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Abstract

The paper analyses how company-specific financial factors and country-specific institutional and cultural factors affect the extent to which companies disclose Non-GAAP Financial Measures (NGFMs) in their financial communications. Our study is based on the analysis of 1,731 quarterly financial reports from 120 companies located in 23 countries and listed in Standard & Poor's Global Oil Index. The results provide evidence that supports both the informative theory on NGFMs (asserting that NGFMs are disclosed to provide the investors with higher quality information) and the opportunistic theory (affirming that NGFMs are disclosed to mislead investors). On one side we see that highly indebted companies more frequently disclose NGFMs, but they are conservative in their adjustments, which is consistent with the informative theory. On the other side, low profitability is a driver of positive adjustments providing evidence of an opportunistic behaviour. The regulation on NGFMs has a positive effect on disclosure and does not increase conservatism. It increases the transparency of adjustments, but more in a formal way than substantially. Also the specific set of accounting standards adopted has a relevant effect on the disclosure of NGFMs. The cultural factors play a role partially consistent with this theory, but on average their impact is negligible. Our study was the first to analyse the use of NGFMs including companies from different continents and considering the impact of cultural variables. From a theoretical point of view, the results provide evidence that an informative and opportunistic use of NGFMs coexist and that different factors (mainly company-specific financial factors and institutional factors) lead to different practices. From a practical point of view the analysis provides interesting evidence for the evolution of regulations on NGFMs.

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Introduction

The disclosure of Non-GAAP Financial Measures (hereinafter NGFMs) in the corporate financial communication is increasing in relevance, not only in the US (Heflin and Hsu 2008; Webber et al. 2013), but also in the UK (Walker and Louvari 2003) and in Europe (Isidro and Marques 2013a; Aubert and Grudnitski 2014; Hitz 2010). Growing attention to the topic is also being paid by academic research (Young 2014) and by the regulatory bodies from different countries and on a supranational level (ESMA 2014; IOSCO 2014; SEC 2003). Moreover, the SEC has included NGFMs among the ten most relevant topics related to the information that listed companies have to provide to the market. The term NGFMs refers to financial measures not immediately derivable from the application of accounting standards, but obtained after different kinds of adjustments aimed at excluding “non-recurring” or “exceptional” events. Two opposite theories have been developed about the reasons leading to the adoption of NGFMs. The so called “informative theory” (Choi et al. 2007) suggests that they can increase the value relevance and informativeness of reported earnings (Young 2014) by: a) enhancing the transparency of the reported value; b) supporting cross-sectional and longitudinal comparisons; c) increasing the usefulness of data for predictions and company valuations; d) providing more useful data for analysts and investors. On the contrary, the “opportunistic/strategic” theory (Walker and Louvari 2003) considers NGFMs as tools used by managers to manipulate GAAP earnings in order to meet the benchmarks set by analysts and to mislead less expert investors. Substantial evidence supports both theories. For instance, in respect of the informative theory, Bradshaw and Sloan (2002) show an increasing difference between GAAP earnings and street earnings presented by analysts, while there is an overlap between adjustments made by managers and analysts. Brown and Sivakumar (2003) show how NGFMs and street earnings contain value-relevant information not included in GAAP earnings. Other studies (Choi et al. 2007; Bhattacharya et al. 2003) find that the majority of adjustments generate values that are more representative of “core earnings”, as well as being more informative and more persistent for investors. The opportunistic theory is also supported by many studies showing that NGFMs are usually higher than the corresponding GAAP measures and they are used to meet or exceed analysts’ benchmarks (Isidro and Marques, 2013a, 2015; Marques 2006; Walker and Louvari 2003).

Given that both theories are meaningful and supported by rigorous studies, the main issue remains unresolved: can investors rely on NGFMs provided in the corporate financial communication? Are NGFMs aimed at reducing any information asymmetry between managers and stakeholders or, on the contrary, at misleading investors, particularly the less sophisticated ones? A third view is also possible. The two reasons for disclosing

NGFMs can coexist and there can be different contingent factors determining an “informative” or “opportunistic” disclosure of NGFMs. As a consequence the main question becomes: which factors influence the propensity to an informative/opportunistic disclosure of NGFMs? Few studies have followed this third approach which starts from the assumption that both theories are well-grounded and try to understand the specific contextual drivers of either an opportunistic or informative approach to NGFMs’ disclosure (Choi and Young 2015; Lougee and Maquardt 2004).

Our research work follows the “third way”, aimed at understanding the contextual factors that affect the adoption of NGFMs (disclosure, magnitude of adjustments and transparency), thus supporting the definition of contingent situations more or less favourable to the informative/strategic use of NGFMs. A limitation of many research papers in this field is that they focus on a very narrow issue (a specific behaviour related to NGFMs led by a specific condition linked to financial results, governance, market trend, etc.), without considering the “environment” in which that behaviour has been generated. With the notable exception of Isidro and Marques (2015), as well as Aubert and Grudnitski (2014), these studies are located in the US, UK, or anyway in a single country, without considering the role of country-related factors in affecting the adoption of NGFMs. This is a severe constraint, considering the extensive literature demonstrating the role of country-related institutional (Bhattacharya et al. 2003b; Douppnik 2008; Gaio 2010; Leuz et al. 2003;) and cultural factors (Douppnik, 2008; Gray 1988; Hofstede 1980) in affecting accounting behaviours.

We analysed a sample of 120 companies located in 23 countries and listed in Standard & Poor’s Global Oil Index. We hand-picked a number of information items about whether and how they disclosed NGFMs in each quarterly financial report between the last quarter of 2008 and the second quarter of 2012 (15 quarters in total; 1,731 financial reports analysed). The aim was to understand how company-specific financial factors and country-specific institutional and cultural factors affect the propensity to include NGFMs in the reports (disclosure), the difference between NGFMs and correspondent GAAP measures (magnitude and conservatism of the adjustments) and the information provided to reconcile the NGFM to the comparable GAAP measure (transparency). The idea was to obtain a big picture of the drivers behind NGFM use, not aimed at directly supporting either of the two theories, but at exploring the factors that can lead to an opportunistic (informative) use of NGFMs. In order to do that, we employed various multivariate regression models among the logistic, multinomial logistic and pooled panel regression models, depending on the kind of dependent variable under examination. The analysis provided interesting insights. On the one side, the propensity to disclose NGFMs is closely related to the financial leverage and is much higher for IFRS adopters than for other GAAP adopters. Profitability does not play a statistically significant role. This first result is consistent with the informative theory whereby highly indebted companies are more interested in providing information to the market to attract investors and reduce the cost of capital. Also, the increasing use of NGFMs in companies adopting IFRS has nothing to do with opportunism, but it is consistent with the intent to provide higher quality information about exceptional items, since the IFRS income statement does not include a separate “extraordinary section” for them. The informative scope is confirmed by the fact that high-debt companies do material but conservative adjustments, not aimed at presenting higher performances. On the other side, profitability is by far the main

driver of conservatism of the adjustments. This result cannot be explained by the informative theory, which assumes that the need for adjustments should not be related to the financial performance and shows that opportunism is linked to poor profitability. The presence of a specific set of rules about NGFMs' disclosure leads the companies to presenting a specific section for NGFMs and a motivation for the adjustments, but not the numeric reconciliation between NGFMs and the closest GAAP values, which plays a much more relevant role in providing transparency to the whole adjustment process. What emerges is a more formal than substantial effect of regulation on the transparency of NGFMs. The other institutional values are rarely significant and cultural values are sometimes statistically significant, often consistently with the theory (Gray 1988); however they do not have a relevant impact if compared to the financial variables. On the whole, the impact of financial and institutional variables is much more significant.

This work provides several contributions to this theory. First of all it enriches knowledge about the effect of company-specific and country-specific factors on accounting behaviours related to NGFMs. To our knowledge, this is the first analysis examining the adoption of NGFMs worldwide and evaluating the impact of institutional factors (previously conducted only in Europe) and cultural factors on the adjustment process. It also contributes to the rich literature about the impact of institutional and cultural factors on accounting behaviours (Bhattacharya et al. 2003b; Douppnik, 2008; Douppnik and Tasakumis 2004; Gaio, 2010; Gray 1988; Hofstede 1980; Leuz et al. 2003). Finally, it provides insights regarding the role and the effect of regulation on NGFMs that can be useful for stock market authorities in this field, particularly considering the numerous activities they are performing to increase the reliability of NGFMs².

The paper is organized as follows. In the second Section we present the theoretical background about NGFMs and the potential role of financial, institutional and cultural factors in affecting their use. The third Section describes the research hypotheses associated with the research questions, the statistical models employed for their assessment, and a detailed definition of independent and dependent variables. Sample selection and data collection are presented in Section 4, while Section 5 provides the descriptive evidence emerging from the collected data. In Section 6 we show the estimated statistical models and we discuss the results obtained. The final Section presents the conclusions and implications, the limitations of the work and defines some potential routes for further research emerging from the study.

2. Background and literature review

2.1 NGFMs: definition and conflicting theories

Starting from the beginning of the twenty-first century, listed companies have included in their financial reports NGFMs. Since a conventional financial indicator is a financial performance measure defined according to the

² NGFMs have recently been involved in a revised proposed statement by the International Organization of Securities Commission (IOSCO) aimed at assisting issuers in providing clear and useful disclosure for investors and other users of financial information (IOSCO, 2014). In addition, NGFMs are involved in a revised consultation paper by the European Securities and Market Authority (ESMA) aimed at strengthening the principles contained in the previous regulation CESR 05/178b (ESMA, 2014). Finally, NGFMs issues have recently emerged as an item of discussion for the International Accounting Standard Board (IASB) (IASB, 2011, 2014).

local GAAP, NGFM is a financial performance measure not directly derivable from the audited financial statements and coming from unconventional methods of calculation.

NGFMs can be divided in two main subcategories (Hitz 2010, 67). The first one refers to the so-called “EB-metrics”, which are performance indicators not directly derivable from financial statements but commonly accepted in practice (such as EBITDA, EBIT, EBT). The second category covers what are known as “non-GAAP metrics”, conventional performance measures or EB-metrics adjusted to special items related to infrequent or unusual events and transactions. The debate on NGFMs began alongside the increasing adoption of non-conventional indicators in financial reporting addressed to external users. While part of the studies focused on market reactions to NGFMs disclosure (Bhattacharya et al. 2003a, Johnson and Schwartz, 2003), most of the research analysed the motivations underlying the choice of disclosing NGFMs. International literature shows two distinct and contradictory theories in order to justify NGFM disclosure.

According to the “informative reporting/disclosure” theory, NGFM disclosure would be related to greater accountability and transparency offered by managers in order to provide the investors with the same core indicators used for internal decision-making. From this point of view, NGFMs would help to support the year-to-year comparability of performance by excluding one-time, anomalous, transitory items. A whole series of studies (Bhattacharya et al. 2003a; Bradshaw and Sloan 2002;) supports this line of thought, claiming that NGFMs have significant explanatory power for returns compared to GAAP financial measures. Lougee and Marquardt (2004) show that firms with low GAAP earnings informativeness are more likely to disclose NGFMs. Moreover, investors find NGFMs to be more useful when GAAP earnings informativeness is low or when strategic considerations are absent). Johnson and Schwartz (2005), examining US stock data, find no evidence of a stock return premium for firms disclosing NGFMs at the earnings announcement date, thus questioning that investors are misled by NGFMs.

According to the second theory, namely “opportunistic reporting/disclosure”, NGFMs disclosure would be related to strategic reasons. This approach is prevalent in literature (Chen 2010; Marques 2010; Doyle et al. 2013; Jennings and Marques 2011) and is shared by international regulators who usually express a critical opinion about the inclusion of NGFMs in corporate financial reporting. As a matter of fact, the use of NGFMs would be seen as a way of manipulating financial results to mislead investors and to help managers reap different kinds of benefits. Doyle et al. (2003) observe that excluding special items from performance measures leads to major and abnormal positive returns. An experiment conducted by Fredrickson and Miller (2004) shows that NGFMs cause less sophisticated investors to perceive the earning announcement as more profitable, which in turn leads to higher stock prices. Allee et al. (2007), using archival data, support the same conclusion. Both these opposing theories are conceptually well-grounded and supported by substantial evidence, however the final result of huge research work on this topic is that the initial main question remains unanswered “Should investors trust the information provided through NGFMs?”. In approaching this issue, a small part of the literature follows a “third way”, without choosing one of the two theories, but taking for granted that some companies disclose NGFMs for opportunistic reasons and others to provide their stakeholders with better information. In short, these two theories can coexist, therefore the new main question is “Which factors lead

to an opportunistic/informative disclosure of NGFMs?”. Lougee and Marquardt (2004) show that managers are more likely to disclose NGFMs when GAAP earnings informativeness is low (according to the informative theory), but also when GAAP surprises are negative (more in line with the opportunistic view). Moreover, they highlight that NGFMs have an incremental informative power only when GAAP earnings’ informativeness is low and GAAP surprises are positive, while investors do not consider them when previous GAAP earnings were informative and GAAP surprises are negative. They conclude by saying that “our evidence on the question of whether pro forma earnings are used to mislead or inform investors is thus mixed and highly context-dependent, as the empirical evidence may be interpreted as consistent with either side of the pro forma debate, depending upon the set of results on which one chooses to focus.” (p. 771). Choi and Young (2015) try to find the specific circumstances that lead to an informative or strategic disclosure of NGFMs. Based on research on 795 listed companies in the UK, they find a positive relationship between NGFMs’ disclosure and the magnitude of transitory items when GAAP earnings meet market’s benchmarks, thus supporting the informative theory. At the opposite extreme, the link between NGFM’s disclosure and transitory items is much weaker when GAAP surprises are negative, consistently with the strategic theory. The final result is that managers disclose NGFMs opportunistically when the incentives to report higher earnings are strong.

Our study follows this third way by looking for motives leading to the disclosure of NGFMs, specifically focusing on factors affecting the propensity to disclose NGFMs, the magnitude of the adjustments and the level of transparency of the whole process. More in detail, it takes into consideration company-specific financial factors and country-specific institutional and cultural factors. In the following sections each of these factors is analysed in depth.

2.2 Company-specific financial factors

A significant number of studies focuses its attention on the relationship between the financial performance of the company and the level of voluntary disclosure. According to Lang and Lundholm (1993), a firm’s disclosure decision is influenced by various potential explanatory variables among which performance variables play an important role. Empirical evidence about this relationship, however, is still controversial. Several prior studies show a higher propensity to communicate when profitability and financial results are satisfactory (Haniffa and Cooke 2002; Lim et al. 2007), thus supporting the signalling theory (Arrow 1972; Spence 1973). Under this theoretical approach, high-performance firms are supposed to use voluntary disclosure to overcome the adverse selection mechanism and to favourably distinguish themselves from less performing competitors (Dye 1985; Miller 2002; Verrecchia 1983; Welker 1995). A recent interesting study by Dainelli et al. (2013) shows results supporting the idea that “firms with better results provide the market with higher incremental value information than do other firms” (p. 268). The authors identified as a dependent variable the companies’ financial indicators with incremental informative power and their findings confirm that the most profitable companies report a higher number of indicators.

