciation costs is considerably different from the amount in the reclassification of the Orbis database. Orbis reclassifies a part of the cost of sales into depreciation costs, thus increasing the latter and reducing the cost of sales. This reclassification also leads to an anomalous value of GMI, which has cost of sales in its formula.

The GMI index measures the gross margin and compares it with the previous year's gross margin. In this case, it can be seen that GMI has a value well below the average (0,289 versus 0,503 average and 0,524 median), which indicates an exponential increase in the gross margin increase, but this is due to the reclassification of the cost of sales.

To find out more, the M-score was recalculated for the time interval 2013-2023 in order to have more detailed information and to understand whether this is an exception or whether the M-score is so high over the entire time interval.

Figure 3.13: CRH PLC's M-scores recalculation for the time interval 2013-2023

Year	DSRI[90]	GMI	AQI	SGI	DEPI	SGAI	TATA	LVGI	M-Score
2023	0,929	0,289	0,210	0,902	0,003	-0,153	1,356	-0,357	-1,662
2022	0,832	0,539	0,301	1,020	0,111	-0,165	0,182	-0,311	-2,330
2021	0,923	0,541	0,511	1,085	0,138	-0,164	0,108	-0,318	-2,015
2020	1,054	0,463	0,802	0,711	0,103	-0,197	0,072	-0,305	-2,137
2019	0,794	0,503	0,111	0,939	0,090	-0,168	0,081	-0,363	-2,855
2018	1,071	0,539	0,683	0,867	0,127	-0,163	0,194	-0,329	-2,375
2017	0,821	0,530	0,407	0,907	0,119	-0,168	0,166	-0,317	-2,359
2016	0,827	0,519	0,368	1,023	0,097	-0,162	0,117	-0,308	-3,266
2015	1,118	0,498	-0,780	1,115	0,160	-0,181	-0,004	-0,351	-2,359
2014	1,190	0,511	-2,630	0,936	0,134	-0,156	0,086	-0,334	-3,266
2013	0,937	0,520	0,066	0,889	0,074	-0,193	-0,046	-0,347	-5,104

As can be seen from the table above, CRH PLC's classification as a 'likely manipulator' is only temporary. By analysing the results over the entire time period, it becomes clear that the M-score is consistently below the cut-off threshold of -1,78, and in most cases, even below the cut-off threshold of -2,22.

As already analysed, the two components of the M-score that make the result above the cut-off threshold are the TATA and the GMI.

[90] All values are already weighted in the M-score (See the M-score weights in previous paragraph)

Vonovia SE

Vonovia SE operates as an integrated residential real estate company in Europe. It operates through four segments: Rental, Value-Add, Recurring Sales, and Development. The company offers property management services; property-related services; and value-added services, including maintenance and modernization of residential properties, craftsmen and residential environment organization, condominium administration, cable TV, metering, energy supply, and insurance services. It also engages in the sale of individual condominiums and single-family houses, and project development activities. The company was formerly known as Deutsche Annington Immobilien SE and changed its name to Vonovia SE in August 2015. Vonovia SE was founded in 1998 and is headquartered in Bochum, Germany.[91]

Ratio	Ratio Value	Weights in M-Score	Value in M-Score
DSRI	5,273	0,920	4,852
GMI	1,111	0,528	0,587
AQI	1,465	0,404	0,592
SGI	0,699	0,892	0,623
DEPI	0,501	0,115	0,058
SGAI	2,353	-0,172	-0,405
TATA	0,006	4,679	0,026
LVGI	1,021	-0,327	-0,334

M-Score	1,159

[91] https://finance.yahoo.com/quote/VNA.DE/profile/

Key Financial Data

Profit & Loss	**2023**	**2022**
Net Sales	6.096.200,00	8.725.300,00
Cost of good sold	-3.213.100,00	-6.078.700,00
Other operating expense	-636.900,00	-387.400,00
EBITDA	2.416.700,00	2.422.100,00
Depreciation	-183.200,00	-109.700,00
Balance sheet		
Total current assets	6.874.500,00	5.351.700,00
Net accounts receivable	593.200,00	161.000,00
Net Property, plant & equipment	655.100,00	673.400,00
Total assets	91.995.900,00	101.389.600,00
Total current liabilities	5.138.900,00	5.475.900,00
Non current liabilities	56.912.400,00	61.474.900,00
Total liabilities and equity	91.995.900,00	101.389.600,00
Cash flow		
Net cash from operating activites	1.901.200,00	2.084.300,00

As far as Vonovia is concerned, the relevant index that makes the company rank as a likely manipulator is DSRI, daily sales in receivables index, which is 4.852 against an average of 1.027 and a median of 0.919. This is due to a decrease in sales revenue but contrasted with an increase in trade receivables. However, the nature of Vonovia's business, real estate, is very different from that of an industrial production company or a service company and this results in a balance sheet with different characteristics and classifications. Suffice it to say that the most significant item in the income statement is 'Other non-operating and financial income (expenses)', which is called 'Net income from fair value adjustment of investment properties' in Vonovia's official financial statements.

For this company, therefore, the Beneish model, which, as previously mentioned, was developed for industrial manufacturing or service companies, is not valid for Vonovia SE, which should have been excluded from the sample like the financial companies. This analysis is nevertheless included in the paper for the sake of completeness and to demonstrate the model's limits of applicability.

This result is therefore not relevant, and it is therefore not possible to define Vonovia SE as a 'likely manipulator'.

3.3.3 Analysis of 'Possible Manipulators'

As briefly mentioned earlier, the analysis resulted in twelve companies being classified as 'Possible Manipulators'.

Below is a summary table of the twelve companies with their M-score.

Figure 3.14: M-scores of the twelve Possible Manipulators

Company	M-Score
VOLKSWAGEN AG	-2,098
STELLANTIS N.V.	-2,040
MERCEDES-BENZ GROUP AG	-2,179
DEUTSCHE TELEKOM AG	-2,131
SCHNEIDER ELECTRIC SE	-2,210
INDUSTRIA DE DISENO TEXTIL S.A.	-1,793
ASML HOLDING N.V.	-2,100
ESSILORLUXOTTICA	-2,009
SAFRAN	-2,167
INFINEON TECHNOLOGIES AG	-2,126
HERMES INTERNATIONAL	-1,836
PERNOD RICARD	-2,060

As can be seen, two companies in particular have M-scores just below the cut-off threshold of -1,78: INDUSTRIA DE DISENO TEXTIL S.A. and HERMES INTERNATIONAL with -1,793 and -1,836 respectively. The other companies in this list, on the other hand, all have an M-score greater than 2,000 and are therefore statistically less at risk of manipulation. The analysis will therefore focus on:

- INDUSTRIA DE DISENO TEXTIL S.A.;
- HERMES INTERNATIONAL.

INDUSTRIA DE DISENO TEXTIL S.A.

