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The Impact of Institutional and Cultural Factors on the use of Non-GAAP Financial Measures.

International evidence from the Oil and Gas industry

Abstract: While the main aim of Non-GAAP Financial Measures (NGFMs) is to increase the comparability of the performance, many studies highlight an opportunistic use aimed at distorting investors' decisions. A recent stream of literature suggests that the conditions in which the company operates affect how NGFMs are used. Many studies focus on the impact of company-specific factors, while the role played by the institutional and cultural context remains scarcely investigated. This research analyses how institutional and cultural factors affect the propensity to disclose NGFMs, and both the materiality and the transparency of adjustments. The analysis is based on 1,731 quarterly press releases of 120 firms from the Oil and Gas industry. The results show that the propensity to use NGFMs is reduced by a strong institutional system, while increased by the presence of a regulation on NGFMs' disclosure and the adoption of IFRS accounting standards. A strong legal system also reduces the materiality of the adjustments. The presence of regulation increases the formal transparency, but not the substantial one. Cultural factors, such as uncertainty avoidance and long-term orientation, reduce the propensity to disclose NGFMs and positively increase transparency. However, compared to institutional values, cultural factors play a less relevant role.

Keywords: Non-GAAP Financial measures, Adjusted financial measures, Institutions, Culture.

1. Introduction

Non-GAAP Financial Measures (henceforth NGFMs) are financial measures that do not immediately derive from the application of accounting standards. They are the result of adjustments aimed at excluding the effects of non-recurring events, thus disclosing information about the normalized performance of the company.

Disclosure of NGFMs in corporate financial communications is increasingly relevant, not only in the US (Webber et al., 2013), but also in Europe (Aubert & Grudnitski, 2014). Consequently, academic research and regulatory bodies (SEC 2010, 2016; ESMA, 2014; IOSCO, 2014), are paying increasing attention to this topic. Furthermore, the phenomenon deserves attention because of the demonstrated impact of NGFMs on the decisions of less experienced investors (Black et al., 2012).

Two different theories have been developed for explaining the rationale of NGFMs' use. On one hand the "informative" theory suggests that companies correctly use NGFMs for removing the effects of special items, i.e. events with non-repeatable effects. The final aim is to provide their stakeholders with more reliable information on the expected future performance (Bhattacharya et al., 2003a; Bradshaw & Sloan, 2002).

On the other hand, the "opportunistic/strategic" theory states that managers use NGFMs mainly for distorting the performance presented to the market. The target is to show higher profits, thus affecting the decisions of investors (Chen, 2010; Marques, 2010; Doyle et al., 2013).

In this debate, a meaningful contribution has been made by a stream of literature that follows a contingent approach. In this view, the informative or opportunistic use of NGFMs is driven by the contingent conditions

in which a company operates (Choi & Young, 2015). More in details, the accounting behavior is affected by company-specific and environmentally related conditions.

Many studies analyze company-specific circumstances affecting the propensity to disclose NGFMs, including financial results (Bhattacharya et al., 2004; Francis et al., 2005), manager stock-based compensation plans (Bansal et al., 2013), and corporate governance systems (Frankel et al., 2011).

Conversely, there is a lack of research concerning the institutional and cultural environment in which firms operate (Fiechter, 2013). This constitutes a significant constraint in light of the extensive literature demonstrating that institutional (Doupnik, 2008; Leuz et al., 2003) and cultural factors (Gray, 1988) affect accounting practices. The only study examining the role of institutional factors on NGFMs' practices (Isidro & Marques, 2015), focuses its attention on European companies, where the environment is at least partially homogeneous. Moreover, it does not consider the interplay between institutional factors, regulation, and cultural environment at all.

Our research attempts to bridge this gap in the literature by analyzing whether, and how, country-related institutional and cultural factors affect the use of NGFMs, starting from a neutral perspective. The aim is not to contribute to either the "informative" theory or the "opportunistic" one, but to provide a deeper knowledge of the factors affecting the use of the NGFMs. More specifically, we focus on three main aspects: the propensity to disclosing NGFMs, the materiality of the adjustments and the transparency in NGFMs disclosure.