Less recent studies in the NGFMs field show different results. Bhattacharya et al. (2004) provide evidence that firms reporting NGFMs have consistently lower profitability indicators and higher leverage and book-to-

market ratios. Moreover, average trends in sales, earnings and return on sales (ROS) of firms reporting NGFMs are consistently lower. Francis et al. (2005) find that firms in industries with greater external financing needs have higher voluntary disclosure levels, and that an expanded disclosure policy for these firms leads to a lower cost of both debt and equity capital. Durnev and Kim (2005) report similar results. Lougee and Marquardt (2004) find that highly indebted firms are more prone to disclosing adjusted financial indicators in their corporate communication, because when exceeding the optimal threshold of financial leverage the value relevance of earnings decreases, due to a higher probability of firm distress and earnings management behaviours (Hodgson and Clarke, 2000). Another company-specific condition playing a significant role in voluntary disclosure is company size. Different studies show a positive correlation between a company's size and its level of disclosure, motivated with a total cost of disclosure affected by economies of scale (Freeman, 1987; Lang and Lundholm 1993). According to prior studies (Kaznik and Lev 1995; Skinner 1994) larger firms are more likely to communicate additional not mandatory information in order to contain litigation risks. More recent studies confirm the positive relationship between size and voluntary disclosure (Karim et al. 2013) and specifically NGFMs (Choi and Young 2015).

2.3 Country-specific institutional factors

For the purposes of this research, we consider as country-specific institutional factors first of all the regulatory environment where companies operate. In this regard, we look at the regulation on NGFMs issued by the stock market regulatory bodies and the set of accounting standards the companies have to comply with in preparing their financial reports. Furthermore, we consider as able to impact on NGFMs disclosure also the other institutional conditions related to the development of the stock market, the quality of the legal system and their investor protection attitude.

2.3.1 The regulation on NGFMs

On an international level, concerns about the role of non-GAAP disclosure in misleading investors led both the stock market regulatory bodies and the standards setters to pay close attention to this issue. As a result, the practice to disclose NGFMs as part of corporate financial communication has undergone specific regulatory actions (regulations, recommendations, guidelines) in many jurisdictions with the aim to protect investors, especially the less sophisticated ones. The SEC, through Regulation G, issued the first provision in 2003, then followed by many other countries. Its purpose was to increase the transparency in reporting NGFMs through reconciliation between any disclosed NGFM and the most closely related GAAP financial measures.

Accordingly, a number of subsequent studies (Black et al. 2012; Entwistle et al. 2006a, 2006b; Heflin and Hsu 2008; Jennings and Marques 2011; Kolev et al. 2008; Marques 2006; Nichols et al. 2005; Zhang and Zheng 2011) have addressed the effects of the introduction of Regulation G on the use of NGFMs. They demonstrate that, after the intervention of SEC, the use of NGFMs suffered a significant mitigation in terms of frequency, emphasis and magnitude of the adjustments, while transparency has increased. Marques (2006) and Nichols et al. (2005) show that the probability of the disclosure of NGFMs has been steadily declining after the SEC

intervention. In the same way, Kolev et al. (2008) show that the SEC intervention prevented firms from releasing NGFMs with lower quality adjustments. Sharing this view, Entwistle et al. (2006b) refer to the strong impact of Regulation G in reducing frequency, magnitude and prominence of the NGFMs reported. Heflin and Hsu (2008) find that Regulation G has reduced the opportunistic use of NGFMs, which is aligned with the intentions of legislators and regulators. As for the transparency issue, Zhang and Zheng (2011) observe that the reconciliation provision imposed by Regulation G reduces the extent of mispricing. Elliot (2006) carries out an experiment to show that the quantitative reconciliation between GAAP and NGFMs leads analysts to consider NGFMs more reliable. According to Black et al. (2012), the SEC regulation has increased the quality of adjusted earnings disclosure by filtering out the ones that are most likely to be misleading. More recently, only few studies have produced similar research on individual EU countries (Aubert 2010; Hitz 2010) and the EU area as a whole (Aubert and Grudnitski, 2014; Isidro and Marques 2013a, 2015;) considering as turning point the CESR 05/178B recommendation issued in 2005.

Generally speaking, in order to ensure that NGFMs do not mislead investors, all regulations on NGFMs set forth the rules with which firms must comply when disclosing NGFMs in their corporate financial communication process, through earnings press releases, management’s discussion and analysis, prospectus filings, websites and marketing materials, presentations to investors and briefings to analysts. An issuer should clearly define the measure and explain its relevance, and should present the measure transparently on a consistent basis from time to time or explain any changes. In Table 1 the main regulations defined in the world are reported. However, regulations often do not have the force of law; they are only guidelines and general recommendations that issuers are strongly encouraged to comply with.

While many studies have analysed the impact in the US of Regulation G on NGFMs adoption and disclosure, so far we have little evidence of the impact of the regulation in the other countries. This is one of the objectives of our paper.

Table 1: The main regulations on NGFMs around the world

Country	NGFMs regulation
U.S.A.	2001 - the SEC issues a Cautionary Advice and an Investor Alert, warning investors that the NGFMs could be misleading. 2003 - the SEC adopts a new Regulation G, applicable to all public disclosures, and amended Item 10(e) of Regulation S-K, which is applicable to all SEC filings. 2010 - the SEC staff reviews its interpretation of NGFMs by issuing a new Compliance and Disclosure Interpretations (C&Dis), which gave more flexibility to disclose NGFMs.
Canada	2008 - the Canadian Institute of Chartered Accountants issues illustrative guidelines on NGFMs containing the general principles for the proper disclosure. In the Canadian context, interventions about the NGFMs issue are included in the Canadian Securities Administrators’ Staff Notice 52-306 (Revised in 2012) issued by the Ontario Securities Commission.

Australia and New Zealand	<p>2011- the Australian Securities & Investments Commission (ASIC) issues the Regulatory Guide 230, aimed at regulating the use of “non-IFRS” performance indicators (ASIC, 2011).</p> <p>2012 - in New Zealand the Financial Markets Authority (FMA) issues the “Guidance Note: Disclosing non-GAAP financial information”. The purpose is promoting more meaningful communication of financial information to investors.</p>
Europe	<p>2005 - the NGFMs topic is addressed by the Committee of European Securities Regulators (CESR - the predecessor of European Securities and Markets Authority (ESMA)) in the Recommendation 178/b, entitled “Alternative Performance Measures”. CESR recommendations are not legally binding; so all member states are expected to implement them with internal acts.</p> <p>2009 - the European Financial Reporting Advisory Group (EFRAG) focuses its attention to NGFMs in a discussion paper within the initiative “Pro-active Accounting Activities in Europe (PAAinE).</p> <p>2011 - the IFRS Advisory Council issues a specific topic “Use of underlying earnings and non-GAAP measures”. It expresses some concerns about the use of NGFMs.</p> <p>2014 - ESMA decides to review the CESR recommendations with the objective of strengthening the principles contained in it, issuing a consultation paper available for comments.</p> <p>2014 - the IFRS Advisory Council meeting expresses the intention to assess the “non-GAAP/Non-IFRS” measures issue within the Integrated reporting and digital reporting project.</p>

2.3.2 The accounting standards

To date it is possible to observe a globally important shift toward the endorsement of International Financial Reporting Standards (IFRSs). The IASB’s aim is to establish uniform high quality financial reporting across the world (Ball 2006) to enhance comparability (Barth et al. 2008; Daske et al. 2008; Ding et al. 2009), transparency and usefulness of financial information (Barth et al., 2008). The value relevance of financial information should be higher, because IFRS has introduced a better recognition of transactions (more consistent with the impact on the real value of the company), particularly substituting the fair value accounting to the conservative historical cost accounting (Barth et al. 2008). In view of all these considerations, accounting information produced under IFRS requirements should be of better quality than that obtained using local accounting standards (Aubert and Grudnitski, 2012; Byard et al. 2011; Horton et al. 2013; Chen et al. 2010). However, the research provides mixed results on this point. Therefore, literature has raised some doubts in considering IFRS able to produce better financial information (Ahmed et al. 2013; Aubert and Grudnitski 2011). Moreover, Christensen et al. (2015) and Daske et al. (2013) show that the improvement in the quality of information under IFRS is achieved only by voluntary adopters as they have some incentives to switch to a different set of accounting standards, while mandatory IFRS compliance - as has happened in EU following European regulation 1606/2002 – does not necessary lead to higher quality in financial figures.

To summarize, the potential aptitude of the IFRS to increase the quality of financial information should make it less necessary for firms to voluntarily communicate additional financial information (accordingly, also fewer NGFMs), since GAAP information should already be value relevant. At the same time, however, IFRSs, by introducing greater complexity in measuring accounting numbers often based on less objective approaches, may lead to a greater need for firms to produce additional information (accordingly, also more NGFMs). In support of this idea, de La Bruslerie and Gebteni (2014, 367) find that “voluntary disclosure policies

experienced an upward swing with the introduction of IFRS”. Considering the specific NGFMs literature, only the recent study by Isidro and Marques (2015) on European companies implements IFRS as a firm-specific control variable, showing that firms compiling their financial statements according to IFRS provide less NGFMs. Therefore, there are windows for considering IFRS as a significant institutional driver for NGFM behaviour in order to verify previous conflicting findings.

2.3.3 Other Institutional Factors

The literature is unanimous in considering that institutional factors other than accounting standards affect the value relevance of financial information (Ball et al. 2003; Leuz et al. 2003). For instance, in a recent paper Helman et al. (2015), analysing nine countries that adopted IFRS in 2005, show that the differences in accounting behaviours have not become smaller, even though companies have been using the same accounting standards for a decade. The role of institutional factors has been deeply analysed in economic literature (Djankow et al. 2008; Kaufmann et al. 2010; La Porta et al. 2006;) as well as in accounting and finance literature (Bhattacharya et al. 2003b; Dougnik 2008; Gaio 2010; Gaio and Raposo 2011). More specifically, some of the institutional elements more deeply investigated in the accounting research are the legal system (common law vs. civil law), law enforcement (quality of the legal system), protection for minority shareholders (the so-called anti-director laws) and the level of economic development. Ball et al. (2000) link accounting timeliness and conservatism to the origin and the strength of the legal system. Jaggi and Low (2000) and Hope (2003) show that legal origin has a prevalent role over cultural factors in determining the level of disclosure. Many studies analyse the role of law enforcement (Cofee 2007; Hitz et al. 2012; Mahoney 2009), discovering a relationship with the value relevance of accounting information. Daske et al. (2008) find that the adoption of IFRS generates market benefits only where the legal enforcement is strong and there are incentives to transparency. Jayaraman (2012) shows that law enforcement affects accounting conservatism, specifically timely loss recognition. Houge et al. (2012), with a study on 46 countries, find that earnings quality increases for mandatory IFRS adoption for countries with higher investor protection. On the other side, many studies reveal that accounting disclosure is more relevant in countries with weak legal systems, because in that kind of environment the investor demands a higher level of information to reduce the risk of being deprived of part of his wealth (Durnev and Kim 2005). Accordingly, Webb et al. (2008) in their study on 643 companies in 30 countries, find a higher level of disclosure for firms based in weak legal environments. Earnings management literature has also widely highlighted such institutional factors as conditions for a different earnings quality in different countries. Leuz et al. (2003) find earning management practices decrease in a context with high investor protection. Gaio and Raposo (2011) show that the quality of accounting information affects the market value of a company, particularly in countries where legal protection for investors is limited. However, according to Gaio (2010), the macro-environment is not the major driver of earnings quality compared to firm-specific features.

On the basis of these studies Fiechter (2013) raised the issue of whether and how institutional factors affect the adoption of NGFMs for opportunistic purposes. Isidro and Marques (2015) take this issue into

consideration, showing that the use of NGFMs to reach the analysts' benchmarks is higher "in countries with efficient laws and law enforcement, strong investor protection, developed financial markets, and good communication and dissemination of information." (p. 3). The authors conclude that in these countries there is a higher pressure on financial results and a lower possibility to alter GAAP results because of the high quality of the legal system and strong investor protection. Thus, the managers use the less strictly regulated NGFMs to mislead their investors. So far, this is the only research on the impact of institutional factors on the adoption and use of NGFMs, while Aubert and Grudnitski (2014) involved some institutional factors only as control variables in their research (legal origin, investor protection, market development) and found no statistical significance in their regard.

2.3.4 Cultural Factors

While the impact of some financial and institutional factors on the adoption and disclosure of NGFMs has already been analysed by previous literature, so far we do not have any example of research focusing on the role played by national cultures. Accordingly, this deserves a deeper analysis.

The idea that culture affects accounting practices dates back to the 1960's when it was analysed as an obstacle to the international harmonization of accounting standards (Bedford 1966, Mueller 1968). The earliest research on this topic analysed different aspects of the relationship culture-accounting: the role of accounting as an uncertainty absorbing process (March and Olson 1976), the language and the symbolic role of accounting (Violet 1983), the factors affecting the accounting system considered as a social system (Harrison and McKinnon 1986), the behavioural factors affecting differences in accounting among different countries (Schreuder 1987)³.

A turning point in this field of research was the paper "Towards a theory of cultural influence on the development of accounting systems internationally" by Sidney Gray (1988). The framework proposed by Gray starts from Hofstede's work on cultural analysis (1980) where external influences (forces of nature, trade, investment, conquest) affect ecological influences (geographic, demographic, genetic, etc.), which in turn define the societal values that are typical of each society: power distance, uncertainty avoidance, masculinity, individualism, long term orientation and indulgence. The definition of each of the values is given in Table 2.

Table 2: Description of societal values by Hofstede⁴

³ A detailed analysis of the first studies on the relationship between cultural elements and accounting goes beyond the scope of the present paper. A well-developed literature review can be found in Chanchani and MacGregor (1999).

⁴ The first four societal values (power distance, individualism/collectivism, uncertainty avoidance and masculinity/femininity) were presented by Hofstede in the first edition of *Cultures and Organizations* (1980) and obtained through a survey completed between 1967 and 1973 among IBM's employees all around the world. The fifth dimension was added later, based on research by Michael Harris Bond, who conducted an additional international study among students with a survey instrument which was developed together with Chinese professors. That dimension, based on Confucian thinking, was called Long Term Orientation (LTO) and was applied to 23 countries (Hofstede and Bond 1988). The sixth dimension (Indulgence vs. Restraint) derives from an analysis by Michael Minkov on the World Values Survey data for 93 countries and included in the 2010 edition of *Cultures and Organizations* where Minkov was involved as co-author (Hofstede et al. 2010). For recognition of the development of Hofstede's work on cultural analysis see Minkov and Hofstede (2011). In the first development of Gray's model written in 1988 only the first four dimensions were

Societal Values	Description
Power Distance (PDI)	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people.
Uncertainty Avoidance (UAI)	This dimension expresses the degree to which members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen?
Masculinity vs. Femininity (MAS)	The Masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness and material rewards for success. Society at large is more competitive. Its opposite, femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life.
Individualism vs. Collectivism (IDV)	The upper section of this dimension, called individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty.
Long Term Orientation vs. Short Term Orientation (Hofstede and Bond 1987) (LTO)	“Long Term Orientation stands for the fostering of virtue oriented towards future rewards, in particular, perseverance and thrift. Its opposite pole, Short Term Orientation, stands for the fostering of values related to the past and present, in particular respect for tradition, preservation of “face” and fulfilling social obligations” (Hofstede and Hofstede 2001, 359).
Indulgence versus Restraint (Hofstede et al. 2010) (IND)	Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.