Industria de Diseño Textil, S.A. engages in the retail and online distribution of clothing, footwear, accessories, and household products. The company sells its products under the

Zara, Pull & Bear, Massimo Dutti, Bershka, Stradivarius, Oysho, and Zara Home brands. It is also involved in the textile manufacturing, logistics, design, insurance, construction, and real estate businesses, as well as provides financial services. The company operates in Spain, the rest of Europe, the Americas, Asia, and internationally. Industria de Diseño Textil, S.A. was founded in 1963 and is headquartered in A Coruña, Spain.[92]

Ratio	Ratio Value	Weights in M-Score	Value in M-Score
DSRI	0,969	0,920	0,892
GMI	0,982	0,528	0,519
AQI	1,031	0,404	0,417
SGI	1,161	0,892	1,036
DEPI	1,022	0,115	0,117
SGAI	0,997	-0,172	-0,172
TATA	0,104	4,679	0,489
LVGI	0,895	-0,327	-0,293

M-Score	-1,836

Key Financial Data

Profit & Loss	2023	2022
Net Sales	35.947.000,00	32.569.000,00
Cost of good sold	-15.250.000,00	-13.946.000,00
Other operating expense	-10.912.000,00	-10.194.000,00
EBITDA	9.786.000,00	8.504.000,00
Depreciation	-2.591.000,00	-2.516.000,00
Balance sheet		
Total current assets	16.016.000,00	14.639.000,00
Net accounts receivable	622.000,00	590.000,00
Net Property, plant & equipment	13.434.000,00	12.501.000,00
Total assets	32.735.000,00	29.983.000,00
Total current liabilities	8.937.000,00	8.137.000,00
Non current liabilities	5.126.000,00	4.813.000,00
Total liabilities and equity	32.735.000,00	29.983.000,00
Cash flow		
Net cash from operating activites	5.701.000,00	6.674.000,00

As can be seen from the table above containing all the results of the indices and the various components of the M-score, all the values are generally close to the median values of the analysis sample, the component with a value that deviates the most is the TATA with a ratio value of 0,103 against an average of 0,027, but considering the high weight of the

[92] https://finance.yahoo.com/quote/ITX.MC/profile/

index in the calculation of the M-score (4,679), it is evident how this difference is amplified.

A higher TATA value indicates that the difference between EBITDA and net cash from operating activities relative to total assets is higher than the sample average, thus increasing the risk of accruals.

HERMES INTERNATIONAL

Hermès International Société en commandite par actions engages in the production, wholesale, and retail of various goods. The company offers leather goods and saddlery, such as bags for men and women, travel articles, small leather goods and accessories, saddles, bridles, and a full range of equestrian products and clothing; ready-to-wear garments for men and women; and accessories, including jewellery, belts, hats, gloves, the Internet of Things products, and shoes. It also provides silk and textiles for men and women; art of living and tableware products; perfumes; and watches. In addition, the company is also involved in weaving, engraving, printing, dyeing, finishing, and producing textiles; and purchasing, tanning, dyeing, finishing, and selling precious leathers. It sells its products through a network of stores worldwide. The company also sells watches, perfumes, and tableware through a network of specialized stores. Hermès International Société en commandite par actions was founded in 1837 and is based in Paris, France. Hermès International Société en commandite par actions operates as a subsidiary of H51 SAS.[93]

Ratio	Ratio Value	Weights in M-Score	Value in M-Score
DSRI	0,955	0,920	0,879
GMI	0,993	0,528	0,524
AQI	1,106	0,404	0,447
SGI	1,103	0,892	0,983
DEPI	1,054	0,115	0,121
SGAI	0,970	-0,172	-0,167
TATA	0,125	4,679	0,584
LVGI	0,995	-0,327	-0,325

M-Score	-1,793

[93] https://finance.yahoo.com/quote/RMS.PA/

Key Financial Data

Profit & Loss	**2023**	**2022**
Net Sales	13.114.000,00	11.295.000,00
Cost of good sold	-3.655.000,00	-3.294.000,00
Other operating expense	-3.319.000,00	-2.866.000,00
EBITDA	6.463.000,00	5.490.000,00
Depreciation	-667.000,00	-601.000,00
Balance sheet		
Total current assets	14.008.000,00	11.829.000,00
Net accounts receivable	431.000,00	383.000,00
Net Property, plant & equipment	4.055.000,00	3.589.000,00
Total assets	20.447.000,00	17.459.000,00
Total current liabilities	3.184.000,00	3.004.000,00
Non current liabilities	2.060.000,00	1.998.000,00
Total liabilities and equity	20.447.000,00	17.459.000,00
Cash flow		
Net cash from operating activites	4.184.000,00	4.328.000,00

For HERMES INTERNATIONAL the same applies to INDUSTRIA DE DISENO TEXTIL S.A., all components of the M-score do not deviate significantly from the mean and median values of the analysed sample. Also, for Hermes, the index that deviates the most, while remaining within acceptable levels, is TATA. A possible explanation for this may also be given by the sector in which the two companies operate, i.e. 'Textiles & Clothing Manufacturing', which could entail a greater use of accruals, a theory partly confirmed by the result in this index of another company in the same sector[94] present in the sample, LVMH MOET HENNESSY LOUIS VUITTON, which despite having an M-score just below the cut-off threshold (-2,304) has an above-average TATA.

3.3.4 Outliers Analysis

Eni S.p.A.

One particular outlier emerged from this analysis, Eni S.p.A. with an M-score of -10.479, which is classified by the model as an 'Unlikely Manipulator' but which, being significantly lower than any value in the sample for completeness should be analysed.

Below are the values of the individual components of the M-score and the main financial data used for the calculation.

[94] for completeness LVMH MOET HENNESSY LOUIS VUITTON does not only operate in the textile and clothing sector, although it is the main one, but also differentiates itself in the hotel, food and publishing sectors.

Ratio	Ratio Value	Weights in M-Score	Value in M-Score
DSRI	1,127	0,920	1,037
GMI	1,029	0,528	0,543
AQI	-18,793	0,404	-7,592
SGI	0,707	0,892	0,631
DEPI	0,846	0,115	0,097
SGAI	0,932	-0,172	-0,160
TATA	0,027	4,679	0,126
LVGI	0,979	-0,327	-0,320

M-Score	-10,479

Key Financial Data

Profit & Loss	2023	2022
Net Sales	93.717.000,00	132.512.000,00
Cost of good sold	-73.171.000,00	-102.624.000,00
Other operating expense	-3.136.000,00	-4.758.000,00
EBITDA	18.960.000,00	26.532.000,00
Depreciation	-9.546.000,00	-8.225.000,00
Balance sheet		
Total current assets	46.705.000,00	61.597.000,00
Net accounts receivable	14.749.000,00	18.502.000,00
Net Property, plant & equipment	61.133.000,00	60.778.000,00
Total assets	142.606.000,00	152.130.000,00
Total current liabilities	36.059.000,00	48.717.000,00
Non current liabilities	52.903.000,00	48.183.000,00
Total liabilities and equity	142.606.000,00	152.130.000,00
Cash flow		
Net cash from operating activites	17.460.000,00	15.119.000,00

As can be seen from the table above, the component with a complete outlier value is AQI with a result of -18,793 as a ratio, which weighted according to the specific weight in the M-score (0,404) becomes -7,592, a value that is completely different from the mean, 0,193, and the median, 0,412, of the analysed sample.

This anomalous value is due to the net decrease in the item 'total current assets' from 61.597 to 46.705, this decrease significantly increases the difference between PPE and current assets, which will therefore have a greater weight on the total assets than in 2022, thus generating an anomalous value.

The reduction in "Total current assets" is due to decreases in:

- Financial assets measured at fair value through profit or loss;
- Trade receivables and other receivables;
- Other assets.

The decrease in total current assets, although significant, was not investigated further because it was not considered a cause of earnings management. In conclusion, despite the anomalous AQI value affecting the M-score, Eni S.p.A. remains classified as an "unlikely manipulator," as there are no reasonable factors to suggest a different classification for the company.