We hand-collected data from the quarterly press releases of 120 firms located in 23 countries, listed in Standard & Poor's Global Oil Index between 2008 and 2012. Overall 1,731 documents were analyzed through logistic and pooled panel regression models.

The findings support the idea that institutional and cultural environments affect the use of NGFMs. In more details, the presence of a strong institutional environment with developed financial markets, high-quality legal systems and minority shareholder protection reduces the propensity to disclose NGFMs. A strong legal system also reduces the materiality of the adjustments.

Conversely, the presence of a regulation on NGMFs increases the propensity to disclose NGFMs, the materiality of adjustments, and formal transparency, while reducing substantial transparency. Also, the presence of IFRS accounting standards increases the disclosure of NGFMs.

Cultural values play an interesting role: NGFMs disclosure decreases in countries where uncertainty avoidance and long-term orientation is high and/or individualism is low. However, the role of cultural factors in affecting the use of NGFMs is lower than the effect of institutional factors.

One possible interpretation of the results is that companies are afraid to be perceived as opportunistic when using NGFMs and operating in strong institutional systems with high uncertainty avoidance and long-term orientation. The presence of regulations reduces uncertainty and provides legitimization for the use of NGFMs. This leads to a higher level of adoption, even if does not increase the substantial transparency.

Our study contributes to the contingent view regarding the use of NGFMs by enriching the knowledge on the effect of country-specific factors. To our knowledge, this is the first analysis examining NGFMs disclosure worldwide and jointly to evaluate the effect of institutional and cultural factors.

Moreover, in terms of the practical implications of this study, we provide insights into the role and effect of NGFMs regulation in different institutional and cultural contexts. This evidence could be useful for stock market authorities involved in the issuance of new guidelines (ESMA, 2014; IOSCO, 2014; SEC, 2016).

The paper is organized as follows. In the second section we present the theoretical background of the research and we develop the research questions. The third section describes the methodology and the variables. The sample selection and data collection are described in section four. Section five provides some descriptive evidence derived from the data, while section six presents and discusses the main findings. The last section draws conclusions and implications.

2. Background and research questions

2.1 NGFMs: Prior studies, main research streams and gaps

From the start of the 21st Century, listed companies have included NGFMs data in their financial reports. A NGFM is a financial performance measure not directly derivable from audited financial statements and comes from unconventional calculation methods.

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 has focused on market reactions to NGFMs disclosure (Bhattacharya et al., 2003a; Johnson & Schwartz, 2005), most of the research has analyzed the motivations underlying the choice of disclosing NGFMs. On this point, international literature shows distinct and contradictory theories in order to justify NGFM disclosure.

According to the “informative reporting/disclosure” theory, NGFM disclosure is related to the greater accountability offered by managers, in order to provide 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-off /anomalous, transitory items. Many studies (Bhattacharya et al., 2003a; Bradshaw & Sloan, 2002) support this line of thought, claiming that NGFMs have significant explanatory power for returns compared to GAAP financial measures. For instance, Lougee and Marquardt (2004) show that when GAAP earnings informativeness is low, firms are more likely to disclose NGFMs. As well as the fact that investors find NGFMs to be more useful.

On the other hand, according to the “opportunistic reporting” theory, NGFMs disclosure is related to strategic reasons. This theory considers the use of NGFMs as a way of manipulating financial results to mislead investors, and thus to help managers reap the benefits. This approach is prevalent in the literature (Chen, 2010; Marques, 2010; Doyle et al., 2013; Jennings & Marques, 2011) and is shared by international regulators, who usually express a critical opinion towards the inclusion of NGFMs in corporate financial reporting. In line with this second theory, Doyle et al. (2003) observe that excluding special items from performance measures leads to major and abnormal positive returns. Coherently, an experiment conducted by Fredrickson and Miller (2004) shows that NGFMs cause less sophisticated investors to perceive earnings announcement as more profitable, which in turn leads to higher stock prices. Allee et al. (2007), using archival data, support the same conclusion.