The contribution of Gray to Hofstede’s model consists in the link between the societal values and the Accounting Values of Professionalism, Uniformity, Conservatism, and Secrecy derived from the literature on accounting (described in Table 3) that, together with institutional consequences of the same societal values (legal system, corporate ownership, capital markets, etc.), define the characteristics of accounting systems (authority, enforcement, measurement and disclosure).

Table 3: Description of accounting values defined by Gray⁵

Accounting Values	Description
Professionalism vs. Statutory Control	A preference for the exercise of individual professional judgment and the maintenance of professional self-regulation as opposed to compliance with prescriptive legal requirements and statutory control.

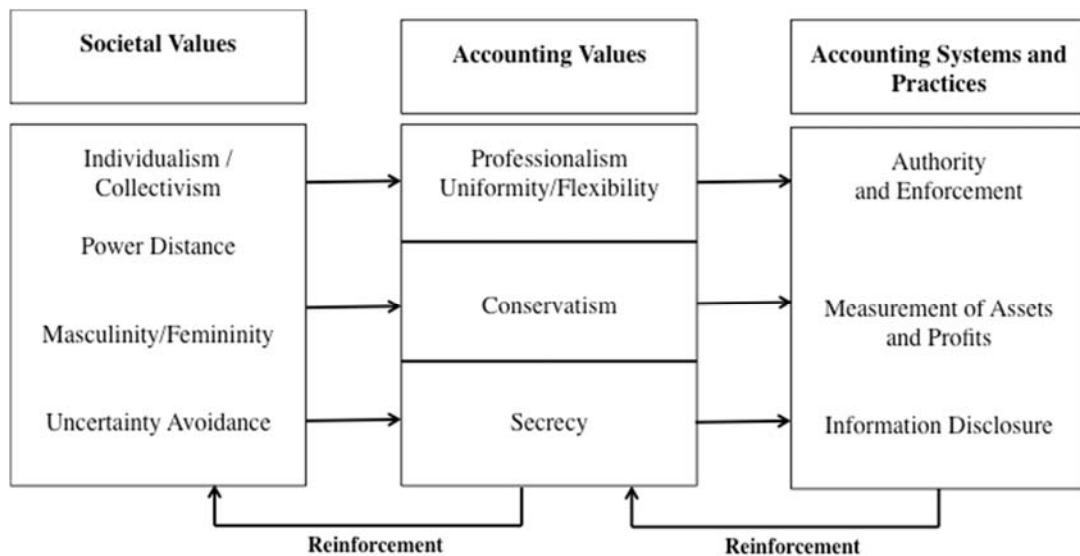
considered, here we present all six dimensions that have been tested in the present work. The description of each cultural value, except for Long Term Orientation, is obtained by Geert Hofstede’s website (<http://geert-hofstede.com/national-culture.html>, consulted the 25th of October, 2015).

⁵ The description of the four accounting values is derived from Gray (1988, 8).

Flexibility vs. Uniformity	A preference for the enforcement of uniform accounting practices between companies and for the consistent use of such practices over time as opposed to flexibility in accordance with the perceived circumstances of individual companies.
Conservatism vs. Optimism	A preference for a cautious approach to measurement so as to cope with the uncertainty of future events as opposed to a more optimistic, laissez-faire, risk-taking approach.
Secrecy vs. Transparency	A preference for confidentiality and restricting any disclosure of information about the business only to those who are closely involved with its management and financing as opposed to a more transparent, open and publicly accountable approach.

In the following development of the model (Radebaugh and Gray 1993), the accounting values of Professionalism and Flexibility were unified to represent an autonomous approach to accounting, where the accountant claims some flexibility from the generally accepted rules to apply his/her professional judgement on financial reporting. A simplified version of the framework is presented in Figure 1.

Figure 1: A simplified representation of Gray's framework (Radebaugh and Gray 1993)



Gray's framework, and the following integrations for the fifth and sixth cultural dimensions (Baydoun and Willet 1995; Borker 2012), assumes the following series of impacts by cultural values on accounting values (see Figure 2):

- Professionalism/Flexibility is positively affected by individualism and indulgence, and negatively by power distance, uncertainty avoidance and long term orientation;
- Conservatism is positively affected by power distance, uncertainty avoidance and long term orientation and negatively affected by individualism, masculinity and indulgence;
- Secrecy is positively affected by power distance, uncertainty avoidance and long term orientation and negatively affected by individualism, masculinity and indulgence.

Figure 2: The hypothesized relationships between societal values and accounting values. Our elaboration on Gray (1988), Baydoun and Willet (1995) and Borker(2012)

	Power Distance	Individualism	Masculinity	Uncertainty Avoidance	Long Term orientation	Indulgence vs. Restraint
Professionalism/ Flexibility	-	+	?	-	-	+
Conservatism	+	-	-	+	+	-
Secrecy	+	-	-	+	+	-

The original framework by Gray and its following refinements (Baydoun and Willet 1995; Perera 1989) have been tested by many research- papers. Some of them evaluated all the expected influences of societal values on accounting values (Salter and Niswander 1995; Sudarwan and Fogarty 1996), some others focus their attention only on the impact of societal values on secrecy (Orij 2010; Wingate 1997,)⁶. The results are mixed: some of the relationships hypothesized by Gray are confirmed by some tests and not by others. For instance, the analysis of Tsakumis (2007) based on a comparison between American and Greek accountants, supports Gray's hypotheses on secrecy, but not on conservatism. Moreover, most of the tests suffer from a relevant issue concerning the way the different accounting values are measured (Doupnik and Tsakumis 2004).

Many of the first analyses based on Gray's framework tested the cultural variables in isolation as independent variables, while particularly interesting results are obtained by the following work jointly considering the role of culture and institutions in determining accounting behaviour. Zarzeski (1996), analyzing 256 companies in seven different countries, finds that the impact of cultural factors increases in less internationalized companies. Jaggi and Low (2000), evaluating 401 companies in six countries find that the impact of cultural elements is negligible in common-law countries, while it has some impact in code-law countries. The analysis by Doupnik (2008) on the role of culture in affecting earning management behaviours shows that uncertainty avoidance and individualism play a relevant role even after controlling the mitigating effect of investor protection and other institutional factors. Research by Han et al. (2010) found that uncertainty avoidance and individualism affect managers' earnings discretion, but with different intensity depending on investor protection within each country. The longitudinal analysis by Sudarwan and Fogarty (1996) shows that only some of Hofstede's cultural values (power distance, uncertainty avoidance and individualism) are linked to accounting values, while a more relevant role is played by the influence of the government in the economy of the country and by growing market competition. Salter et al. (2013) find a relevant impact of societal values on conservatism, but with a significant role of institutional factors such as corruption, legal origin and rule of law, particularly on conditional conservatism. On the whole, when including institutional variables in the analysis, the impact of cultural factors appear less relevant in explaining the development of accounting values and behaviours

⁶ For a well-developed description and evaluation of these tests, see Doupnik and Tsakumis (2004).

(Heidhues and Patel 2011)⁷. These results support the idea of jointly analysing institutional and cultural factors, in order to understand the relative role of the two kinds of variables. Even if the impact of culture on accounting practices has been analysed in depth, so far we do not have any evidence of how cultural differences affect the adoption, size and transparency of NGFMs. This is one of the main aims of the present research.

3. Development of hypotheses and description of variables

On the basis of the foregoing premises, we aim at analysing the extent to which financial, institutional and cultural factors affect the disclosure (research question 1), the magnitude of adjustments (research question 2) and the transparency (research question 3) of NGFMs. In this section, for each research question we selected a different statistical model from the logistic, the multinomial logistic and the pooled panel regression models, depending on the kind of dependent variable. The starting set of independent variables (divided into three groups: financial, institutional and cultural) is common to all the models we employ. Here, we firstly present the independent variables; next, we describe the dependent variables analysed for each research question and we formulate the hypothesized relationships between dependent and independent variables.

3.1 Independent variables

a. Company-specific financial variables. The measures adopted to represent different financial conditions of companies were selected taking into consideration those from similar previous studies. The size of the company (SIZE) is measured through the natural logarithm of total assets. The profitability (PROF) is measured as the ratio between Net Income and Net Sales as it describes the degree of ability of a firm to generate profit from sales. The financial debt (DEBT) is expressed through the natural logarithm of the ratio between total liabilities and total assets and it represents the company's financial leverage. The Market-to-Book ratio (MTB) is calculated as the ratio between the market capitalization and the book value of equity. Market-to-book ratio is used in the literature as a common measures of companies' performance (Ceccagnoli 2009; Liew and Vassalou 2000), reflecting the extra value the market places on net assets. Accordingly, it is a proxy for the firms' efficiency on asset utilization as well as the firms' growth potential (Leno et al. 2010). All financial data are extracted from the OSIRIS database.

b. Country-specific institutional variables. We considered the following different institutional aspects of countries where the companies have the legal registration: development of the financial market (MARKET), quality of the legal system (LEGAL), presence of legal protection for minority shareholders (ANTIDIRECTOR), specific accounting standards adopted in the country (US GAAP; IFRS or local GAAP), and presence of any specific regulation on NGFMs disclosure in the main stock exchange where the companies are listed (REGULATION). We obtained the market development (MARKET) for each country based on two variables: total market capitalization of the listed companies as the average percentage of Gross Domestic

⁷ In other fields of financial management different patterns emerged. For instance, Lievenbruck and Schmid (2014) show that culture has a strong impact on a firm's hedging decisions. This influence is not captured by institutional factors such as economic development or legal framework.

Product (GDP) during the period 2008-2012, and average total value of stocks traded (again, as a percentage of GDP) in the same period. We collected the data from World Bank World Development Indicators Database. Then, we ran a principal component analysis on the two variables and we found that over 94.0% of the total variance was explained by the first component, which we considered as market development (MARKET). The selection of the first component was consistent with the Kaiser criterion, which is based on the value of the eigenvalues of the data correlation data matrix (1.880 for the first component and 0.119 for the second one), and the scree plot, which plots variances against the number of the principal components. The two considered variables contribute in the same way to the linear combination of the first principal component with a coefficient equal to 0.707. A similar procedure was followed to define the quality of the legal system of each country (LEGAL). We started from the data of four different variables: “Regulatory Quality”, “Voice and accountability”, “Rule of Law” and “Control of Corruption” obtained from The Worldwide Governance Indicators, 2015 update, Aggregate Governance Indicators 1996-2014 (Kaufmann et al. 2010)⁸. The principal component analysis revealed a first component responsible for 92.7% of the total variance. Here again, the selection of the first principal component was supported by the Kaiser criterion (the eigenvalues of the correlation data matrix were 3.709, 0.223, 0.045, and 0.023 respectively for the four components) and the scree plot. The coefficients of the linear combination defining the first principal components for the four variables considered were 0.504, 0.473, 0.512, and 0.510, respectively. The investor protection level is represented through the Djankov et al. (2008)’s “anti-self-dealing index” also known as “revised anti-director index” (ANTIDIRECTOR) and it represents the legal protection of minorities. The specific GAAPs the companies utilize in compiling their financial reports were obtained according to the accounting rules of the countries where the companies have the legal registration. More specifically, we extracted this information for each point in time from the OSIRIS database and we considered three alternative different options: IFRS, US GAAP, local GAAP. REGULATION represents the existence of specific rules on how to disclose NGFMs transparently in the main stock exchange where the companies are listed. We considered any kind of rule issued on a national level by stock market authorities or by the local standard setters regardless of the degree of enforcement the rules have in that country.

c. Country-specific cultural variables

⁸ Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Voice and accountability captures perceptions regarding the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Rule of law captures perceptions in respect of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Control of corruption captures perceptions as regards the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. (source: World Bank website: www.worldbank.org).

The 2015 update database is available at <http://info.worldbank.org/governance/wgi/index.aspx#home> Data collected on the 20th of February 2015.

The variables representing the culture of each country in which the companies have the legal registration have been obtained from Hofstede's list. We considered all six cultural variables in the last version of the model after the inclusion of Long Term Orientation (Hofstede and Bond 1988) and Indulgence (Hofstede et al. 2010). The final list comprises Power Distance (PDI), Uncertainty Avoidance (UAI), Masculinity (MAS), Individualism (IND), Long Term Orientation (LTO) and Indulgence (IND). The description of each societal value is reported in Table 1. The numeric value for each variable was derived from Hofstede's website were the last available values are presented⁹.

3.2 Dependent variables and research hypotheses

3.2.1 Research question 1

The first research question aims at understanding the extent to which financial, institutional and cultural factors affect the propensity to include NGFMs in financial reports. The propensity was measured through two different variables: a) the presence of at least one NGFM in the financial report (PRESENCE) and b) the number of NGFMs included in the financial report (NUMBER). PRESENCE is a dummy variable equal to 1 if at least one NGFM is included in the report and 0 otherwise; from a statistical point of view this variable follows a binomial probability model. NUMBER is a categorical variable that assumes the values 0, 1, 2, which indicate, respectively, 0, 1-2 or more than 2 NGFMs in the financial report; from a statistical point of view this variable follows a multinomial probability model. In this way, we can distinguish the factors affecting the general propensity to include NGFMs from those generating a massive presence of NGFMs.

The two models analysed are summarised in one formula as follows:

$$\begin{aligned}
 \text{logit}(Y_{it}) = & \beta_0 + \beta_1 \text{SIZE}_{it} + \beta_2 \text{PROFITABILITY}_{it} + \beta_3 \text{DEBT}_{it} + \beta_4 \text{MTB}_{it} + \beta_5 \text{USGAAP}_{it} \\
 & + \beta_6 \text{LOC GAAP}_{it} + \beta_7 \text{REGULATION}_{it} + \beta_8 \text{MARKET}_{it} + \beta_9 \text{LEGAL}_{it} \\
 & + \beta_{10} \text{ANTIDIRECTOR}_{it} + \beta_{11} \text{PDI}_{it} + \beta_{12} \text{IDV}_{it} + \beta_{13} \text{MAS}_{it} + \beta_{14} \text{UAI}_{it} + \beta_{15} \text{LTO}_{it} \\
 & + \beta_{16} \text{IND}_{it} + \varepsilon_{it}
 \end{aligned} \tag{1}$$

where $\text{logit}(Y_{it})$ is the logit of Y observed at the time t for the company i . When the dependent variable is PRESENCE, $\text{logit}(Y_{it})$ is the logarithm of the odds $P(Y_{it} = 1)/P(Y_{it} = 0)$, where $P(Y_{it})$ is the probability that at the time t the company i has at the least one NGFM in the financial report. When the dependent variable is NUMBER, $\text{logit}(Y_{it})$ is the logarithm of the odds $P(Y_{it} = j)/1 - P(Y_{it} = J)$, where $j = 0, 1, 2$. $J = 0$ is the reference category, and $P(Y_{it} = j)$ is, of course, the probability that the i -th response at a time t falls in the j -th category. The estimation method used is the maximum likelihood estimation method that proceeds by maximization of the binomial or multinomial likelihood function according to the nature of the dependent variable (Agresti 2002; Wooldridge 2002). Note that in the case of a multinomial dependent variable, the model

⁹<http://geert-hofstede.com/countries.html>. Data collected on the 20th of February 2015.

is a ‘pure’ multinomial model, because all the dependent variables are company-specific and not alternative specific.