3.4 Conclusion

From the application of the Beneish model to the EURO STOXX 50 sample, three companies initially emerge as "likely manipulators" (Enel S.p.A., CRH PLC, and Vonovia SE), twelve are identified as "possible manipulators," and 22 as "unlikely manipulators." A more detailed analysis of the companies classified as "likely manipulators" does not reveal clear signs of accounting manipulation. Specifically, in the case of Enel S.p.A., this classification is due to an abnormal increase in revenues, which caused the DSRI and GMI components to assume particularly high values. For CRH PLC, however, a ten-year analysis of the M-score shows that it has been substantially outside the cut-off threshold except in the last year, where the TATA and GMI components exhibited anomalous values. The latter was due to a different classification of costs, while the causes for TATA are more challenging to identify by analysing only the balance sheet items. The M-scores of INDUSTRIA DE DISENO TEXTIL S.A. and HERMES INTERNATIONAL were also subsequently analysed, as both were identified as "possible manipulators" with M-scores very close to the cut-off threshold. The analysis of these two companies did not reveal any significant findings.

Given the tools available for this analysis, it is not possible to definitively conclude whether the companies in the sample engage in earnings management to sustain profit growth. Nonetheless, from the application of the model and the detailed analysis of the anomalous components, combined with the absence of the "typical" elements identified by Beneish for manipulative firms, manipulative actions are not hypothesized. In this context, it is recommended to continuously monitor the financial results and

extraordinary transactions to detect potential issues early that might drive companies to manipulate accounting data.

3.5 Final consideration on the model

Beneish's model is considered to be the most reliable method for the detection of earnings manipulation operations to date, since, thanks to its eight variables, it is capable of capturing the financial condition of a company as well as allowing for the simultaneous assessment of multiple aspects. The advantages provided by the model also translate into time and cost savings in view of the fact that all the data required to calculate the Manipulation Score are easily identifiable from financial statements, which, in turn, are publicly available if they concern companies with securities admitted to trading on regulated markets.

One of the most distinctive features of the model is its ability to capture those variables that most commonly influence top management to cross the earnings management boundary, such as a deterioration in gross margin, an increase in leverage, an increase in customer receivables not accompanied by an equal increase in revenues.

What is important to emphasise is the fact that the model should not be interpreted solely in terms of the values obtained from the calculation of the M-Score, but the latter should be a stimulus to delve deeper into the individual variables in order to identify which values are high or strange with the aim of fully understanding what are the accounting dynamics affecting the probability of manipulation. As can be seen in the practical application of the Beneish model, it has certain limitations that must necessarily be taken into account.

The first of these is the fact that the purpose for which it was created is restricted to transactions that manipulate profits by means of the leverage of accruals and, consequently, accounting falsifications based on the cash side will not be detected.

In addition, the model is influenced by the fact that growing companies are assigned a higher risk of manipulation than companies with an established business trend; this is because in such companies, managers are given a lower propensity to constantly improve earnings.

A further factor distorting the results is the presence of exceptional events such as takeovers and mergers, where indices tend to take on extreme values. The latter, if not properly contextualised and included in the Manipulation Score calculation, can lead to a misinterpretation of the probability of manipulation.

One of the major shortcomings of the model, moreover, is the failure to include a variable relating to inventories, a balance sheet item in which manipulation and fraud very often occur.

In conclusion, the Beneish model is an excellent tool for retrospective analysis and detecting earnings management. However, it is a tool that necessarily requires integration and further investigation. One cannot rely solely on the model's results; these must be supplemented and analysed with all available company information, such as annual reports and press releases for external analysts, and through inquiries with the company's management for internal analysts.

4. The effect of audit quality on earnings management

In this chapter, we will examine the effect of audit quality on earnings management through discretionary accruals. As mentioned in the first chapter, managers have incentives to "adjust" earnings to maximize the wealth of the firm and/or themselves. These incentives arise from contracts that are explicitly based on reported earnings, such as management compensation plans and debt agreements; contracts that are implicitly based on reported earnings, such as those between the firm and its customers and suppliers; and various situations where reported earnings play an important role, such as import relief negotiations, management buyouts, and proxy contests.

Auditing reduces the information asymmetries that exist between managers and firm stakeholders by allowing outsiders to verify the validity of financial statements. The effectiveness of auditing, and its ability to constrain earnings management, is expected to vary with the audit quality.

4.1 Audit

4.1.1 Audit: Definition, process and core principles

Defining auditing can be quite easy. According to the Cambridge dictionary the definition of auditing is as follows: “to make an official examination of the accounts of a business and produce a report”. While this definition would serve for most purposes, in the context of this research a deeper understanding of the auditing process will be valuable.

The first research discussing external auditing dates from the beginning of the previous century (Woolf, 1912)[95]. External auditing was referred to as producing some sort of certificate, in which the auditor confirmed and certified that stated amounts were fair or correct or something of the sort (Church et al. 2008)[96]. Eimers and ten Klooster (2010)[97] propose a more recent definition of auditing: ‘The providing of an independent judgement regarding financial statements for the benefit of stakeholders’ (p. 6).

[95] Woolf, A.H. (1912). A short history of accountants and accountancy. London: Gee.
[96] Church, B.K., Davis, S.M. and McCracken, S.A. (2008). The auditor’s reporting model: A literature overview and research synthesis. Accounting Horizons, 22(1), p. 69-90.
[97] Eimers, P., and ten Klooster, A. (2010). The social relevance of the accountant - there is more to accountancy than financial statements. Monthly Journal of Accountancy and Business Economics, 84(12), p. 633-640.

Academic scholars debate over the role of the external auditor and the definition of external auditing. Knechel et al. (2013)[98] proposes a more extended definition of auditing which is as follows: 'An audit is an economically motivated professional service designed to reduce the information risk of stakeholders that relies on the knowledge and skills of experts used in a systematic process that considers the idiosyncratic needs of a client where the outcome is unobservable and subject to market constraints and regulatory forces' (p. 219). With this definition, Knechel et al. (2013) recognizes four different constructs, namely: 1) audit value depends on its use as a risk management tool by stakeholders, 2) audit outcome is inherently uncertain and ultimately unobservable, 3) the audit process characteristics depend on the client and 4) expertise is the ultimate source of value in an audit. In order to fully understand the auditing process and the use of auditing, these four characteristics need explanation. Considering the first characteristic, Knechel et al. (2013) assume that compliance with standards is not the only factor adding value to auditing. Stakeholders will not buy audits for it to solely meet auditing standards. Knechel et al. (2013) argues that in order to create economic value, an audit will need to exceed regulatory auditing standards. Second, inspectors and auditors may have different perspectives on an audit and the quality of the audit. Both can be equally right (or wrong), each can reach valid conclusions about the audit. The conclusions of the inspector will mostly be complementary to those of the auditors. This leads to the auditor investing valuable effort into trying to anticipate what an inspector will want to see. This is time that can be used to examine more substantive issues regarding the audit engagement. Next, the third characteristic is an effect of the second. Auditors may adjust their auditing process to the inspectors needs, or what they want to see. This could harm the quality of the audit, as it is no longer adjusted to client's needs but to inspectors. The fourth characteristic implies that judgment cannot be standardized or regulated out of the process. In the end, the quality of auditor judgment determines the quality of the audit. With the absence of professional expertise, auditing may have limited value. Combining these four characteristics, the foundation is laid for any professional financial service (Knechel et al., 2013).

[98] Knechel, W.R., Krishnan, G.V., Pevzner, M.B., Shefchik, L., and Velury, U. (2013). Audit quality: Insights from the academic literature. Auditing: A Journal of Practice & Theory, 32(1), p. 385 - 421.

Furthermore, Holm (2007)[99] researched the role of the auditor and states that it is closely related to the subject of the audit, the financial statements and its credibility. The role of the auditor is once more defined as it is stated that by examining financial statements and underlying documents, the financial auditor can catch small problems before they become issues of higher scale.