Approaching the issue of the informative/opportunistic aim of the NGFM's disclosure, a growing stream of literature follows a contingent approach. Starting from the assumption that some companies disclose NGFMs for opportunistic reasons and others to provide their stakeholders with better information, it aims to understand which factors lead to different behaviors.

The issue is not understanding whether the adjustments leading to NGFMs are opportunistic or not, but to understand which factors drive the behavior of the company. For instance, 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 earnings surprises are negative (in line with the opportunistic view). 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).

Similarly, Choi and Young (2015) try to find the specific circumstances that lead to an informative or strategic disclosure of NGFMs. Based on research examining 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 benchmarks, thus supporting the informative theory. At the opposite extreme, the link between NGFMs' disclosure and transitory items is much weaker when GAAP earnings surprises are negative, consistent with the strategic theory. The final result is that managers disclose NGFMs opportunistically when the incentives to report higher earnings are strong.

According to this stream of studies, the phenomenon is contingent on the specific conditions under which NGFMs are developed. Consequently, the research should focus on how the companies use NGFMs and the environment in which they operate (Fiechter, 2013). Several gaps in the literature remain, which must be further explored in order to better understand this contingent view of NGFMs' use.

First of all, past studies mainly focus on single markets, mostly on the U.S. (Battacharya et al., 2004; Entwistle et al., 2006a; Black et al., 2012). Very few studies compare the use of NGFMs at an international level, therefore it is impossible to evaluate the role played by country-related factors on the use of the NGFMs.

Second, while many researches analyze the impact of company-specific financial variables in affecting the use of NGFMs (Durnev & Kim, 2005; Dainelli et al., 2013; Karim, 2013), a very limited number of studies have been conducted on the role played by the institutional and cultural environment. 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) in affecting accounting behaviors.

Third, as for the specific object of the analysis, most of the studies focus their attention on the unobservable concept of opportunism and develop proxies for detecting it. These proxies are more or less sophisticated and can be easily criticized, thus indicating questionable results from the studies. For instance, Epping and Wilder (2011) consider adjustments with a positive effect on profitability as opportunistic. Many other researchers require that those adjustments must be able to transform a GAAP loss into non-GAAP profit, or to reach the benchmarks set by the financial analysts (Black & Christensen, 2009; Heflin & Hsu, 2008;

Isidro & Marques, 2015). These kinds of proxies are questionable, because an informative adjustment could also be positive and able to reach the expected profit, while on the other hand an opportunistic adjustment could just be aimed at breaking even.

A second stream of research does not focus on the size and sign of the adjustments, but on their object and presentation. For instance, several studies define all the adjustments on “recurring” events as opportunistic, while others select those companies that present NGFMs in the first lines of the press release, without any clear reconciliation with the related GAAP value (Fiechter, 2013).

On this point, both the practitioners (ENI, 2013), and the regulators¹ have clearly stated that adjustments on recurring events are acceptable, when the values related to the adjusted items are not representative of the ordinary course of the business. Conversely, opportunistic NGFMs could be presented out of the first lines of the press release, together with a tabular reconciliation. As a consequence, even if they are theoretically meaningful, these kinds of proxies should also be questioned.

Our study aims to bridge these gaps of the literature by analyzing how country-specific institutional and cultural variables affect objective and relevant dimensions related to NGFMs’ disclosure all over the world, without strong assumptions about what could be considered as opportunistic or not.

Paragraphs 2.2 and 2.3 analyze the potential role in affecting the use of the NGFMs played by institutional and cultural factors respectively, while section 2.4 explains the specific dimensions of the NGFM phenomenon analyzed in the study and develops the research questions.

2.2 The role played by the institutional environment

We considered as country-specific institutional factors the regulation on NGFMs issued by the stock market regulatory bodies; the set of accounting standards that the companies have to comply with; the development of the stock market; the quality of the legal system and the attitude towards investor protection.