As for company-specific financial variables, the hypothesis is that the size of the company (SIZE) and the amount of liabilities (DEBT) positively affect the propensity to disclose NGFMs, while Market to Book Ratio (MTB) and profitability (PROFITABILITY) have a negative effect. Following the informative disclosure theory, the inclusion of NGFMs in financial reports reduces information asymmetry (Huang et al. 2015), thus positively affecting earnings quality. Different contributions show that an increase in earnings quality positively impacts firm value (Gaio and Raposo 2011) and reduces the cost of capital (Bhattacharya et al. 2003). This effect is obviously more relevant for companies with high financial debt, low firm value and low profitability. Indeed, Bhattacharya et al. (2004) find that “pro forma announcers tend to be ... significantly less profitable, more liquid, and have higher debt levels” (p.27). Again, Gaio (2010) finds a specific association between company size and earnings quality.

As for institutional variables, previous research by Isidro and Marques (2015) on a sample of European companies shows that the adoption of NGFMs which beat benchmarks increases in developed market, with strong legal protection for investors. The idea, following the opportunistic theory, is that in these contexts the companies face higher pressure because of the developed market and greater difficulty in manipulating GAAP earnings due to law enforcement (Burgstahler et al. 2006; Leuz et al. 2003). As a consequence, they use less regulated NGFMs to affect investors’ decisions.

Then, we expect a positive relationship between the presence and number of NGFMs and market development (MARKET), quality of the legal system (LEGAL) and investor protection level (ANTIDIRECTOR). On the other side, we expect a negative link with the presence of a regulation on the adoption of NGFMs (REGULATION), because it limits the potential of NGFMs as a means to influence investors’ opinion (Nichols et al. 2005). As for accounting standards, we have different potential impacts of IFRS on NGFM disclosure. On one side the higher quality information provided by IFRS should reduce the need to use NGFMs for informative purposes, but on the other hand the more subjective evaluations requested by IFRS could be integrated and explained through NGFMs.

As for cultural variables we defined our hypotheses starting from Gray’s framework. The adoption of NGFMs is an expression of Professionalism and Flexibility, because through NGFMs the accountant claims a space of flexibility where, using professional experience and capability, it is possible to express a more reliable (i.e. replicable) level of performance. As a consequence, we can use the hypotheses made by Gray and the following integrations by Baydoun and Willet (1995) and Borker (2012) to test the relationship between NGFM adoption and cultural values. Going back to Figure 2, we can expect a positive relationship with Individualism (INV) and Indulgence (IND), while a negative impact of Uncertainty Avoidance (UAI), Power Distance (PDI) and Long Term Orientation (LTO) can be assumed.

3.2.2 Research question 2

The second research question aims at understanding the extent to which financial, institutional and cultural factors affect the magnitude of adjustments applied to NGFM calculation. We measured this dimension with two distinct concepts (and related measures): materiality of the adjustments (MATERIALITY) and conservatism of the adjustments (CONSERVATISM).

Materiality is a relevant topic in financial reporting, because companies are asked to disclose any material information. Materiality limits the threshold between what is trivial and what is relevant. A fact is material when its omission or false representation can affect the decision of investors. Even if previous studies (Adams et al. 1999; Heitzman et al. 2010) have measured materiality through ratios affected by the sign of the variation (positive or negative), it is clear, starting from this definition, that a material adjustment on net profit can be either positive or negative (Lo 2010). As a consequence, we refer to materiality of the adjustments as the size of the percent adjustment of net profit in absolute value, regardless of whether it is positive or negative. More specifically, we calculate the absolute value of the ratio between the adjustment on net profit and GAAP net profit. Considering that this ratio can generate enormous and meaningless values when the denominator is very close to zero, we kept as dependent variable its empirical cumulative distribution function computed at the observed values of MATERIALITY, thus having a robust measure of the variable and reducing any effects due to outliers.

$$MATERIALITY\ OF\ ADJUSTMENTS = \left| \frac{Net\ profit\ adjusted - Net\ profit}{Net\ Profit} \right|$$

On the other hand, the approach to conservatism adopted here still measures the distance between adjusted and GAAP net profit, but considering the direction (i.e. the sign) of the adjustment. Accounting conservatism can be defined on the basis of the different verifiability standards that must be met for recognition of profits versus losses. (Watts 2003). Many measures of accounting conservatism have been developed, distinguishing unconditional and conditional conservatism, but they are focused on the concept of conservatism in reporting GAAP values, while we aim at measuring how conservatism applies to the adjustment process that leads to NGFMs. The core meaning of conservatism of adjustments remains the same as for accounting conservatism. Also conservatism of the adjustments shares the definition of “a cautious approach to measurement” (Gray 1980), something that “if two estimates of amounts to be received or paid in the future are about equally likely ... dictates using the less optimistic estimate” (FASB, 1980), an approach that deals with “reporting the lowest value among possible alternative values for assets and the highest alternative values for liabilities” (Watts and Zimmerman 1986, 205). The difference in respect of conditional conservatism is that we aim at measuring the level of conservatism in respect of the adjustment process that leads to NGFMs, not of the accounting process that leads to the GAAP values.

Accordingly, we define conservatism of the adjustments index, inspired by the Gray Index (1980)¹⁰, representing both the distance and the sign of the adjustment.

¹⁰ After its definition in 1980, Gray’s index was labelled as “conservatism index” in several following research papers

$$CONSERVATISM\ OF\ ADJUSTMENTS = 1 - \frac{Net\ profit\ adjusted - Net\ profit}{|Net\ Profit|}$$

If there are no adjustments the index is equal to 1, while the more positive the adjustment the higher the reduction of the index. On the other side, negative adjustments lead to a value of the index higher than 1¹¹. Even in this case, the value of the ratio can be extremely high when the net profit is very low and again to resolve this issue we considered the values of its empirical distribution function instead of the numeric results of the ratio.

The statistical model analysed here is as follows:

$$Y_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 PROFITABILITY_{it} + \beta_3 DEBT_{it} + \beta_4 MTB_{it} + \beta_5 USGAAP_{it} + \beta_6 LOCGAAP_{it} \\ + \beta_7 REGULATION_{it} + \beta_8 MARKET_{it} + \beta_9 LEGAL_{it} + \beta_{10} ANTIDIRECTOR_{it} + \beta_{11} PDI_{it} \\ + \beta_{12} IDV_{it} + \beta_{13} MAS_{it} + \beta_{14} UAI_{it} + \beta_{15} LTO_{it} + \beta_{16} IND_{it} + \varepsilon_{it} \quad (2)$$

where Y_{it} is MATERIALITY or CONSERVATISM observed at the time t for the company i . The model employed is a pooled panel regression model (Baltagi 1995; Wooldridge 2002) where the error component is assumed to be i.i.d. $(0, \sigma_\varepsilon^2)$ and the covariates x_{it} are assumed to be exogenous, that is to say; $E(\varepsilon_{it}, x_{it}) = 0, \forall i = 1, \dots, N, \forall t = 1, \dots, T$. The estimation method used is the ordinary least square that gives the best linear unbiased estimator when the two previous assumptions are satisfied.

As for company-specific financial variables, there is evidence that debt markets and not equity markets have a higher influence on financial reports and that debt markets require high scores on conservatism (Ball et al. 2005, 2008; Gassen et al. 2006). The reason is that a debt agreement has asymmetric payoffs for the lender: he does not receive any higher output if the performance of the debtor increases, but the risk of default rises if the financial performance of the debtor decreases. Accordingly “the lending party demands that the borrowing party report information that may reflect weak financial performance (i.e. bad news) in a timelier manner than it would report information that may reflect strong financial performance (i.e. good news)” (Ruch and Taylor 2015). As a consequence, we assume a positive relationship between the amount of financial debt and the level of conservatism. There is also huge evidence that companies disclose NGFMs when GAAP earnings do not

(Cooke 1993). Later, the definition was changed to “comparability index”, (Weetman et al. 1998), because it is at first a comparison between two values, without a judgement on the “conservative” approach of the accountant. In this work, we still refer to it (or, better, its adaptation to NGFM’s analysis) using the phrase “conservative index”. Conceptually, there is no reason to hypothesize positive or negative adjustments to net profit in the definition of NGFMs. Being related to special items and unattended events, they can be both positive and negative with the same probability. As a consequence, if we see that one or more independent variables have negative (or less positive) impacts on our index in a systematic and statistically significant way, we can reasonably relate this to a “conservative” approach to adjustments.

¹¹Nichols et al. (2005) use the same formula to evaluate the materiality and not the conservatism of adjustments. As explained earlier in the Section, contrary to the Gray Index, the materiality of adjustments should not be affected by the sign of the adjustment (positive or negative).

meet the expected results, thus we can imagine a positive impact of PROFITABILITY and MTB on conservatism.

As for institutional variables, it is widely known that institutional factors can affect conservatism. Ball et al. (1997), with an analysis on seven international GAAP regimes, documented variation in asymmetric timeliness across regimes and attributed this variation to specific legal and institutional factors, particularly to regulatory power and litigation costs. But also on this point there are mixed results. Gassen et al. (2006), in line with previous studies (Ball et al. 2000, Bushman and Piotroski 2006) find that conditional conservatism is higher in common law countries, but this effect disappears once it has been controlled for company-specific factors, thus demonstrating a higher effect of financial factors over institutional ones. Again, as pointed out in Section 2.2, many studies highlight that after the issuing of Regulation G in the US, the magnitude of adjustments has been reduced (Entwistle et al. 2006b). But other studies performed in Europe lead to different conclusions (Hitz 2010). Starting from the opportunistic theory we can hypothesize that REGULATION, LEGAL, ANTIDIRECTOR positively affect CONSERVATISM. On the other side MATERIALITY, which represents the willingness to carry out “high” adjustments, without an opportunistic purpose, could be positively affected by REGULATION. Indeed, once a clear set of rules is in place, companies could feel free to present values substantially diverging from the GAAP ones.

As for cultural variables, following Gray’s model and subsequent integrations (Figure 2), we can assume that Power Distance (PDI), Uncertainty Avoidance (UAI) and Long Term Orientation (LTO) have a negative effect on MATERIALITY and a positive impact on CONSERVATISM. On the other hand, individualism (IDV), Masculinity (MAS) and Indulgence (IND) should have a positive effect on MATERIALITY and a negative impact on CONSERVATISM.

3.2.3 Research question 3

The third research question aims at understanding whether and how financial, institutional and cultural variables affect transparency in the disclosure of NGFMs. The transparency of the adjustment process is considered by stock markets regulators as a fundamental condition to avoid opportunistic behaviours. With this aim, international regulations on NGFMs such as Regulation G or EU CESR/05-178b require to attach additional information to the adjusted values. Moreover, international literature has extensively focused its attention on the transparency on NGFMs as a means for constraining an opportunistic use of NGFMs.

We measured transparency through three variables related to the presence of: a) a specific section in the financial statements expressly dedicated to the presentation and discussion of NGFMs (SECTION); b) an explicit statement disclosing the reasons why management considers it useful to provide NGFMs (MOTIVATION); c) the numerical reconciliation between NGFMs and the most comparable GAAP financial measures (RECONCILIATION).

Although the presence of a specific section within the financial report is not explicitly required by any regulation on NGFMs, it supports transparency by better organizing the additional information in a specific area of the report, in such a way that investors can easily find all the details on NGFMs. On this point, the

study by Dilla et al. (2013) suggests that high-knowledge nonprofessional investors are able to acquire additional information on NGFM calculation even when positioned in different areas of financial disclosure. We measure this condition by verifying whether a specific section explicitly dedicated to NGFMs exists within the financial statements. This is a dummy variable coded as 1 if this section exists, and 0 otherwise.

Regarding the dependent variable MOTIVATION, according to SEC (2003, 9), companies disclosing NGFMs have to provide "...a statement disclosing the reasons why the registrant's management believes that presentation of the non-GAAP financial measure provide useful information to investors regarding the registrant's financial condition" and "... a statement disclosing the additional purposes, if any, for which the registrant's management uses the non-GAAP financial measure that are not otherwise disclosed". Moreover, CESR (2005, Sect. 31) explicitly requires explaining why NGFMs are presented and how they are used internally. We measure this condition by verifying whether an explicit statement disclosing the reasons why the management considers NGFMs useful for financial information users exists within the report. This is a dummy variable coded as 1 if this section exists, and 0 otherwise.

The last dependent variable (RECONCILIATION) is the most important additional and detailed information associated with transparency and it is explicitly required by international regulators. According to CESR (2005, Sect. 25) a company "should present alternative performance measures only in combination with defined measures. Furthermore, issuers should explain the differences between both measures; this might be through a reconciliation of figures to provide investors with enough information to fully understand the results and financial position of the company". On the same point SEC Regulation G (2003, p. 7) specifies that the reconciliation shall be presented through a schedule or any other clearly understandable method, and it shall be both quantitative and qualitative in nature by presenting the differences between NGFMs and the most directly comparable GAAP measures. Prior studies (Aubert and Grudnitski 2014; Bhattacharya et al. 2003a; Hitz 2010; Zhang and Zheng 2011) implemented a reconciliation quality score by evaluating the degree of completeness of information about the differences between GAAP and non-GAAP figures. Given that it is not the aim of this work to introduce a further sophisticated scale for measuring the quality of the NGFMs reconciliation, we merely measure this condition by verifying whether a numerical (tabular or narrative) reconciliation both quantitative and qualitative nature in exists or not. This is a dummy variable coded as 1 if this reconciliation exists, and 0 otherwise.

The regression model analysed here is:

$$\begin{aligned}
 \text{logit}(Y_{it}) = & \beta_0 + \beta_1 \text{SIZE}_{it} + \beta_2 \text{PROFITABILITY}_{it} + \beta_3 \text{DEBT}_{it} + \beta_4 \text{MTB}_{it} + \beta_5 \text{USGAAP}_{it} \\
 & + \beta_6 \text{LOCGAAP}_{it} + \beta_7 \text{REGULATION}_{it} + \beta_8 \text{MARKET}_{it} + \beta_9 \text{LEGAL}_{it} \\
 & + \beta_{10} \text{ANTIDIRECTOR}_{it} + \beta_{11} \text{PDI}_{it} + \beta_{12} \text{IDV}_{it} + \beta_{13} \text{MAS}_{it} + \beta_{14} \text{UAI}_{it} + \beta_{15} \text{LTO}_{it} \\
 & + \beta_{16} \text{IND}_{it} + \varepsilon_{it}
 \end{aligned} \tag{3}$$

where Y_{it} is one dummy variable among SECTION, MOTIVATION or RECONCILIATION observed at the time t for the company i , which has a binomial probabilistic distribution, and $\text{logit}(Y_{it})$ indicates the logarithm

of the odds $P(Y_{it} = 1)/P(Y_{it} = 0)$. Each of the three models here is a logistic regression model, which is estimated by the maximum estimation method (Agresti 2002; Wooldridge 2002).

As for financial variables, whereas literature attributes to high quality information on NGFMs the power to restrict the opportunistic use of NGFMs, we expect that companies with low profitability and low market value tend to strongly curtail as much as possible the disclosure of additional information on NGFMs, because they could be more inclined to an opportunistic use of the NGFMs. Accordingly, we assume that PROFITABILITY and MTB positively impact the transparency of NGFMs. As regards the size of companies, according to the voluntary disclosure theory, we assume that SIZE has a positive impact on the transparency of NGFM disclosure.