According to the American Accounting Association (1973), an audit may be defined as: “A systematic process of objectively obtaining and evaluating evidence regarding assertions about economic actions and events to ascertain the degree of correspondence between these assertions and established criteria and communicating the results to interested users”. So, Auditing is characterized by its systematic approach, which entails following a structured and documented plan to ensure comprehensive analysis of all pertinent evidence. This methodical process guarantees that all significant aspects are thoroughly examined. Objectivity is paramount in auditing, necessitating that auditors maintain independence, objectivity, and expertise, thus ensuring an impartial attitude throughout the audit.

The process of obtaining and evaluating evidence is crucial to an audit. It involves assessing the reliability and sufficiency of the information contained within the accounting records. Assertions, which are representations made by management, whether explicit or implicit, are embedded in the financial statements. These assertions include elements such as existence, rights and obligations, among others.

To ascertain the degree of correspondence between these assertions and established criteria, auditors employ various techniques. These techniques include the examination of physical evidence, document confirmation, inquiry, and observation, all aimed at testing the validity of the assertions made by management.

Finally, the results of the audit are communicated to interested users through a written report known as the "audit opinion." In this report, auditors express their opinion on whether the financial statements provide a true and fair view of the company's financial

[99] Holm, C., and Zaman, M. (2012). Regulating audit quality: Restoring trust and legitimacy. Accounting Forum, 36, p. 51-61.

position. This communication ensures that stakeholders are informed of the auditor's findings and conclusions.

In addition to the above definition of an audit, we may highlight the following requirements included in ISA 200:

- The auditor must use professional scepticism, which is an attitude including a questioning mind, being alert to conditions which may indicate possible misstatement due to error or fraud, and a critical assessment of evidence.
- The auditor must recognize that circumstances may exist that cause financial statements to be materially misstated, meaning that such a mistake in the accounts could influence the economic decision of users if they take their business decision based on those financial statements;
- The auditor shall exercise professional judgment, applying relevant professional training, knowledge and experience provided by the relevant standards;
- The auditor must obtain sufficient (quantity of audit evidence) and appropriate (quality of audit evidence) audit evidence to obtain reasonable (not absolute) assurance that the financial statements are free from material misstatements.

The auditor performs an essential function in the economy's ecosystem. In order for capital markets to make financial decisions they need trustworthy financial statements. As such, the main purpose of the audit is to ensure reliability.

4.1.2 The regulatory framework

The statutory audit consists of a complex process of checks and procedures carried out in accordance with international auditing standards, with the aim of verifying that the annual or consolidated financial statements comply with the rules and principles governing their preparation and give a true and fair view of the audited company's assets and liabilities, financial position and results of operations. The need to delineate a regulatory framework for auditing companies stems from the need to limit the subjectivity granted to directors up to that point in representing the accounting situation of the companies they manage. In Italy, the first form of external and independent control introduced on company financial statements was ruled by "art. 2 della Legge del 7 giugno 1974, n. 216", which regulated the purpose, methods and subjects authorised to perform

auditing activities. Specifically, the obligation to audit and certify the financial statements was envisaged for all joint-stock companies with securities listed on the stock market. The latter, in order to obtain this certification, had to comply with the regular bookkeeping, present a correspondence between the accounting records and the final result of the financial year and, finally, comply with the legal regulations on financial statements.

In the same year, the "Commissione Nazionale per le Società e la Borsa" (CO.N.SO.B) (National Commission for Companies and the Stock Exchange) was also established to protect investors and ensure the efficiency, transparency and development of the Italian securities market. CONSOB was also set up to supervise the work of the auditing companies by verifying the independence of the auditors and their technical suitability to carry out this profession. In 1975, in order to meet the need to establish national accounting standards, which already existed in other countries - the Anglo-Saxon states, in fact, had long had 'General Accepted Accounting Principles' (GAAP) -, a Commission was set up with the task of investigating any problems connected with the introduction of mandatory auditing in Italy. The accounting principles issued by the Commission identified, on the one hand, the purpose, subject matter and criteria for the formation of the annual financial statements; while, on the other hand, they defined the manner in which specific management transactions were to be recognised.

An important turning point came in 1991, the year in which "Decreto Legislativo n. 127" of 9 April 1991 was promulgated, by which the Fourth Council Directive (78/660/EEC) and the Seventh Council Directive (83/349/EEC) on the subjects of company financial statements and consolidated financial statements, respectively, were implemented. In particular, Article 51 of the Fourth Directive introduced the figure of the statutory auditor[100] and mandatory auditing for all joint stock companies exceeding certain size limits[101]. By means of this Directive, the European Community pursued the objective of guaranteeing the homogeneity of the financial statements of all member states,

[100] Fourth Council Directive (78/660/EEC), Article 51: "Companies must have their annual accounts audited by one or more persons authorized by national law to audit accounts."
[101] Fourth Council Directive (78/660/EEC), Article 27: "The Member States may permit companies which on their balance sheet dates do not exceed the limits of two of the three following criteria:
— balance sheet total: 4 million EUA,
— net turnover: 8 million EUA,
— average number of employees during the financial year: 250"

identifying a common structure and drafting principles and also establishing an external control regime.

Following the numerous scandals of the following decade - first and foremost the bankruptcy of the American giant Enron in 2001 and the collapse of the auditing firm Arthur Andersen[102] - the global securities market suffered a considerable loss of confidence and, as a result, numerous questions arose as to the actual usefulness and effectiveness of auditing.

To address this situation, the Sarbanes-Oxley Act was introduced in America in July 2002, which had the task of rectifying the shortcomings hitherto existing with regard to the performance and responsibility of statutory auditors and promoting greater transparency of accounting records.

At the same time, the European legislator embraced the idea of a standardisation process of the statutory audit discipline with the aim of raising the general quality standard of the audit itself and strengthening the independence of auditors.

To this end, on 17 May 2006, the European Parliament and the Council approved the Directive 2006/43/EC aimed at regulating the concept of legality of the audit, making it mandatory. Specifically, the Directive in question was created as a bridge to unite the corporate control systems for the protection of third parties and the various pre-existing national bodies of law, outlining the general requirements but leaving it to the individual Member States to provide for even stricter rules than those established.

As a result of this Directive, the Statutory Auditor was defined as a figure with skills that were recognised both nationally and within the EU. The possibility of operating throughout the European Community was guaranteed by the adoption of the 'International Standards on Auditing' (ISA), a body of accounting standards identified by the International Auditing and Assurance Standards Board (IAASB), an internal committee of the International Federation of Accountants (IFAC).

[102] The Enron Corporation was until 2001 one of the largest US multinationals in the electricity sector. Its sudden and unexpected bankruptcy exposed an administrative practice based on inflated balance sheets and companies set up abroad with the aim of concealing them. The scandal arising from Enron's bankruptcy led to the dissolution of the Arthur Andersen auditing firm, one of the five largest multinational auditing and accounting firms in the world. For further reading: GIBNEY A., Enron, Feltrinelli, 2006.

The new set of international standards (ISA Clarified) came into force on 15 December 2009, following a complex rewriting process of the pre-existing International Standards on Auditing aimed at ensuring a more immediate understanding and clarification of the objectives and requirements of auditing.

4.1.3 Ethical standards

Ethics represent a broader set of principles than the law, by establishing a code of ethics, the accountancy profession has decided to assume self- discipline beyond the pure requirements of the law. It is in this context that the International Ethics Standards Board for Accountants (IESBA) has made its guidance clear in its Code (Handbook of the Code of Ethics for Professional Accountants). The distinguishing mark of the accountancy profession is that its responsibility is not to satisfy only one client or employer, but to consider the wider public interest.