2.2.1 The regulation on NGFMs

On an international level, concerns about the role of non-GAAP disclosure in misleading investors led to both the stock market regulatory bodies and the standards setters paying closer attention to this issue. As a result, the practice of disclosing NGFMs as part of corporate financial communication has undergone specific regulatory actions in many jurisdictions, with the aim of protecting investors.

The SEC, through Regulation G, issued the first provision in 2003, which was then implemented by many countries. Its purpose was to increase transparency in NGFMs reporting, through reconciliation between any

¹ The SEC, in the “Questions and answers” section clearly states that “The fact that a registrant cannot describe a charge or gain as non-recurring, infrequent or unusual, however, does not mean that the registrant cannot adjust for that charge or gain” (SEC 2018).

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 & Hsu, 2008; Jennings & Marques, 2011; Kolev et al., 2008; Marques, 2006; Nichols et al., 2005; Zhang & Zheng, 2011) have addressed the effects of the introduction of Regulation G on the use of NGFMs.

They demonstrate that, after the intervention of the 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 NGFMs disclosure has been steadily declining after the SEC intervention. In the same way, Kolev et al. (2008) and Heflin and Hsu (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 the frequency, magnitude and prominence of the NGFMs reported. As for the transparency issue, Zhang and Zheng (2011) observe that the reconciliation provision imposed by Regulation G reduces the extent of mispricing, while Black et al. (2012) show that the SEC regulation has increased the quality of adjusted earnings disclosure.

On the other hand, several studies report how the effect of regulations in mitigating opportunism reduces over time (Baumker et al., 2014), as soon as managers learn new ways of manipulating adjusted values (Black et al., 2017).

A second aspect to focus on is the role of regulations in different countries and regions. Whilst regulations and recommendations on the use of the NGFMs have been developed in several countries (see Table 1), there is a lack of international studies on the topic. There has only been a limited amount of research, focused either on individual EU countries (Aubert, 2010; Hitz, 2010), or on the EU area as a whole (Aubert & Grudnitski, 2014; Isidro & Marques, 2013; 2015), which have taken the CESR 05/178B recommendation issued in 2005 into consideration as a turning point.

One of the aims of the present research is precisely to provide an international study involving different countries from all the continents.

[Insert Table 1 about here]

2.2.2 The accounting standards

To date it is possible to observe an important global 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) in order 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). Accounting information produced under IFRS requirements should be of better quality than that obtained using local accounting standards (Aubert & Grudnitski, 2012; Byard et al., 2011; Horton et al., 2013; Chen et al., 2010).

However, the research provides mixed results on this point (Ahmed et al., 2013; Aubert & Grudnitski, 2011). For instance, 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. They, indeed, 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 necessarily 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 NGFMs, since GAAP information should already be value relevant.

At the same time, however, IFRS, by introducing greater complexity in measuring accounting numbers, 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 behavior in order to verify previous conflicting findings.

2.2.3 Other Institutional Factors

The role of institutional factors has been deeply analyzed in the economic literature (Djankov et al., 2008; Kaufmann et al., 2010; La Porta et al., 2006) as well as in the accounting and financial literature (Bhattacharya et al., 2003b; Douppnik, 2008; Gaio, 2010; Gaio & Raposo, 2011).

Several researches have focused on the role played by the origin (common law/civil law) and quality of the legal system in affecting the accounting behaviors. For instance, Ball et al. (2000) show the link between the origin and the strength of the legal system and the accounting timeliness and conservatism. Jaggi and Low (2000) and Hope (2003) show that legal origin has a prevalent role over cultural factors in determining the level of disclosure. 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. Furthermore, many studies analyze the positive impact of law enforcement on the value relevance of accounting information (Coffee, 2007; Hitz et al., 2012; Mahoney, 2009).

Conversely, many studies reveal that accounting disclosure is more relevant in countries with weak legal systems, because in that kind of environment the investors demand more detailed and precise information to reduce the risk of being deprived of part of their wealth (Durnev & 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. 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.