As for institutional variables, according to the largest body of literature (Dilla et al. 2013; Heflin and Su 2008; Kolev et al. 2008; Marques 2006; Zhang and Zheng 2011) we can expect the presence of a specific regulation on NGFM disclosure to play an important role in improving transparency and thus the quality of NGFMs. With regard to accounting standards, considering that international literature associates IFRSs with a possible proliferation of the voluntary disclosure, we assume that IFRS-compliant companies would be more prone to enclose additional information on NGFMs compared to US GAAP or Local GAAP-compliant companies. As for the other country-specific variables, we expect that the quality of the legal system (LEGAL) as well as the investor protection level (ANTIDIRECTOR) can positively impact on the propensity of a company to provide additional and detailed information on NGFMs. Then we assume that LEGAL and ANTIDIRECTOR positively impact on the transparency of NGFM disclosure.

As for cultural variables, the three dependent variables represent the main concept of transparency, that is the opposite of secrecy, defined by Gray's model as one of the main accounting values. As a consequence, we can expect that cultural values affect the three variables in a way opposite to the one assumed by Gray for secrecy (Figure 2). Accordingly, we conclude that Power Distance (PDI), Uncertainty Avoidance (UAI) and Long Term Orientation (LTO) have a negative effect on SECTION, MOTIVATION and RECONCILIATION. On the other hand, individualism (IDV), Masculinity (MAS) and Indulgence (IND) should positively affect these three variables.

4. Sample selection and data collection

This study includes all the companies of the Oil and Gas industry listed in the Standard & Poor's Global Oil Index. We chose a specific industry because a) any given industry is subject to specific trends, regulations, accounting practices, entry barriers, economies of scales and capital intensity (Kothari 2001; Lev and Thiagarajan 1993; Misund et al., 2008). As a consequence, industry-based research maximises the comparability of management and accounting behaviours as well as their profitability trend (Fairfield et al. 2009); b) the value relevance of firms' disclosed earnings and book equity is different across industries, and industry-based research solves this issue (Biddle et al. 1995).

We decided to conduct our research on the Oil and Gas industry for a number of reasons. Firstly, because it is a very relevant industry, not only in terms of turnover and people employed by the companies, but also for its

impact on the global economy (Hammoudeh et al. 2010). The variations in the oil price have the ability to change numerous macro- and micro-economic measures such as GDP growth or inflation (Hamilton 2003). Secondly, it is well known that oil prices have a negative impact on market returns while they have a positive effect on the stock prices of Oil and Gas companies (Filis et al. 2011; Dayanandan and Donker 2011; Kilian and Park 2009; Malik and Ewing 2009; Nandha and Faff 2008;). Accordingly, firms in this industry are characterized by high earnings and stock price volatility, linked to a substantial number of risks, including economic and political risks. Thirdly, from an accounting perspective, according to Quirin et al. (2000) and Cormier and Magnan (2002) for Oil and Gas companies, the value relevance of earnings is lower than that of cash flows and traditional financial statements are not value relevant because the historical cost accounting approach is not able to accurately show the oil and gas firms' financial performance. Measuring proven and probable reserves is difficult as in-ground oil and gas deposits are unobservable, so that reserves entered in the balance sheet are subject to frequent revisions. Prior studies on the Oil and Gas industry (Bryant 2003) show that the accounting method chosen for proven and probable reserves valuation affects the value relevance of accounting information (Misund et al. 2008; Smolarski and Vega 2013).

As a consequence of the foregoing points, NGFMs can play a relevant role in this industry for three main reasons. Firstly, due to the high volatility of their stock prices and earnings, Oil and Gas companies more frequently adjust their results in order to constrain earnings variance. Secondly, due to the uncertainty about how to measure natural reserves, traditional GAAP earnings may not be the most suitable value-relevant measures for information users. Thirdly, due to the extremely high risks associated with this industry, Oil and Gas companies might find it necessary to adjust their results more frequently in order to exclude special items linked to non-recurring events.

As previously mentioned, we included in the sample all the firms in Standard & Poor's Global Oil Index. S&P Global Oil Index is specifically designed to monitor the performance of the 120 largest oil companies of the world. They have legal registration in different countries, and they are listed at least in one of the international exchange markets (see Table 4 for some financial information about the companies included in the sample).

Table 4: Financial information about the companies included in the sample

<i>t</i>	<i>N</i>	Average Assets (th \$)	Net Sales (th \$)	EBITDA %	Net Income/ Net Sales
Q4 2008	110	32,134,214	8,086,407	19.4%	-0.5%
Q1 2009	110	32,066,627	5,647,202	21.3%	6.0%
Q2 2009	110	32,899,821	6,436,099	20.2%	7.2%
Q3 2009	110	33,834,365	6,636,641	17.2%	8.2%
Q4 2009	113	34,059,407	8,071,301	19.7%	6.0%
Q1 2010	113	35,007,169	7,468,313	20.2%	8.9%
Q2 2010	116	35,602,486	8,073,117	17.0%	5.9%
Q3 2010	116	36,952,416	7,343,296	17.4%	8.4%
Q4 2010	117	38,779,652	9,442,634	19.3%	7.7%
Q1 2011	118	39,855,244	8,889,135	20.1%	9.8%

Q2 2011	119	40,264,332	10,306,637	18.8%	9.9%
Q3 2011	119	41,220,993	9,630,907	17.6%	7.3%
Q4 2011	120	42,404,658	11,001,338	17.8%	5.7%
Q1 2012	120	43,503,477	10,104,694	18.3%	8.3%
Q2 2012	120	43,398,762	10,452,282	16.1%	5.7%

Notes: t=time; N=No. of companies included in the sample.

This is a relevant difference compared to previous studies, most of which concern US firms, and only recently European firms (Aubert and Grudnitski 2014; Isidro and Marques 2013a, 2013b, 2015;), whereas a few studies are based on other country-specific firms (Aubert 2010; Hitz 2010; Koning et al. 2010; Venter et al. 2014; Walker and Louvari 2003). Only one relatively recent study (Epping and Wilder, 2011) is based on US listed foreign firms showing a regional comparison analysis. However, the common feature of most of previous studies is that they analyse firms listed on the same stock exchange (namely the NYSE) and therefore subjected to the same rules for NGFM disclosure. The present study goes beyond this limitation, proposing an analysis of a universe of companies located in 23 different countries (and consequently institutions and cultures) and listed in 22 stock exchanges with specific rules (if any) for NGFM disclosure. Institutional (but not cultural) variables were previously analysed only in the study by Isidro and Marques (2015) that was focused solely on European firms. It is possible to consider EU countries' institutional factors as being quite homogeneous, at least if compared with the countries included in our sample that range from China to New Zealand, from Finland to South Korea, from Brazil to Japan.

Another peculiarity of this paper is that, contrary to most of the previous studies, it does not include within the NGFMs category the so-called EB-metrics, because nowadays the latter is considered as a conventional benchmark and, as such, generally accepted by the business community.

This study seeks to provide a complete map of the NGFMs companies decide to disclose; comprising those indicators related to cash flow or other adjusted balance sheet items. Several prior studies, on the other hand, are focused only on one or two NGFMs. Walker and Louvari (2003), Frankel et al. (2011) and Doyle et al. (2013) based their research only on non-GAAP earning per share (EPS), Bhattacharya et al. (2004) looked at non-GAAP EPS and non-GAAP net income, Nichols et al. (2005) analysed non-GAAP net income.

We hand-picked information about non-GAAP financial measures from financial releases associated with the financial reports on a quarterly time basis. More in detail, the period analysed begins with the full-year (and fourth quarter) 2008 and ends with the half-year (and second quarter) 2012. For each company we analysed, if available, a panel of 15 documents in ascending chronological order, with potentially 1,800 firm-quarter observations¹².

The choice of a four-year period of investigation is aligned with prior studies, which are usually two-year or five-year based. Furthermore, this study analyses a relatively recent period compared with the ones reported in the most recent prior studies: Bansal et al. (2013) show results until fiscal year 2009, Isidro and Marques

¹²Only nine companies presented incomplete financial documentation for the period considered, mostly because they were founded or publicly traded after 2008. A total of 1,731 individual documents have been analysed.

(2015) until the fiscal year 2007, Black et al. (2012) until the fiscal year 2006, Doyle et al. (2013) until the fiscal year 2009, Webber et al. (2013) until the fiscal year 2010, and Choi and Young (2015) until the fiscal year 2001. Moreover, the choice to focus on quarterly reports instead of easier-to-analyse annual statements allows us to gather a huge amount of data about a relatively limited period of time. This was important to support the hypothesis of stable institutional and cultural factors in each country during the period.

We obtained the periodical financial reports mainly from the companies' websites and - in a small number of cases - from the OSIRIS Database (Bureau VanDijk). We collected all other firm-specific information (such as financial items, GAAP financial measures, legal country, main exchange, GAAP adopted for preparing the financial statements) from the OSIRIS Database (Bureau VanDijk) and from DATASTREAM (Thomson Financials) for capitalization. Due to the different currencies used in the financial reports, we extracted the financial data on a local currency basis at each point in time, and then we converted them into US dollars considering the exchange rates existing at the 31st of December 2012.

5. Descriptive evidence

Table 5 presents some evidence about the use and disclosure of NGFMs by the companies in the sample. At first, we can see a huge dissimilarity in adoption levels among different geographical regions. Considering the data for the last available quarter (the second quarter of 2012), the percentage of companies disclosing NGFMs range from 14% in South America, Oceania and Africa to 84% in Canada, 46% in Europe and 56% in the U.S.A.. The number of NGFMs included in each report is more similar: 2.60 in Europe; around 2.30 in U.S.A. and Canada; 2.00 in the remaining countries. Out of the total, half of the companies in the sample introduce NGFMs in their financial reports (50.8%), with an average of 2.34 NGFMs per document. The increasing trend in the use of NGFMs is clear. Comparing the average value in the first four quarters (from Q4 2008 to Q3 2009) with the average in the last four quarters (from Q3 2011 to Q2 2012), the adoption rate in Europe increases from 39.8% to 45.3%; in the U.S.A. from 43.8% to 49.8%; in Canada from 76.6% to 84.2%; only in the rest of the world is there a limited decrease from 25% to 22.6%. Within the sample as a whole, the adoption rate rose from 44.3% to 49.3% during the analysed period: a huge increase in less than four years. On the contrary, the number of NGFMs included in the financial reports did not change significantly: from 2.08 in the first four quarters to 2.22 in the last four.

Additional interesting information concerns the percentage of positive adjustments to net profits. There are huge variations in this percentage from year to year in all the geographical areas; this is understandable, considering that adjustments depend on special items which, by definition, vary every year. What is interesting to note is that on average, during the 15 quarters, positive adjustments on net profit account for less than 50% of the total (194 out of 425), providing a first evidence that companies use NGFMs not only to present higher performances, but also to erase the effects of exceptional and not repeatable positive events. Another interesting point is that the percentage of positive adjustments (again on average in the 15 quarters) is much lower in Europe (30.1%), than in Canada (45.5%) and especially than in the U.S.A. (56.4%). This evidence could be useful to explain different results emerging from studies conducted in different geographical contexts.

As for transparency practices, it is evident that the U.S.A. and Canada are more advanced in this regard. In these two countries the percentages regarding the presence of a specific section for NGFMs, motivation for the adjustments and presentation of a numeric reconciliation between NGFMs and GAAP values range between 75% and 93%, while they account for between 33% and 67% in Europe and in the remaining countries. Another interesting point is that the presence of a specific section and of motivation is more frequent than numeric reconciliation for all the regions except Europe. Considering the average values in the 15th quarter Europe shows 69% for SECTION, 67% for MOTIVATION and 68% for RECONCILIATION, while the same values are 83%, 78% and 72% in the U.S., 92%, 90% and 80% in Canada and 49%, 50% and 37% for the remaining countries.

In terms of trend, considering the whole sample, there is a general reduction of the presence of a specific section (from 63% in the first four quarters to 54% in the last four ones), while an increase in motivation (from 78% to 80%) and numeric reconciliation (from 74% to 78%) has been recorded.

Table 5: Descriptive data about NGFMs adoption and disclosure.

A	C	t	N	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EUROPE	Austria, Finland, France, Italy, Luxembourg, Netherlands, Norway, Portugal, Russia, Spain, Switzerland, U.K.	Q4 2008	32	31.3%	2.40	40.0%	75.0%	70.0%	70.0%	70.0%
		Q1 2009	32	40.6%	2.31	61.5%	25.0%	69.2%	61.5%	76.9%
		Q2 2009	32	46.9%	2.67	60.0%	11.1%	66.7%	60.0%	73.3%
		Q3 2009	32	40.6%	2.31	61.5%	12.5%	69.2%	61.5%	76.9%
		Q4 2009	32	37.5%	2.33	33.3%	25.0%	66.7%	66.7%	58.3%
		Q1 2010	32	43.8%	2.21	50.0%	14.3%	78.6%	78.6%	71.4%
		Q2 2010	32	46.9%	2.33	53.3%	25.0%	73.3%	73.3%	73.3%
		Q3 2010	32	40.6%	2.31	61.5%	37.5%	76.9%	76.9%	76.9%
		Q4 2010	32	37.5%	2.42	33.3%	25.0%	66.7%	66.7%	66.7%
		Q1 2011	32	43.8%	2.29	57.1%	25.0%	78.6%	78.6%	78.6%
		Q2 2011	32	50.0%	2.56	56.3%	33.3%	68.8%	68.8%	68.8%
		Q3 2011	32	46.9%	2.27	60.0%	33.3%	73.3%	73.3%	73.3%
		Q4 2011	32	46.9%	2.47	33.3%	20.0%	53.3%	53.3%	53.3%
		Q1 2012	32	40.6%	2.31	53.8%	14.3%	69.2%	69.2%	69.2%
Q2 2012	32	46.9%	2.60	53.3%	75.0%	60.0%	60.0%	60.0%		
U.S.A.	U.S.A.	Q4 2008	44	29.5%	1.38	15.4%	50.0%	61.5%	61.5%	46.2%
		Q1 2009	44	50.0%	2.14	63.6%	71.4%	86.4%	77.3%	72.7%
		Q2 2009	44	47.7%	2.19	61.9%	84.6%	85.7%	81.0%	76.2%
		Q3 2009	44	47.7%	2.24	61.9%	76.9%	85.7%	85.7%	76.2%
		Q4 2009	44	31.8%	1.57	21.4%	100.0%	71.4%	71.4%	57.1%
		Q1 2010	44	56.8%	2.16	68.0%	11.8%	84.0%	80.0%	72.0%
		Q2 2010	45	55.6%	2.12	64.0%	37.5%	88.0%	76.0%	76.0%
		Q3 2010	45	55.6%	2.12	64.0%	43.8%	88.0%	76.0%	76.0%
		Q4 2010	45	31.1%	1.57	21.4%	33.3%	78.6%	78.6%	71.4%
		Q1 2011	46	56.5%	2.08	61.5%	75.0%	88.5%	80.8%	76.9%
		Q2 2011	47	55.3%	2.12	61.5%	25.0%	88.5%	80.8%	76.9%
Q3 2011	47	53.2%	2.16	64.0%	37.5%	88.0%	80.0%	76.0%		