There are six fundamental principles[103] of ethics that apply to all accountants, whether they work in public practice (Independent external auditors giving assurance to financial statements prepared by their client) or for their employer only (CFO of a corporation for example). These principles are:

- Independence: the auditor must be in a position of formal and substantive independence in the performance of the engagement;
- Integrity: Auditor must be straightforward and honest in all professional and business relationships;
- Objectivity: They must not allow bias or conflict of interest influence your judgment, to be independent both in actual terms and from a perception perspective in the eyes of the various stakeholders;
- Professional competence and due care: Accountants are required to maintain professional knowledge and skills at the level required to deliver diligent client or employer competent services in line with applicable technical and professional standards

[103] In accordance with the general principles set out in Parts A and B of the IFAC Code of Ethics for Professional Accountants (IFAC Code of Ethics Auditing Standard 200), which contains the measures that must be implemented for the performance of the engagement.

- Confidentiality: They must never disclose information obtained during a professional relationship to third parties unless legally or professionally required to do so, and must not use such information for personal gain;
- Professional behavior: Accountants must comply with relevant laws and regulations and avoid any acts that discredits the profession.

The main threats to those fundamental principles are:

- Self-interest threat: This arises when an auditor could benefit from a financial or non- financial interest with an audit client.
- Self-review threat: This occurs when the results of a previous engagement need to be re-evaluated in reaching conclusions on the present audit engagement.
- Advocacy threat: This occurs when a member of the audit team would promote, or seem to promote, an audit client's position or opinion.
- Familiarity threat: This threat emerges when an auditor would become too sympathetic to the client's interest because he has a close relationship with the client, its directors, officers or employees.
- Intimidation threat: This arises when an auditor would be deterred to act objectively and exercise professional skepticism because of threats, actual or perceived, from the directors, officers or employees of an audit client.

To mitigate these threats, various safeguards have been implemented through professional, legal, and regulatory measures, as well as within the work environment. There are three main types of safeguards:

- Safeguards created by the profession: These include training and experience requirements to become a certified member of the audit profession, continuing compulsory education requirements, professional rules or regulations governing the independence obligations of the firm.
- Safeguards within the work environment: These consist of internal policies and procedures set up by the audit firm to perform quality control of audit engagements, policies and procedures to identify interests or relationships between the client and members of audit team, procedures enforcing compulsory rotation of senior audit team personnel.

- Safeguards implemented by laws and regulations: These include mandatory tendering of audit services or obligation to change audit supplier every (specified) number of years, restriction on or prohibition of non-audit services to an audit client, disciplinary sanctions of auditors in case of non-compliance which can range from financial penalties to the revocation of an auditor's license.

4.2 Audit quality

4.2.1 The concept of audit quality

According to DeAngelo (1981)[104], "the market assessed joint probability that a given auditor will both discover a breach in a client's system and report the breach" (p.186) is the commonly accepted definition of audit quality. According to DeAngelo (1981), audit quality can be essentially divided into two categories: (1) the possibility of finding misstatements, and (2) responding correctly to disclose any findings. The groundwork for audit quality study was established by DeAngelo's (1981) work. Before DeAngelo's (1981) research, audit quality was never specifically mentioned, and it was generally accepted that, as long as professional standards and qualifications were upheld, it was unfair to differentiate between the largest eight and all other Certified Public Accountant (CPA) firms (Arnett and Danos, 1979)[105].

In fact, the American Institute of Certified Public Accountants (AICPA) justified the claim that auditor size has no bearing on audit quality by arguing that auditor size should not be taken into consideration when choosing an auditor.

DeAngelo (1981) was the first to refute this notion, arguing instead that larger audit firms offer higher-quality audits. His study on audit fees supports this, contending that an auditor is less likely to act opportunistically the larger their clientele is and the smaller their clientele is relative to their total clientele. This increases the likelihood that the audit quality will be perceived as having improved.

[104] DeAngelo, Linda Elizabeth. "Auditor size and audit quality." Journal of accounting and economics 3.3 (1981): 183-199.
[105] Arnett, Harold E., and Paul Danos. CPA firm viability: A study of major environmental factors affecting firms of various sizes and characteristics. Division of Research, Graduate School of Business Administration, University of Michigan, 1979.

Knechel (2016)[106] rephrases the definition of audit quality into two components in more recent literature, building on DeAngelo's (1981) earlier work: 1) auditor knowledge (probability of identifying misstatements) and 2) auditor independence (likely of exposing the identified misstatements). Since both of these characteristics are seen to be positively correlated with audit quality, they are typically handled as distinct audit aspects. By demonstrating how these two notions are related to one another and affect how much changes in audit regulations and audit procedures affect audit quality, Knechel's research adds to the body of literature already in existence.

4.2.2 Regulations

The interest from regulators in auditing quality receives is indicative of Knechel's (2016) argument that more regulation is preferable than less. Many supervising (governmental) organizations in Europe and America have projects aimed at defining, measuring, and assessing audit quality on their agendas. These organizations include the International Auditing and Assurance Standards Board (IAASB, 2013)[107], the PCAOB (PCAOB, 2012[108], 2013, 2014), the AICPA (AICPA, 2014)[109], and the Centre for Audit Quality (CAQ, 2012). "In accordance with Generally Accepted Auditing Standards (GAAS) to provide reasonable assurance that the financial statements are (1) presented in accordance with GAAP, and (2) not materially misstated whether due to errors or fraud" is how the Government Accountability Office (henceforth: GAO) defines audit quality.

The already mentioned Sarbanes-Oxley Act (2002) is arguably the most important change in regulation of recent times. The SOX most notorious mandate is that external auditors are now obliged to include a report on the effectiveness of firm's internal controls over financial reporting in the annual report (Gates and Leuschner, 2007)[110]. Furthermore, it is required to attach a certification of the accuracy of the firm's periodic reports given by the CEO and CFO and account for the maintaining of an independent audit committee, banning all non-audit services provided by the auditing firm (Sarbanes-Oxley Act, 2002).

[106] Knechel, W. Robert. "Audit quality and regulation." International Journal of Auditing 20.3 (2016): 215-223.
[107] International Auditing and Assurance Standards Board (IAASB) (2013). A framework for audit quality. New York: The International Federation of Accountants.
[108] Public Company Accounting Oversight Board (PCAOB) (2012). Strategic plan: Improving relevance and quality of the audit for the protection and benefit of investors, 2012-2016. November 30, 2012.
[109] American Institute of Certified Public Accountants (AICPA) (2014). Enhancing audit quality: Plans and perspectives for the U.S. CPA Profession. August 2014, New York, NY.
[110] Gates, S.M., Leuschner, K.J. (2007). In the name of entrepreneurship? Rand Corporation, Santa Monica, CA.

Many researchers devoted to studying the effects of the SOX since its enactment (e.g. Hansen et al., 2009[111]; Dey and Simon, 2010[112]). Nevertheless, the overall effect of SOX on publicly traded firms remains debated (Kamar, Karaca-Mandic, and Talley, 2009)[113].

Shortly after the SOX enactment, the PCAOB was appointed to oversee the auditing industry. This board supervises the enactment of the SOX by inspecting auditors, establishing auditing standards and fining lawbreakers (PCAOB, 2004)[114]. Palmrose (2013)[115] argues that SOX established the PCAOB "to oversee the audit of public companies that are subject to the securities laws, and related matters, in order to protect the interest of investors".

Furthermore, Palmrose (2013) evaluates the role and effectiveness of the PCAOB over the past decade and acknowledges that the PCAOB has improved audit quality by further expanding on older standards and developing new standards. Some even consider these legislative requirements for audit committees as one of the major influences of audit service post-SOX (Palmrose, 2013).

As the SOX and its enforcement by the PCAOB lead to more strict regulation in the US, Europe uses a more principle-based framework with IFRS. A question that continues to rise, is how the adoption of either IFRS or US GAAP affects accounting quality. Iatridis (2010)[116] investigated the difference between the two accounting standards and examines the effect for United Kingdom firms. Iatridis' most prominent finding reveals that IFRS leads to more fair value relevant accounting measures. Moreover, Henry, Lin and Yang (2009)[117] find that significant differences between the US GAAP and IFRS exist, for example companies that adopt IFRS report higher net profitability than their US GAAP

[111] Hansen, B., Pownall, G. and Wang, X (2009). The robustness of the Sarbanes Oxley effect on the U.S. capital market. Review of Accounting Studies, 14(2-3), p. 401-439.
[112] Dey, A. and Simon, W.E. (2010). The chilling effect of Sarbanes-Oxley: A discussion of Sarbanes- Oxley and corporate risk-taking. Journal of Accounting Economics, 49(1-2), p. 53-57.
[113] Kamar, E., Karaca Mandic, P., and Talley, E. (2009). Going-private decisions and the Sarbanes-Oxley Act of 2002: A Cross-Country analysis. Journal of Law, Economics and Organization, 25(1), p. 107-133.
[114] Public Company Accounting Oversight Board (PCAOB) (2004). References in Auditors' Reports to the Standards of the Public Company Accounting Oversight Board. Auditing Standard No 1, Release No. 2003-2025, Washington DC.
[115] Palmrose, Z. (2013). PCAOB Audit regulation a decade after SOX: Where it stands and what the future holds. *Accounting Horizons, 27*(4), p. 775-798. Page (777).
[116] Iatridis, G. (2010). International Financial Reporting Standards and the quality of financial statement information. International Review of Financial Analysis, 19, p. 193-204.
[117] Henry, E., Lin, S. and Yang, Y.W. (2009). The European-US GAAP Gap: IFRS to US GAAP Form 20-F Reconciliations. Accounting Horizons, 23(2), p. 121-150.

counterparts. However, despite various convergence efforts, both the US GAAP and IFRS accounting regimes do not provide for a unified audit quality model (Iatridis, 2010).

4.3 Effect of audit quality on earnings management

The impact of audit quality on earnings management practices has become one of the timeliest topics in modern accounting research since it is important to the integrity of financial reporting. Audit quality can be normally measured by the reputation of auditors and the size of audit firms, which are regarded as major factors for reliability and transparency of financial statements. Recent literature has associated audit quality with earnings management practices like manipulation of accruals and income smoothing, to show the extent to which high audit quality is a deterrent against such practices.[118]

It is the duty of auditors to confirm that the financial statements accurately depict the entity's "true" financial circumstances and operating performance, as well as to confirm that they are honestly stated and compliant with GAAP. The financial statements gain credibility as a result of the auditor's confirmation. Furthermore, not only acceptability but also quality of the financial statements must be discussed by the auditor (Lin and Hwang, 2010)[119]. The reflection of the "true" economic conditions in the financial statements would be jeopardized if managers had different incentives to mislead stakeholders by manipulating the financial statements. According to Knechel et al. (2013)[120], a quality audit is therefore anticipated to limit earnings management and lower the information risk that the report contains major misstatements.

Several studies consider three elements that influence audit quality and its effect on earnings management: audit firm size, auditor independence and auditor tenure.

[118] Mwangi, J., (2024). Effect of Audit Quality on Earnings Management Practices. American Journal of Accounting, Vol.6, Issue 1, pp 1 - 12, 2024.
[119] Lin, J.W. and Hwang, M.I. (2010). Audit quality, corporate governance, and earnings management: A meta-analysis. International Journal of Auditing, 14, p. 57-77.
[120] Knechel, W.R., Krishnan, G.V., Pevzner, M.B., Shefchik, L., and Velury, U. (2013). Audit quality: Insights from the academic literature. Auditing: A Journal of Practice & Theory, 32(1), p. 385-421.

Various studies mention auditor size to be a characteristic of audit quality (e.g. Becker et al., 1998[121]; Francis et al., 1999[122]). Furthermore, multiple studies examine the relationship between earnings management and auditor firm size (e.g. Lennox, 1999)[123].

According to Becker et al. (1998), the major six auditors have an edge that makes them more successful at detecting earnings management. They also take action to disclose and uncover earnings management in order to preserve their good reputations. Renowned audit companies typically limit their ability to manipulate earnings, which improves the audited financial statements' quality and transparency. Furthermore, Krishnan (2003)[124] contends that because they have a larger clientele and a higher chance of losing business, larger audit firms are more motivated to safeguard their reputation. Francis et al. (1999) and Becker et al. (1998) both note that the big six auditors have a detrimental impact on earnings management. However, this impact is not reported by Davidson et al. (2005)[125] or Bédard et al. (2004)[126].

However, Lin and Hwang (2010) contend that the big 4/5/6 and earnings management are negatively correlated. Furthermore, Houqe et al. (2017)[127] differentiate between big four and non-big four auditors in order to investigate the association between audit quality and earnings management using a sample of more than 7,000 Indian enterprises.

DeFond and Zhang (2014)[128] examined whether the quality of audits affects earnings management at publicly traded U.S. firms. Using panel data analysis, they found that the higher the quality of audits, proxied through auditor reputation and industry expertise, the lower the level of earnings management. This study highlighted that audit quality is integral to financial reporting integrity and, therefore, regulators, firms, and stakeholders

[121] Becker, C.L., Defond, M.L., Jiambalvo, J. and Subramanyam, K.R. (1998). The effect of audit quality on earnings management. Contemporary Accounting Research, 15, p. 1-24.
[122] Francis, J.R., Maydew, E., and Sparks, C. (1999). The role of Big 6 auditors in the credible reporting of accruals. Auditing: A Journal of Practice & Theory, 18(2), p. 17-34.
[123] Lennox, C. (1999). Non-audit Fees, disclosure and audit quality. The European Accounting Review, 8(2), p. 239-252.
[124] Krishnan, G. (2003). Does big 6 auditor industry expertise constrain earnings management? Accounting Horizons, 17, p. 1-16.
[125] Davidson, R., Goodwin-Steward, J. and Kent, P. (2005). Internal governance structures and earnings management. Accounting and Finance, 45, p. 241-267.
[126] Bédard, J., Chtourou, S.H. and Courteau, L. (2004). The effect of audit committee expertise,independence and activity on aggressive earnings management. Auditing: A Journal of Practice & Theory, 23, p. 13-35.
[127] Houqe, M.N., Ahmed, K. and van Zijl, T. (2017). Audit quality, earnings management, and cost of equity capital: Evidence from India. International Journal of Auditing.
[128] DeFond, M. L., & Zhang, J. (2014). A review of archival auditing research. Journal of Accounting and Economics, 58(2-3), 275-326.

should focus on ways of improving audit quality to reduce earnings management in order to restore investor confidence.