		Q4 2011	48	33.3%	1.75	31.3%	80.0%	81.3%	81.3%	75.0%
		Q1 2012	48	56.3%	2.19	63.0%	76.5%	88.9%	81.5%	77.8%
		Q2 2012	48	56.3%	2.30	70.4%	42.1%	92.6%	85.2%	81.5%
CANADA	Canada	Q4 2008	16	81.3%	1.69	30.8%	0.0%	92.3%	100.0%	92.3%
		Q1 2009	16	75.0%	2.00	33.3%	75.0%	100.0%	91.7%	91.7%
		Q2 2009	16	75.0%	2.17	41.7%	80.0%	100.0%	91.7%	83.3%
		Q3 2009	16	75.0%	2.25	50.0%	16.7%	91.7%	83.3%	83.3%
		Q4 2009	18	83.3%	2.07	40.0%	50.0%	80.0%	86.7%	80.0%
		Q1 2010	18	77.8%	2.21	50.0%	28.6%	92.9%	85.7%	78.6%
		Q2 2010	19	73.7%	2.21	50.0%	42.9%	92.9%	85.7%	78.6%
		Q3 2010	19	73.7%	2.21	50.0%	42.9%	92.9%	85.7%	78.6%
		Q4 2010	19	78.9%	2.27	46.7%	71.4%	86.7%	93.3%	73.3%
		Q1 2011	19	84.2%	2.06	50.0%	37.5%	93.8%	87.5%	81.3%
		Q2 2011	19	84.2%	2.19	56.3%	11.1%	93.8%	93.8%	81.3%
		Q3 2011	19	84.2%	2.19	56.3%	33.3%	93.8%	93.8%	81.3%
		Q4 2011	19	84.2%	2.38	50.0%	75.0%	87.5%	93.8%	75.0%
		Q1 2012	19	84.2%	2.19	50.0%	62.5%	93.8%	93.8%	75.0%
		Q2 2012	19	84.2%	2.25	56.3%	55.6%	93.8%	93.8%	75.0%
SOUTH AMERICA, ASIA, AFRICA AND OCEANIA	Australia, Brazil, China, Colombia, Hong Kong, India, Japan, South Africa.	Q4 2008	18	33.3%	2.33	66.7%	25.0%	33.3%	33.3%	16.7%
		Q1 2009	18	22.2%	1.00	0.0%	0.0%	50.0%	50.0%	25.0%
		Q2 2009	18	22.2%	1.00	0.0%	0.0%	50.0%	50.0%	25.0%
		Q3 2009	18	22.2%	1.00	0.0%	0.0%	50.0%	50.0%	25.0%
		Q4 2009	19	36.8%	2.29	71.4%	60.0%	28.6%	28.6%	28.6%
		Q1 2010	19	21.1%	1.00	0.0%	0.0%	50.0%	50.0%	50.0%
		Q2 2010	20	15.0%	1.00	33.3%	100.0%	66.7%	66.7%	33.3%
		Q3 2010	20	20.0%	1.25	25.0%	0.0%	50.0%	50.0%	50.0%
		Q4 2010	21	42.9%	2.00	66.7%	50.0%	33.3%	33.3%	33.3%
		Q1 2011	21	19.0%	1.25	0.0%	0.0%	50.0%	50.0%	50.0%
		Q2 2011	21	19.0%	1.75	50.0%	100.0%	75.0%	75.0%	50.0%
		Q3 2011	21	19.0%	1.50	25.0%	100.0%	50.0%	50.0%	50.0%
		Q4 2011	21	38.1%	2.38	75.0%	83.3%	37.5%	50.0%	37.5%
		Q1 2012	21	19.0%	1.50	25.0%	100.0%	50.0%	50.0%	50.0%
Q2 2012	21	14.3%	2.00	66.7%	50.0%	66.7%	66.7%	33.3%		
TOTAL	23 countries	Q4 2008	110	38.2%	1.86	33.3%	35.7%	69.0%	71.4%	61.9%
		Q1 2009	110	46.4%	2.06	51.0%	57.7%	82.4%	74.5%	74.5%
		Q2 2009	110	47.3%	2.23	51.9%	59.3%	80.8%	75.0%	73.1%
		Q3 2009	110	45.5%	2.16	54.0%	44.4%	80.0%	76.0%	74.0%
		Q4 2009	113	42.5%	2.02	37.5%	55.6%	66.7%	68.8%	60.4%
		Q1 2010	113	50.4%	2.11	54.4%	16.1%	82.5%	78.9%	71.9%
		Q2 2010	116	49.1%	2.14	56.1%	37.5%	84.2%	77.2%	73.7%
		Q3 2010	116	48.3%	2.13	57.1%	40.6%	83.9%	76.8%	75.0%
		Q4 2010	117	42.7%	2.06	40.0%	50.0%	70.0%	72.0%	64.0%
		Q1 2011	118	50.8%	2.07	53.3%	53.1%	85.0%	80.0%	76.7%
		Q2 2011	119	52.1%	2.23	58.1%	27.8%	83.9%	80.6%	74.2%
		Q3 2011	119	50.4%	2.15	58.3%	37.1%	83.3%	80.0%	75.0%
		Q4 2011	120	45.8%	2.22	43.6%	66.7%	69.1%	72.7%	63.6%

Q1 2012	120	50.0%	2.17	55.0%	60.6%	83.3%	80.0%	73.3%
Q2 2012	120	50.8%	2.34	62.3%	52.6%	83.6%	80.3%	72.1%

Notes: A=Area; C=Countries; t=time; N=No. of companies included in the sample; (1)=% companies disclosing NGFMs; (2)= Average number of NGFMs in each report; (3)= Adjustments on Net profit % on total; (4)= % of positive adjustments on Net profit; (5)=Specific section; (6)=Motivation; (7)=Reconciliation.

6. Results and discussion

In this section, we attempt to answer to the three research questions described in Section 3 by using logistic, multinomial logistic and pooled panel regression models. We start by describing the results of the preliminary analysis performed in order to avoid multicollinearity. We evaluate the presence of multicollinearity through the variance inflation factor (VIF, from now on)¹³, which assesses how much the variance of an estimated regression coefficient increases if the predictors are correlated. In general, a VIF greater than 10 may be problematic since regression coefficients are poorly estimated and their standard error is inflated, thus increasing the uncertainty about the estimated parameter value. In order to avoid multicollinearity, we analysed each estimated model through the VIF and we removed the variables with the highest VIF, one at a time, until the VIF for all the covariates in the model was no greater than 10. Next, we show the obtained estimated models and provide a statistical and economic interpretation; a check of the residuals of each model is also performed. For all computations, the R software (R Core Team 2013) was used; in particular, the main R packages chosen were "mlogit" and "pglm" by Y. Croissant (2013a, 2013b).

6.1 Research question 1: the impact of NGFMs on disclosure

Here we analyse the factors affecting the presence and the number of NGFMs disclosed. We employ *i*) a multivariate logistic regression model when we work with the dependent variable PRESENCE (hereinafter MOD1.1,) and *ii*) a multivariate multinomial (without alternative-specific constants) logit regression model when we work with the dependent variable NUMBER (hereinafter MOD1.2.). For each estimated regression model, we show the resulting coefficients with its standard deviation and an evaluation of their significance level. For the two models employed here we use the whole dataset. Due to multicollinearity, the covariate PDI has been removed in both of the models evaluated here. In this way, we obtained estimated models with a VIF value of each covariate between 1.008 and 8.037. Note that, in both models, the covariate of the accounting standards adopted has been introduced through two dummy variables: LOCGAAP and USGAAP, to express the effect of the usage of the local GAAP and the US GAAP standards, respectively, on the dependent variable with respect to the effect of the IFRS standard, which is the reference category. Tables 5 and 6 show the results obtained.

MOD1.1 in Eq. (1) with PRESENCE as the dependent variable is a generalized linear regression model with binomial dependent variable and logistic link function. Each regression coefficients β_i can be interpreted along

¹³ Note that the approach based on the correlation coefficient is not appropriate in the context we work with because we estimate different models on different samples of companies, and the multicollinearity analysis results depends on them.

the same lines as in linear models, bearing in mind that the left-hand-side of the model equation is a logit rather than a mean. Thus, β_i represents the change in the logit of the probability associated with a unit change in the i -th predictor holding all other predictors constant.

MOD1.2 in Eq. (1) with NUMBER as dependent variable is a logistic regression with a multinomial dependent variable whose reference category is 0, i.e. “none NFGM in the financial report”, which we indicate by DEBT.0. Hence, each covariate has been introduced in the model through two dummies. We give an example for the interpretation of the estimated coefficients. Considering the covariate DEBT, it appears that the average impact of DEBT is 1.352 higher for alternative “1 or 2 NGFM in the financial report” than for the alternative DEBT.0. Similarly, the constant for the alternative “more than two NFGMs in the financial report” is 2.616. If DEBT.1 were left out instead of “none NFGM in the financial report”, then all the constants would be relative to alternative DEBT.1, and the constant for alternative DEBT.2 would be $2.616 - 1.352 = 1.264$. This means that the average impact of the covariate DEBT is 1.264 higher for companies with more than two NGFMs in the financial report than the ones with one or two NGFMs in their financial report. Similarly for the other alternatives. Finally, the observed that the frequencies of the three alternatives DEBT.0, DEBT.1, and DEBT.2 are 0.525, 0.322, and 0.153, respectively, which means that they are perfectly predicted by the estimated model (0.526, 0.321, and 0.153 are the average probabilities of the three alternatives).

Tables 6 and 7 are mostly consistent, which means that the drivers of the disclosure of NGFMs also affect the number of NGFMs presented. Looking at the estimates, three factors emerge as the most relevant: the level of financial debt, the accounting standards and the regulation.

Table 6. MOD1.1 results: estimated parameters, standard deviations and t-statistic with significance evaluation

	Coefficients	Std. error	t value
Intercept	1.807	1.240	1.457
Size	0.099	0.048	2.055*
Profitability	-0.001	0.002	-0.485
DEBT	1.752	0.230	7.632***
MTB	-0.208	0.040	-5.204***
LOCGAAP ^o	-0.494	0.180	-2.747**
USGAAP ^o	-1.521	0.238	-6.394***
Regulation	1.196	0.225	5.322***
MARKET	-0.366	0.170	-2.148*
LEGAL	-0.075	0.082	-0.925
Antidirector	-0.379	0.087	-4.377***
IDV	-0.014	0.007	-1.863.
MAS	0.000	0.005	0.091
UAI	-0.020	0.006	-3.529***
LTO	-0.011	0.005	-2.184*
IND	0.034	0.011	3.154**

Significance levels: *** 0.001, ** 0.01, * 0.05, . 0.1

^o IFRS standard is the reference category

Table 7. MOD1.2 results: estimated parameters, standard error, and t-statistic with significance evaluation.

	Coefficient	Std. error	t value
SIZE.1	0.075 .	0.040	1.848
SIZE.2	0.302	0.056	5.401***
PROFITABILITY.1	-0.001	0.002	-0.402
PROFITABILITY.2	-0.300	0.113	-2.650**
DEBT.1	1.352	0.243	5.558***
DEBT.2	2.616	0.364	7.185***
MTB.1	-0.303	0.049	-6.174***
MTB.2	-0.042	0.046	-0.898
LOCGAAP.1 [°]	-0.435	0.194	-2.242*
USGAAP.1 [°]	-1.344	0.264	-5.087***
LOCGAAP.2 [°]	-0.470	0.236	-1.989*
USGAAP.2 [°]	-1.752	0.342	-5.118***
REGULATION.1	0.897	0.249	3.607***
REGULATION.2	1.913	0.319	5.999***
UAI.1	-0.018	0.006	-3.191**
UAI.2	-0.030	0.008	-3.921***
LEGAL.1	-0.296	0.087	-3.414***
LEGAL.2	0.479	0.146	3.282**
MARKET.1	-0.236	0.211	-1.118
MARKET.2	-0.547	0.207	-2.644**
ANTIDIRECTOR.1	-0.353	0.097	-3.651***
ANTIDIRECTOR.2	-0.374	0.132	-2.823**
IDV.1	-0.010	0.008	-1.240
IDV.2	-0.026	0.011	-2.355*
MAS.1	-0.013	0.006	-2.240*
MAS.2	0.027	0.007	3.588***
LTO.1	-0.004	0.005	-0.824
LTO.2	-0.020	0.007	-2.708 **
IND.1	0.066	0.011	5.903***
IND.2	-0.018	0.015	-1.178

Significance levels *** 0.001, ** 0.01, * 0.05, . 0.1
[°] IFRS standard is the reference category

The positive effect of financial debt on the disclosure of NGFMs confirms the well-grounded theory whereby companies with a high financial debt must provide a higher level of information to increase the number of potential investors and reduce the cost of capital (Battacharya et al. 2003a, 2007). Also, the impact of financial leverage seems to be higher than the relevance of equity: there is a positive impact of Market-to-Book ratio on the disclosure of NGFMs, but with a much lower estimate. Again, this is consistent with the literature, showing a higher relevance of financial debt on equity in affecting the value relevance of accounting information (Ball et al. 2008). On the whole, we can say that the pressure generated by the markets (of financial debts and equity) is one of the main drivers of NGFMs disclosure.

The impact of accounting standards on NGFM disclosure is very interesting and not described in previous research. What emerges is that, compared to companies adopting IFRS (IFRS-companies), companies embracing the local GAAP (local GAAP-companies) and particularly the US GAAP (US GAAP-companies)

method show a limited adoption of NGFMs. This is not consistent with the hypothesis affirming that the high-quality information provided by IFRS should reduce the need to disclose adjusted indicators. A potential interpretation is that IFRS-companies, with the introduction of IFRS, have lost the possibility to clearly represent the impact of extraordinary events on their profit and loss account. This situation, for many companies actually adopting IFRS, has occurred relatively “recently” (for instance in Europe in 2005 following the introduction of the European Regulation 1606/2002). As a consequence, many IFRS-companies probably still feel the need to clearly distinguish ordinary from extraordinary results and they use NGFMs for this purpose. The “persistence” of previous accounting behaviours after the adoption of a new set of accounting standard has already been reported by the literature (D’Arcy, 2001; Helman et al. 2015). On the contrary, local GAAP-companies often still have the opportunity to separately represent the effect of extraordinary events in their GAAP financial reports, while US GAAP-companies are used to reporting GAAP results that do not clearly distinguish the financial effect of ordinary and extraordinary events, because they have been adopting the same accounting standards for decades. As a consequence, they feel a reduced need to report NGFMs for this aim, compared to IFRS-companies.

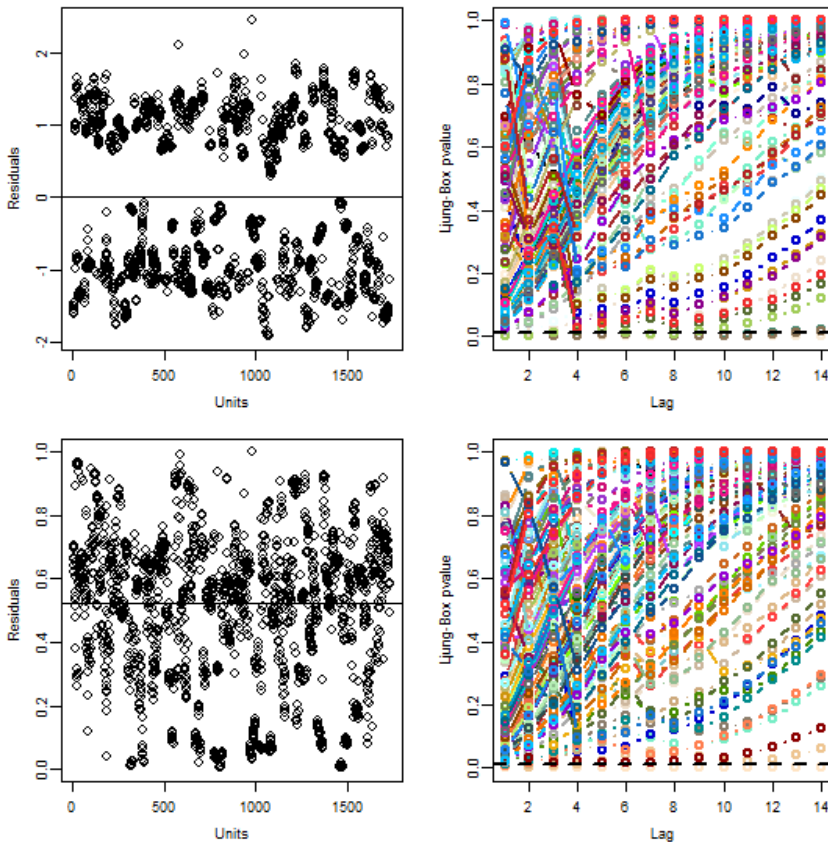
Finally, regulation has a partially unexpected positive effect on the disclosure of NGFMs. Previous studies, mainly focused on the US, have shown a mitigation of the disclosure of NGFMs after the introduction of a regulation, specifically SEC Regulation G (Entwistle et al. 2006b; Marques 2006; Nichols et al. 2005). Those analyses were mainly based on an opportunistic view of the use of NGFMs, while our results better support the informative theory. But the two interpretations can coexist. The regulation has a negative impact on the disclosure of NGFMs for opportunistic aims (Heflin and Hsu 2008), but at the same time it increases the propensity to disclose informative NGFMs, because it provides a clear set of guidelines and boundaries for companies that want to provide a higher level of information while respecting all the rules. The regulation seems to have a double role: as an obstacle for the opportunistic use of NGFMs, but at the same time as an enabler and facilitator for the informative use of NGFMs.

Considering the institutional variables, the results show a negative impact of market development and investor protection rules on the adoption of NGFMs. Again, the results seem inconsistent with Isidro and Marques (2015), the only previous study approaching this issue. They state that in a well-developed market the pressure to present financial results which meet the targets is higher and, where the legal system is strong, managers cannot distort GAAP results to mislead investors. As a consequence, they adopt less regulated NGFMs for this purpose. The main difference between the two studies is that Isidro and Marques specifically refer to the adoption of NGFMs for opportunistic purposes (to meet the analysts’ benchmarks), while in this study we consider all the NGFMs, without any ex-ante consideration about the aim of disclosure. Again, we think that the two results can coexist. The presence of a strong institutional context can increase the adoption of NGFMs for opportunistic purposes due to the reasons clearly outlined by Isidro and Marques, but at the same time it can discourage the (prevalent) group of companies that want to disclose informative NGFMs and that are afraid of being perceived as opportunists by the market and the regulators. This result is also coherent with the previous one related to the positive impact of regulation on NGFMs’ disclosure.

As for cultural variables, the results show that only Uncertainty Avoidance, Long Term Orientation and Indulgence are statistically relevant at a 0.05 level of significance, while Individualism is relevant at a 0.1 level of significance. The direction of the relationships, except for individualism, is consistent with our hypotheses based on Gray (1988): uncertainty avoidance and long term orientation reduce the probability of adopting NGFMs, while indulgence has a positive effect. Anyway, the estimates of all the cultural factors are very low if compared to the ones of financial and institutional variables, denoting a secondary role of cultural factors in affecting NGFM disclosure.

As for the analysis of residuals, a random inspection suggests lack of patterns and influent outliers in the scatter plot (see Fig. 3, left panel)¹⁴. Moreover, we computed the Ljung–Box test for each time series of each company at lag from 1 to 14 (or up to the maximum available value of t for each company) in order to evaluate whether the autocorrelation of the residuals at each distinct time lag is equal to zero. The obtained results lead to conclude that the residuals of the companies are, in general, not autocorrelated since the p-value of the test is almost always greater than 0.05 (see Fig. 3, right panel).

Figure 3. Residuals analysis of the model in Eq.(1) with dependent variable *PRESENCE* (upper panel) or *NUMBER* (lower panel). Left: Scatter plot of residuals of the estimated model. Right: Plot of the p-values of the Ljung–Box test at lag=1, 2, ..., T , where T is the available maximum number of observed instant time, of the residuals (time series for each company) of the estimated model. The dashed black line corresponds to p-value=0.05.



¹⁴ We estimated the two models after removing the only one potential outlier appearing in the scatter plot and the estimate results did not change.

6.2 Research question 2: the impact on the magnitude of adjustments

The second research question aims at understanding whether and how financial, institutional and cultural factors affect the magnitude of adjustments leading to NGFMs. In order to do that, we chose a pooled panel regression model to answer the two points of research question 2. Consistently with the notation previously introduced, we indicate the model in Eq. (2) with the dependent variable MATERIALITY as MOD2.1 and the model in Eq. (2) with the dependent variable CONSERVATISM as MOD2.2. Here, we work on companies with an adjusted net income. For each estimated regression model, we show the resulting coefficients with their standard deviation and an evaluation of their significance level. In the preliminary analysis, the covariates PDI, MARKET, and IDV have been removed on the basis of the VIF and the chosen forward-like VIF procedure leads to models with a VIF value of each covariate between 1.089 and 7.659. Table 8 shows the results for both models. Note that, also here, the covariate of the accounting standards adopted has been introduced through two dummy variables: LOCGAAP and USGAAP, which expresses the effect of the use of the local GAAP and US GAAP standard, respectively, on the dependent variable with respect to the one of the IFRS standard, which is the reference category. MOD2.1 and MOD2.2 in Eq. (2) are pooled panel regression models¹⁵. Each estimated significant coefficient with positive (negative) sign shows how much the dependent variable increased (decreased) for each increment by one unit of the quantitative covariate taken into consideration, holding the other covariates constant. Here, the estimated coefficient for the covariate LOCGAAP (USGAAP) shows how much the dependent variable for the companies with LOCGAAP (USGAAP) increased or decreased with regard to the ones with no NFGM in the financial report.

Table 8. MOD2.1 and MOD2.2 results: estimated parameters, standard error, and t-statistic with significance evaluation.

	MOD2.1 (Materiality)			MOD2.2 (Conservatism)		
	Coefficients	Std. error	t value	Coefficients	Std. error	t value
Intercept	1.608	0.351	4.587 ***	1.081	0.376	2.874 **
Size	-0.077	0.012	-6.495 ***	-0.015	0.013	-1.153
Profitability	-0.043	0.019	-2.327 *	0.100	0.018	5.584 ***
DEBT	0.230	0.079	2.922 **	0.139	0.084	1.659 .
MTB	-0.005	0.009	-0.504	-0.023	0.010	-2.282 *
LOCGAAP ^o	0.048	0.044	1.108	-0.064	0.047	-1.345
USGAAP ^o	0.195	0.050	3.943 ***	-0.025	0.053	-0.467
Regulation	-0.042	0.045	-0.940	-0.081	0.047	-1.713.
LEGAL	0.029	0.018	1.553	0.044	0.019	2.311 *
Antidirector	0.033	0.026	1.259	-0.029	0.029	-1.024
MAS	0.001	0.002	0.413	-0.002	0.002	-0.680
UAI	0.002	0.001	1.519	0.001	0.002	0.704
LTO	0.001	0.002	0.730	0.001	0.002	0.520
IND	-0.001	0.002	-0.263	-0.001	0.003	-0.286

Significance levels *** 0.001, ** 0.01, * 0.05, . 0.1
^o IFRS standard is the reference category

¹⁵ Note that the estimated coefficients and their significance level are practically identical to the one we obtain if we work with a two-way fixed effects panel regression model.

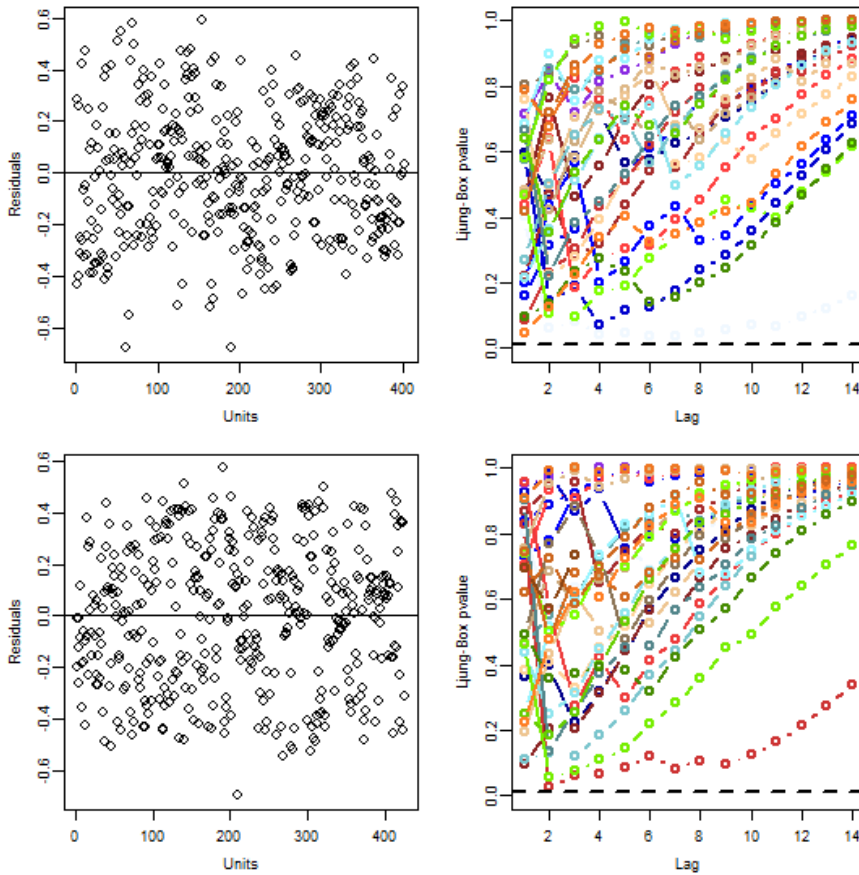
If the two tables representing the results of research question 1 provide very consistent results, the same cannot be said for Table 8 reporting the results for the impact on materiality and conservatism. It is worth underscoring that they represent the concept of “magnitude” from two different perspectives and the results demonstrate that these two perspectives move in different directions. Materiality represents the size of the adjustments irrespective of the sign (positive or negative) and can be considered as a proxy of the propensity to distance the NGFMs included in the financial report from GAAP numbers, but without any opportunistic purpose. It can be considered as a measure of confidence in leaving the certified and law-based numbers built on GAAPs for less regulated and more questionable NGFMs. On the contrary, conservatism largely depends on the direction of the adjustments and can be considered as a (reverse) proxy of opportunistic behaviours. Given that adjustments are the result of casual and extraordinary events, they should be independent of any company-specific or country-specific factor. As a consequence, if we find a statistically relevant positive relationship between one of the factors and conservatism we can assume an opportunistic use of NGFMs (reversely) driven by that factor.

As for materiality, the most relevant factor is the level of financial debt, which drives not only the decision to disclose NGFMs, but also the magnitude of the adjustment considered in their absolute value. Based on the opportunistic theory, we should conclude that highly indebted companies adopt frequent and huge adjustments to mislead investors’ decisions, but this would be incorrect. Indeed, looking at the factors driving conservatism, we see that financial debt positively affect conservatism (even though with a coefficient significant only at the 0.1 level). These results are consistent with the literature reporting that financial debt leads to a higher level of accounting conservatism (Ball et al. 2005, 2008; Gassen et al. 2006). Profitability plays exactly the opposite role of financial debt. It reduces on average the materiality of adjustments but it is the most relevant factor in increasing conservatism. A possible interpretation is that profitable companies do not need to do material adjustments, but the lower the profitability of the company the more positive the adjustments, and this can be considered as a clear signal of opportunistic behaviours. Positive adjustments are used by unprofitable companies to reach the targets set by the analysts, or in any case to show better financial performance, consistently with the part of the literature supporting the opportunistic theory (Chen 2010; Doyle et al. 2013). Shifting our attention to institutional factors, it is interesting to note that the regulation does not play any role in reducing materiality and increasing conservatism, contrary to previous studies maintaining that Regulation G had reduced the magnitude of adjustment (Entwistle et al. 2006b). It does not affect materiality in a statistically significant way, while its impact on conservatism is even negative (with a low significance level). The strength of the legal system determines an effect on conservatism, but, on the whole, firm-specific financial factors appear to play a much more relevant role than institutional elements. This result is consistent with Gassen et al. (2006), who found that the impact of the legal regime on conditional conservatism was not significant if verified for company-specific financial variables.

The role of cultural factors on the magnitude of adjustments is even less relevant. None of the cultural dimensions shows a statistically significant effect on either materiality or conservatism.

As for the residuals analysis, a casual inspection suggests the lack of patterns and influent outliers in the scatter plot (see Fig. 4, left panel). Moreover, the t -test on the mean is not significant (p -value=1) for the residuals in Fig. 4. As regards autocorrelation, the Ljung–Box test computed for each time series at lag from 1 to 14 (or up to the maximum available value of t for each company) leads to conclude that the residuals of the companies are perfectly not autocorrelated at any lag (see Fig. 4, right panel).). Finally, the normality test computed for each time series (Shapiro–Wilks test with p -value 0.05) does not lead to reject the null hypothesis for almost all the considered companies.

Figure 4. Residuals analysis of the model in Eq. (2) with MATERIALITY (upper panel) or CONSERVATISM (lower panel) as dependent variable. Left: Scatter plot of residuals of the estimated model. Right: Plot of the p -values of the Ljung–Box test at lag=1, 2, ..., T , where T is the available maximum number of observed instant time, of the residuals (time series for each company) of the estimated model. The dashed black line corresponds to p -value=0.05.



6.3 Research question 3: the impact on the quality of disclosure

In this section, we analyse the impact of financial, institutional and cultural factors on the different dimensions of the transparency of the adjustment process leading to NGFMs. We do that by employing the multivariate logistic regression model in Eq. (3) by varying between the dependent variables SECTION, MOTIVATION and RECONCILIATION (hereinafter we refer to the three models as MOD3.1, MOD3.2, and MOD3.3, respectively). For this research question, we employed data about companies with at least one NFGM in a quarter and, as in the previous analyses, for each estimated regression model, we show the resulting coefficients

with their standard deviation and an evaluation of their significance level. On the basis of the VIF based analysis, the covariates PDI, MARKET and IND have been removed in all the evaluated models and the obtained estimated models show a VIF value of each covariate between 1.003 and 6.099. Table 9 shows the results for the three models. Note that, also here, the covariate of the accounting standards adopted has been introduced through two dummy variables: LOCGAAP and USGAAP, which expresses the effect of the use of the local GAAP and the US GAAP standard, respectively, on the dependent variable with respect to the one of the IFRS standard, which is the reference category. MOD3.1, MOD3.2, and MOD3.3 are generalized linear regression models with binomial dependent variable and logistic link function. The regression coefficients β_i can be interpreted along the lines given for the model in Eq. (1) with PRESENCE as dependent variable.