Chen, Huang, and Li (2016)[129] empirically examined the relationship between audit quality and earnings management for Chinese publicly traded companies. The findings showed that audit quality proxied by the reputation of audit firms was significantly negatively related to the magnitude of earnings management. Such findings give indications of improvement in the integrity of financial reporting by using reputable audit firms. The study, therefore, goes ahead to recommend that Chinese companies and their regulators should give precedence to reputable audit firms while improving the quality of financial reporting in order for investor confidence to be maintained. According to their findings, there is less profits management when audit quality is good.

Academic interest has been drawn more and more to the auditor's and audit committee's independence (Li et al., 2008)[130]. According to earlier research, large fees that the company pays the auditor strengthens the financial ties between the auditor and the client, thereby undermining the auditor's independence (Frankel et al., 2002[131]; Li and Lin, 2005)[132]. Because of this compromised independence, audit quality is therefore reduced, and more earnings management is possible, which lowers the quality of financial reporting. Furthermore, total fees have a beneficial effect on the occurrence of earnings management by lowering independence, according to Lin and Hwang (2010).[133] Therefore, it is anticipated that the degree of earnings management will decline as auditor independence rises.

The impact of auditor tenure on earnings management is the subject of the third factor. The impact of auditor tenure on the reduction of auditor independence is a topic of continuous discussion. Regulators have determined that the auditor's tenure does have an impact on the audit's quality, though. Therefore, the EU legislation currently mandates

[129] Chen, Y., Huang, J., & Li, P. (2016). Auditor tenure and audit quality: Evidence from China. International Journal of Auditing, 20(2), 313-330.
[130] Lin, Z.J., Xia, J.Z. and Tang, Q. (2008). The roles, responsibilities and characteristics of audit committee in China. Accounting, Auditing and Accountability Journal, 21(5), 721-751.
[131] Frankel, R.M., Johnson, M.F. and Nelson, K.K. (2002). The relation between auditors' fees for non- audit services and earnings management. The Accounting Review, 35(1), p. 71-105.
[132] Li, J. and Lin, J. (2005). The relationship between earnings management and audit quality. Journal of Accounting and Finance Research, 12(1), p. 1-11.
[133] Lin, J.W. and Hwang, M.I. (2010). Audit quality, corporate governance, and earnings management: A meta-analysis. International Journal of Auditing, 14, p. 57-77.

that Public Interest Entities (PIE) rotate their audit firm every ten years. This requirement was just introduced by the European Parliament. Scholarly research on the impact of auditor tenure on earnings management, however, reveals contradictory findings.

In order to better understand the influence of auditor tenure, a critical component of audit quality, on earnings management strategies in European companies, Palmrose and Scholz (2017) undertook a comprehensive study. This study's main goal was to give a thorough understanding of how the length of the auditor-client relationship affects the likelihood of manipulating profits. The investigators utilized a rigorous longitudinal analytic approach, covering several years and scrutinizing a wide range of European enterprises. Their research clarified the complex relationships between auditor tenure and earnings management and produced the rather unexpected finding that higher levels of earnings management were linked to longer auditor tenure. The impacts of this finding for European regulators and companies are significant, since it raises the possibility that limiting the tenure of auditors could preserve audit quality and lessen the incidence of earnings management. As a result, the study offered insightful information that is still relevant in the current debates over audit quality and independence (Palmrose & Scholz, 2017)[134].

According to Hohenfels (2016)[135], auditor tenure has a favourable impact on earnings management. However, he contends that investors may perceive a decline in audit quality as the tenure lengthens, potentially impacting earnings quality.

However, as an auditor's employment grows, they should gain experience and improve their understanding of the internal financial reporting processes and business goals of their clients, which should help them identify major misstatements more easily (Arens et al., 2005)[136]. Moreover, Myers et al. (2003)[137] document a negative correlation between earnings management and auditor tenure. According to Lin and Hwang's (2010) meta-

[134] Palmrose, Z. V., & Scholz, S. (2017). The effect of auditor tenure on audit quality. Contemporary Accounting Research, 34(3), 1424-1454.
[135] Hohenfels, D. (2016). Auditor tenure and perceived earnings quality. International Journal of Auditing, 20, 224-238.
[136] Arens, A., Elder, R. and Beasley, M. (2005) Auditing and assurance services; an integrated approach. Englewood Cliffs, NJ: Prentice-Hall.
[137] Myers, J.N., Myers, L.A. and Omer, T.C. (2003). Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? The Accounting Review, 79(4), p. 1095-1118.

analysis, every one of the 48 research they analysed showed a negative correlation between auditor tenure and earnings management.

Thus, there is compelling evidence that earnings management declines with increasing auditor tenure. Arens et al. (2005)[138] found that the advantages of a longer tenure seem to outweigh the harm of independence.

So according to the various studies mentioned above, higher audit quality, which is defined by the auditor's reputation, industry knowledge, and regulatory reforms, is correlated with lower levels of earnings management. For regulators, businesses, investors, and auditors alike, these findings have important relevance. To guarantee the integrity and dependability of financial statements, they underline the necessity of ongoing efforts to improve audit quality, fortify corporate governance frameworks, and carry out regulatory changes. Being aware of research gaps is crucial, especially with regard to comprehending the fundamental mechanisms by which audit quality influences various contexts, the contextual variances in this relationship among various locations, and the geographic scope of investigations.

In summary, the impact of audit quality on earnings management strategies is still a major issue in modern finance. The continuous investigation of this relationship is necessary to preserve investor confidence, protect financial stability, and guarantee the truth of financial reporting as financial markets and regulatory frameworks change.

4.4 Euro Stoxx sample auditor analysis

In the previous chapter, a comprehensive analysis of earnings management practices within the Euro Stoxx 50 companies was conducted. Building on these findings, this chapter shifts focus to examine the impact of audit quality on earnings management. To further explore this relationship, the following section will identify and analyse the auditors of the companies within the sample previously assessed. This examination aims to understand how the reputation and expertise of these audit firms may influence the financial reporting practices of the Euro Stoxx 50 companies.

[138] Arens, A., Elder, R. and Beasley, M. (2005) Auditing and assurance services; an integrated approach. Englewood Cliffs, NJ: Prentice-Hall.

Below is a table with all the auditors of the companies in the sample analysed. It is important to note that companies resident in France[139] are subject to a legal requirement that they should be audited by a consortium of at least two companies. In France, this provision has applied to listed companies since 1966. It was extended to companies required to publish consolidated financial statements in 1984, a time when Anglo-American audit firms were rapidly expanding their market share.

Figure 4.1: Audit firms employed by the companies in the sample analysed

Company[140]	**Auditor[141]**
VOLKSWAGEN AG	Ernst & Young
TOTALENERGIES SE	Ernst & Young
	Pricewaterhousecoopers
STELLANTIS N.V.	Ernst & Young
BAYERISCHE MOTOREN WERKE AG	Pricewaterhousecoopers
MERCEDES-BENZ GROUP AG	KPMG
DEUTSCHE TELEKOM AG	Deloitte & Touche
ENEL SPA	KPMG
ENI S.P.A.	Pricewaterhousecoopers
KONINKLIJKE AHOLD DELHAIZE N.V.	KPMG
LVMH MOET HENNESSY LOUIS VUITTON	Deloitte & Touche
	FORVIS MAZARS
DEUTSCHE POST AG	Deloitte & Touche
SIEMENS AG	Ernst & Young
BASF SE	KPMG
VINCI	Deloitte & Touche
	Pricewaterhousecoopers
AIRBUS SE	Ernst & Young
ANHEUSER-BUSCH INBEV SA/NV	Pricewaterhousecoopers

[139] The French companies in the analysis sample are: TOTALENERGIES SE, LVMH MOET HENNESSY LOUIS VUITTON, VINCI, SANOFI, L'OREAL, SCHNEIDER ELECTRIC SE, L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE, DANONE, ESSILORLUXOTTICA, SAFRAN, KERING, HERMES INTERNATIONAL and PERNOD RICARD.
[140] Only the companies analysed in the previous chapter were taken into account.
[141] Auditor of the last financial statements taken into account for the analysis in the previous chapter, data from the database Orbis.

IBERDROLA SA	KPMG
BAYER AG	Deloitte & Touche
SANOFI	Ernst & Young
	Pricewaterhousecoopers
L'OREAL	Deloitte & Touche
	Ernst & Young
SCHNEIDER ELECTRIC SE	FORVIS MAZARS
	Pricewaterhousecoopers
INDUSTRIA DE DISENO TEXTIL S.A.	Ernst & Young
CRH PLC	Deloitte & Touche
SAP SE	KPMG
L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE	KPMG
	Pricewaterhousecoopers
DANONE	Ernst & Young
	FORVIS MAZARS
ASML HOLDING N.V.	KPMG
ESSILORLUXOTTICA	FORVIS MAZARS
	Pricewaterhousecoopers
SAFRAN	Ernst & Young
	FORVIS MAZARS
NOKIA OYJ	Deloitte & Touche
ADIDAS AG	Pricewaterhousecoopers
KERING	Deloitte & Touche
	Pricewaterhousecoopers
INFINEON TECHNOLOGIES AG	KPMG
FLUTTER ENTERTAINMENT PUBLIC LIMITED COMPANY	KPMG
HERMES INTERNATIONAL	GRANT THORNTON
	Pricewaterhousecoopers
PERNOD RICARD	Deloitte & Touche
	KPMG
VONOVIA SE	Pricewaterhousecoopers

As can be seen from the table below, the companies in the sample are audited mainly by the Big Four (KPMG, PwC, Deloitte and EY), the other two auditing firms Mazars and Grant Thornton, on the other hand, are part of what can be defined as second tier sized firms, i.e. the tier, in terms of firm size and firm reputation, just below the Big Four. It is important to note, however, that these two firms, in the sample analysed, do not perform audit engagements individually, but perform joint audit engagements alongside a Big Four firm for the engagements of companies in France.

Figure 4.2: Number of companies audited per Audit firms

Auditor	Numbers of companies audited
Pricewaterhousecoopers	12
KPMG	11
Deloitte & Touche	10
Ernst & Young	10
Mazars	5
Grant Thornton	1

The analysis also shows that all companies received an 'Unqualified' audit opinion at the conclusion of the audit of the last available financial statements. The auditor expresses an unqualified opinion when he concludes that the financial statements are prepared, in all material respects, in accordance with the applicable financial reporting framework. Such an opinion is also called a clean opinion or unmodified. When expressing an unmodified opinion on financial statements prepared in accordance with a compliance framework, the auditor's opinion shall be that the financial statements are prepared, in all material respects, in accordance with the applicable reporting framework.

4.5 Conclusions

In conclusion, therefore, it is possible to state that all the companies in the analysis sample are audited by a Big Four, which, according to the previous paragraphs, should lead to an increase in audit quality, while the other factors such as audit independence and audit tenure are more difficult to analyse, the former due to the difficulty in establishing criteria to determine the level of independence and the latter due to the difficulty in finding data.

However, due to the stringent independence rules in force and the limitation on the duration of the audit engagement for listed companies, it is reasonable to state that all audit firms in the sample analysed have a high level of independence, which allows for an increase in the level of audit quality, thus having a positive effect, and thus a reduction/prevention of earnings management.

This statement is consistent with the findings from the empirical analysis in the previous chapter, where the application of the Beneish model to the Euro Stoxx 50 companies did not reveal evidence of earnings management practices. However, it is crucial to remain mindful of the limitations of both this analysis, which is more theoretical and rooted in a review of existing research literature, and the previous chapter's analysis, which is more practical but relies on the Beneish model with all its inherent limitations, as discussed earlier.

Conclusions

This paper, therefore, undertakes an in-depth analysis of earnings management practices, with a view to their detection and mitigation in the companies constituting the EURO STOXX 50. Earnings management has been construed as one of the major challenges to financial reporting since the theoretical underpinnings in chapter one. The managers' manipulation of their firms' financial results compromises transparency and accuracy of corporate disclosures. The review of the theoretical literature underlined the relevance of accruals, for their nature is subjective and hence becomes one of the preferred instruments of manipulation. It also explored ambiguities within accounting standards IAS/IFRS to find the flexibility these models provide to managers and the manipulative use they may be subjected to. Investors, regulators, and other stakeholders eager for corporate transparency need to understand the growth of earnings management and how its roots run deep in managerial incentives. The following section shifted toward practical applications of earnings management detection, reviewing certain popular quantitative models. Models by Healey 1985; DeAngelo 1986; Jones 1991; and Beneish 1999 have served as cornerstones pointing toward questionable financial behavior. The Beneish M-score was one of the major tools used in this study to identify firms most likely to manipulate earnings. It came up with two companies, Enel S.p.A. and CRH PLC, that were then regarded as "likely manipulators," although deeper study did not find sure signs of manipulation. This fully confirms the understanding that models like Beneish's cannot be ideal but rather serve as the first step in investigating company financials. While the analysis of accruals and other abnormalities of the financial statement is of high importance, their models need to be supplemented with qualitative tests to reach some meaningful conclusions.

Thus, the empirical evidence presented in this analysis supports the previously defined limits of the Beneish model: while it can help identify these firms that may manipulate by using accruals, it may classify incorrectly companies in which growth or significant changes such as a merger took place. Moreover, the inability of the model to detect manipulation in cash flows and inventories creates the need to make the approach more subtle in any further research. Irrespective of these limitations, the model keeps its place among the most efficient tools in the earnings management detection, especially if it is

applied as a component of the more extensive investigative framework, which includes qualitative data and ongoing monitoring of the financial transactions.

A major underlying theme in this research is that high audit quality serves to reduce earnings manipulation. Chapters three and four are used to demonstrate a clear link between high-quality audits and reduced earnings management. In view of this, it has to be considered that all sampled firms were audited by one of the Big Four firms, generally associated with superior audit quality due to their particularized industry expertise and resources, internal controls, and compliance with strict regulatory frameworks. Auditor independence and auditor tenure, although more challenging to judge, would imply a general high ranking of audit quality across the board with the strict auditor independence rules for listed companies. This might have contributed to the low level of earnings manipulation findings in the sample. Indeed, there is support from existing literature on the negative relationship between high audit quality and earnings management practices. The study appreciates the bigger implication of audit quality on corporate governance and integrity of financial reporting. Strengthening the practice of audit quality and improvement of corporate governance frameworks go a long way in lessening the occurrence of earnings manipulation. This means that continuing investment confidence depends on a continuous process of the development in auditing techniques and the regulatory oversight of financial reporting, as financial markets evolve and regulatory environments change. In this respect, this study theoretically contributes to the literature by examining one of the many faces of earnings management; using detection models to find manipulation; and maintaining that the identification of manipulation requires a multi-faceted approach.

Therefore, while the Beneish model provided meaningful information for the possible manipulation of earnings, since this manipulation is not clear and greatly available among the listed firms in the EURO STOXX 50, it therefore indicates that strong audit practices are important as a means of maintaining the integrity of financial reporting. However, limitations of the Beneish model and broader analysis naturally cast the onus on investors, regulators, and auditors for constant vigil as far as financial results are concerned and continuous refinement of detection models to adapt to changing tactics employed by earnings management.

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