Table 9. MOD3.1, MOD3.2, and MOD3.3 results: estimated parameters, standard error, and t-statistic with significance evaluation.

	MOD3.1 (Section)			MOD3.2 (Motivation)			MOD3.3 (Reconciliation)		
	Coefficients	Std. error	t value	Coefficients	Std. error	t value	Coefficients	Std. error	t value
Intercept	-3.399	1.944	-1.749	-0.767	1.846	-0.415	2.855	1.646	1.735
Size	-0.051	0.084	-0.607	-0.229	0.082	-2.800 **	-0.291	0.075	-3.890 ***
Profitability	0.014	0.056	0.242	0.008	0.029	0.268	0.158	0.125	1.258
DEBT	-0.091	0.477	-0.192	-1.123	0.482	-2.330 *	0.642	0.399	1.609
MTB	0.086	0.087	0.979	0.056	0.078	0.726	-0.194	0.064	-3.026 **
LOCGAAP°	0.539	0.349	1.541	0.693	0.341	2.030 *	0.815	0.275	2.967 **
USGAAP°	0.653	0.329	1.983 *	0.027	0.298	0.091	-0.251	0.274	-0.915
Regulation	1.724	0.367	4.705 ***	0.787	0.334	2.355 *	-0.717	0.323	-2.222 *
LEGAL	0.094	0.115	0.820	-0.047	0.107	-0.437	0.206	0.109	1.884
Antidirector	0.777	0.151	5.145 ***	0.614	0.148	4.144 ***	-0.141	0.135	-1.047
IDV	0.004	0.012	0.308	0.020	0.012	1.731	0.032	0.010	3.191 **
MAS	-0.016	0.008	-1.916 .	-0.016	0.008	-2.096 *	0.002	0.008	0.256
UAI	0.027	0.011	2.518 *	0.036	0.011	3.340 ***	0.035	0.009	4.121 ***
LTO	0.009	0.001	1.036	-0.006	0.008	-0.793	0.003	0.007	0.414

Significance levels *** 0.001, ** 0.01, * 0.05, . 0.1

° IFRS standard is the reference category

Our evidence (Table 9) on the different dimensions of the transparency of NGFMs disclosure highlights a dominant role of country-specific institutional factors compared to that of firm-specific financial ones, as well as to that related to cultural dimension.

In particular, as for the independent variable SECTION, the most important driver appears to be the regulation on NGFMs, that positively affects this dimension. This is consistent with part of the literature that highlights the positive role of market regulatory bodies' interventions in favouring NGFM-related transparency. Also ANTIDIRECTOR appears to be an important driver for transparency. This result confirms our hypothesis that the regulation and the investor protection level can positively impact the propensity of a company to add relevance and transparency to the disclosed NGFMs, consistently with prior studies (Dilla et al. 2013; Heflin and Su 2008; Kolev et al. 2008; Marques 2006; Zhang and Zheng 2011). Accounting standards also play a significant role on the propensity to have a dedicated section, as USGAAP positively influence this choice. Perhaps, here again, the longer experience of GAAP-companies with NGFMs probably plays a role in this clearer presentation. No statistical significance is attributed to the firm-specific performance variables as well as to the cultural variables with the exception of Uncertainty Avoidance that positively affects this dimension even though with a less prominent weight compared to institutional factors. Notably, this relation is not consistent with Gray's (1988) framework.

As for the independent variable MOTIVATION, our findings highlight an important positive role of REGULATION as well as ANTIDIRECTOR, thus confirming that a strong and regulated environment increases the propensity to transparency. The accounting standards also appear to affect this dimension, as Local GAAP-companies are more inclined to present the motivation for the disclosure of NGFMs. In this regard, also firm-specific financial variables play an important role. SIZE, and particularly DEBT, are negatively associated with the disclosing of motivation. Finally, we observe a marginal role of cultural factors, because only UAI and MAS affect this dimension, while IDV is borderline. Once again, these relations are not consistent with Gray's (1988) framework.

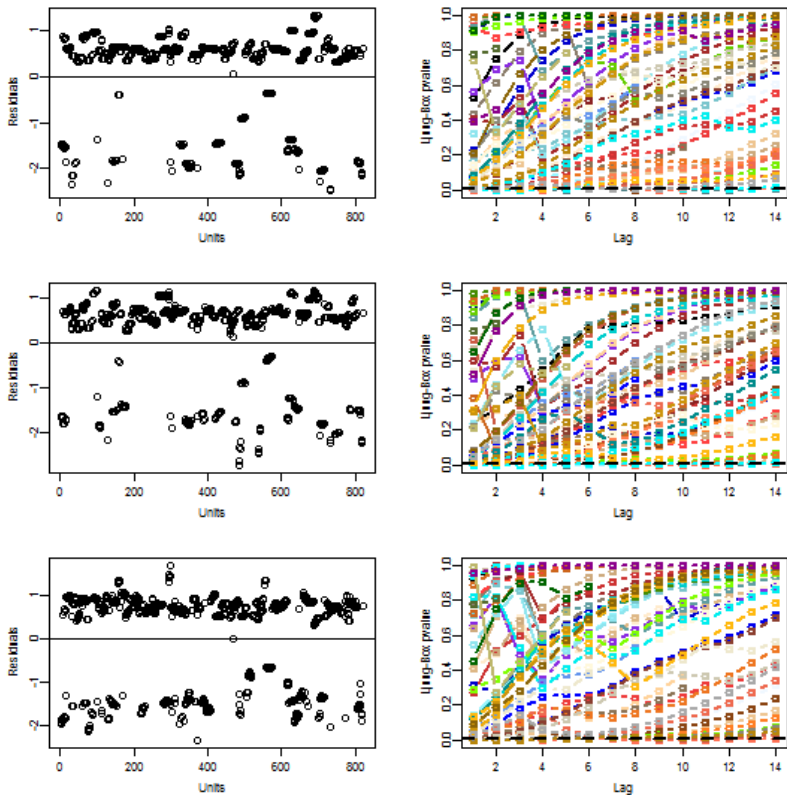
As for the dependent variable RECONCILIATION, our results show an unexpected behaviour by firms disclosing NGFMs. Surprisingly, the driver REGULATION, which positively affects the presence of section and motivation, plays a reverse role on reconciliation. Our hypothesis about the positive pressure of a regulation in raising the transparency of NGFMs is not fully confirmed. This supports the idea that, when a specific regulation on NGFMs exists, companies increase the "formal transparency" granted by a specific space within the financial report and present a generic motivation for NGFM disclosure, but they do not increase the "substantial transparency" provided by detailed numeric information about the adjustments. As regards accounting standards, LOCGAAP again shows a positive relationship with transparency. Firm-specific financial factors and country-specific cultural values are in some cases statistically significant but less important. Indeed, the estimated coefficients are considerably lower than those for REGULATION and LOCGAAP. Particularly, as the company size increases, the probability of providing reconciliation decreases. Also MTB negatively affects RECONCILIATION, showing that the companies most appreciated by the markets appear to have fewer incentives to explain the process leading to their NGFMs.

The cultural variables, IDV and UAI, are positively associated with RECONCILIATION, partially confirming Gray's (1988) framework. Even though these cultural variables are statistically significant, they have a less prominent role in influencing this area of transparency because of their estimated coefficients.

Considering a joint reading of the results coming from MOD3.1, MOD3.2, and MOD3.3, our findings show that the driver which is strongly able to influence the level of transparency is the presence of a specific regulation on NGFM disclosure. However, our results suggest that in an NGFM-regulated market companies provide a sort of formal transparency related to NGFMs instead of a substantial one, which supports the opportunistic position of NGFM disclosure. These results are consistent with the literature (Baumker et al. 2014; Kolev et al., 2008; Nichols et al. 2005) claiming that the regulation on NGFMs is only partially capable of constraining the misuse of NGFMs.

As for the residuals analysis, a casual inspection suggests the lack of patterns and influential outliers in the scatter plot (see Fig. 5, left panel). Moreover, the Ljung-Box test computed for each time series at lag from 1 to 14 (or up to the maximum available value of t for each company) leads to conclude that the residuals of the companies are, in general, not autocorrelated (see Fig. 5, right panel).

Figure 5. Residuals analysis of the model in Eq. (3) with dependent variable SECTION (upper panel), MOTIVATION (middle panel) or RECONCILIATION (lower panel). Left: Scatter plot of residuals of the estimated model. Right: Plot of the p -values of the Ljung-Box test at lag=1, 2, ..., T , where T is the available maximum number of observed instant time, of the residuals (time series for each company) of the estimated model. The dashed black line corresponds to p -value=0.05.



7. Conclusions, limitations and future developments

The objective of this study was to understand whether and how company-specific financial factors and country-specific institutional and cultural factors affect the adoption and use of NGFMs. More in detail, we focused on disclosure (the decision to include NGFMs in the financial reports and the number of NGFMs presented), magnitude of adjustments (materiality and conservatism) and transparency (specific section, motivation, numeric reconciliation) of the adjustment process.

Contrary to the majority of the studies in this field, which assume or affirm that managers have a single specific aim (either informative or opportunistic) in disclosing NFGMs, we think that the two different theories can coexist. Some companies disclose NGFMs with the opportunistic aim of presenting higher financial performances to mislead the less expert investors (Bhattacharya et al. 2003a; Bradshaw and Sloan 2002), while others use NGFMs to provide shareholders and stakeholders with higher quality information able to support them in forecasting future cash flows, earnings and in evaluating the company (Chen 2010; Doyle et al. 2013; Jennings and Marques 2011; Marques 2010). The purpose of our analysis was to investigate the drivers behind NGFM use in order to understand the determinants of the opportunistic/informative role of NGFMs and to investigate the function of the institutional and cultural environment in favouring or discouraging the opportunistic use of NGFMs which causes concern for regulatory bodies all over the world, as previous research attempted to do (Lougee and Marquardt 2004; Choi and Young 2015).

On one side we obtained relevant evidence of an informative use of NGFMs. First of all, among the descriptive statistics we highlight how the majority (56%) of adjustments reduce net incomes. Secondly, the most relevant factors influencing the use of NGFMs are: a) the level of financial debt, which also drives conservatism, thus reducing opportunism; b) the specific set of accounting standards, witnessing a sort of persistence of accounting culture even when the accounting standard have changed; and c) the presence of a specific regulation on the use of NGFMs, which again should reduce rather than increase opportunism. This last point raises a very interesting issue: the introduction of the regulation, contrary to part of the literature (Entwistle et al. 2006b; Marques 2006; Nichols et al. 2005) increases and does not reduce the adoption of NGFMs. This result can be interpreted as a sort of “risk reduction” for companies that want to discover more reliable results, but are afraid of leaving the strongly regulated and law-compliant GAAP values. This interpretation is partially confirmed by the fact that uncertainty avoidance negatively impacts on the disclosure of NGFMs (even with a very small estimate that will be commented on later) as well as the anti-director index. We can assume that in institutional environments with strict rules protecting the minority shareholders and cultural contexts characterized by high uncertainty avoidance, managers and CFOs can be doubtful about the opportunity to disclose non-regulated parameters different from the GAAP ones. Not necessarily because they have opportunistic aims, but because they could think that the external environment can perceive them as opportunistic. The introduction of an explicit regulation clarifying the required and admitted behaviours reduces these barriers and leads some of the companies to introduce or enlarge the adoption of NGFMs.

On the other hand, supporting the opportunistic theory, the descriptive evidence shows that the median value

of the 194 positive adjustments is 42% of the net profit, while the median value of the 231 non positive adjustments is only 21%. The positive adjustments are less numerous (p -value <0.001 , t -Student test), but much higher in size (p -value <0.001 , Mann-Whitney test). Fiechter (2013) highlights the difficulty of measuring opportunistic behaviours and suggests considering as opportunistic “a firm (that) reports a non-GAAP measure exceeding the GAAP measure in the title of the press release without providing any reconciliation.” (p. 322). We obtained evidence of these kinds of behaviour where companies increase the performance for strategic reasons and provide scant information about adjustments. First of all we show that low profitability leads to positive adjustments (thus reducing conservatism). Considering that the relevance of “extraordinary events” which generate the need for adjustments should be completely random, the link with profitability is a clear signal of an opportunistic behaviour. Secondly, the analysis of transparency shows that companies react to regulation and to environments characterized by high anti-director laws by increasing the presence of a specific section and a general motivation for adjustments (which we termed “formal transparency”), rather than by increasing (or even reducing) the “substantial transparency” granted by the numeric reconciliation required according to Fiechter. On the whole, we see that company-specific financial factors and partially country-specific institutional factors (particularly regulation, accounting standards and anti-director laws) play a relevant role in determining the use of NGFMs. We cannot say the same for the cultural factors. This study is the first one to analyse the role of cultural factors on NGFM use, and its results are clear enough. Once controlled by financial and institutional factors, cultural dimensions play a very limited role, if any. Most of the cultural factors do not have any statistical significant impact on the dimensions analysed, particularly on materiality and conservatism, where none of them is statistically relevant. The other dimensions investigated also play a role, sometimes consistent with Gray’s (1988) hypotheses (see for instance the impact of uncertainty avoidance, long term orientation and indulgence on the disclosure of NGFMs), but always with estimates much lower than the ones for financial and institutional factors. These results are consistent with Jaggi and Low (2000) and Hope (2003), showing a prevalent role of the legal system and institutional factors over cultural dimensions. It is worth noting at this point, that a limitation of this study is that our sample cannot be considered representative of “average” companies. The 120 companies listed in Standard & Poor’s Oil and Gas are multinational firms (with oilfields in different countries and continents) and very large-sized companies (more than 10 billion dollars of average turnover in the last available quarter). The literature has already signalled that the role of cultural factors decreases as companies become more international (Zarzeski 1996); therefore our results can be considered valid only in the specific context analysed and cannot be fully generalized. This study also provides interesting practical insights for regulators. First of all, many regulators have always had a negative opinion of NGFMs (ESMA, 2014; SEC, 2003), considered only as potential tools for misleading less expert investors. Our analysis shows that, even if this kind of opportunistic behaviours exist, a relevant part of NGFM disclosure represents an opportunity to provide more reliable and useful information to the market. Accordingly, the regulators should not dissuade companies from adopting these tools in any case, but to regulate them in order to promote virtuous behaviours and to discourage opportunistic ones. Secondly, the link between profitability and opportunistic behaviours suggests that the risk of opportunistic behaviours is

higher for low-profit companies and that the attention on this issue must be increased in times of low profitability as in the recent economic crisis. Thirdly, the conflicting results about the respect of “formal” and “substantial” transparency should lead to a detailed analysis of the specific ways adopted by companies to communicate their adjustment process.

Finally, we think that different avenues for further research on this issue can be explored. First of all, the role of cultural factors can be analysed with a set of companies of different size and level of international diffusion in order to understand whether the results of the present study can be generalized also for less internationalized companies. Secondly, the assumed phenomenon of companies which do not disclose NGFMs to avoid the risk of being considered “outlaws” in strong institutional contexts should be better investigated, not only through quantitative analysis (representing over 90% of the studies on this topic), but also with case studies evaluating the organizational factors leading to the decision to disclose NGFMs. Thirdly, the role of the regulation in different countries could be more thoroughly investigated by considering the different levels of enforcement (from simple recommendations to rules with the strength of laws). Finally, the interactions between institutional and cultural factors in determining opportunistic or informative behaviours could be analysed more in depth with a view to understanding the internal dependency relationships between these two dimensions.

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