A second institutional factor widely analyzed in the accounting literature is the level of protection for minority shareholders (the so-called anti-director laws). Houque et al. (2012) find that earnings quality increases for mandatory IFRS adoption in countries with higher investor protection. Similarly, Leuz et al. (2003) find earning management practices decrease in a context with high investor protection.

Based on the numerous evidences of impact of the institutional environment on the accounting behaviors, 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. So far, this has been the only research conducted on the impact of institutional factors on the adoption and use of NGFMs, even though it focused only on European companies, where the institutional environment can be considered relatively homogeneous when compared with the U.S. or countries of other continents.

Contrarily to Isidro and Marques (2015), a study conducted by Aubert and Grudnitski (2014) involved some institutional factors (legal origin, investor protection, market development) as control variables and found no statistical significance in their regard.

2.3 The Cultural Context and the interplay with the Institutional Context

The idea that culture affects accounting practices dates back to the 1960's when it was analyzed as an obstacle to the international harmonization of accounting standards (Bedford, 1966; Mueller, 1968).

The earliest research on this topic analyzed different aspects of the relationship between culture and accounting (Chanchani & McGregor 1999): the role of accounting as an uncertainty absorbing process (March & Olsen, 1976), the language and the symbolic role of accounting (Violet, 1983), the factors affecting the accounting system considered as a social system (Harrison & McKinnon, 1986), and the behavioral factors affecting differences in accounting among different countries (Schreuder, 1987).

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, and individualism.

Further studies conducted by Hofstede and Bond (1988) and Hofstede et al. (2010) added two more societal values to the initial framework: long term orientation and indulgence (see Table 2 for a detailed

description of each of the societal values)². Consequently, Baydoun and Willet (1995) updated Gray's framework including long term orientation, while Borker (2012) added indulgence as well.

[Insert Table 2 about here]

The contribution of Gray's model can be seen in the link between societal values and the Accounting Values of Professionalism, Uniformity, Conservatism, and Secrecy derived from the literature on accounting (see Table 3). These Accounting Values 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).

[Insert Table 3 about here]

In the following development of the model (Radebaugh & 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.

Gray's framework, and the following integrations for the fifth and sixth cultural dimensions (Baydoun and Willet, 1995; Borker, 2012), assume the following impacts by cultural values on accounting values (see Table 4):

- 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, while it is negatively affected by individualism, masculinity and indulgence.

² 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 developed together with Chinese professors. That dimension, based on Confucian thinking, was called Long Term Orientation (LTO) and was applied to 23 countries (Hofstede & 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 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, was obtained from Geert Hofstede's website (<http://geert-hofstede.com/national-culture.html>, consulted 25th October 2015).

[Insert Table 4 about here]

The original framework by Gray and its following refinements (Baydoun & Willet, 1995; Perera 1989) have been tested by many research papers (Doupnik & Tsakumis 2004). Some of them evaluated all the expected influences of societal values on accounting values (Salter & Niswander, 1995; Sudarwan & Fogarty, 1996), some others focus their attention only on the impact of societal values on secrecy (Orij, 2010; Wingate, 1997).

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. Furthermore, most of the tests suffer from a relevant issue concerning the way the different accounting values are measured (Doupnik & 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 works jointly considering the role of culture and institutions in determining accounting behavior.

In international business studies, it is indeed well known how culture and institutions interact and are intrinsically linked (Alesina & Giuliano, 2015; Beugelsdijk et al., 2017). In this stream of literature Zarzeski (1996), analyzing 256 companies in seven different countries, found that the impact of cultural factors increases in less internationally orientated companies. 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. Jaggi and Low (2000), evaluating 401 companies in six countries found that the impact of cultural elements is negligible in common-law countries, while it has some impact in code-law countries.

Contrarily, Kanagaretnam et al. (2011), in their research on banks from 39 different countries, found that cultural values, once controlled for institutional factors such as creditor rights, the level of bank controls and investor protection, affect earnings quality practices in the bank industry. Analogously, the analysis by Doupnik (2008) shows that uncertainty avoidance and individualism affect earnings quality, even after controlling for the mitigating effect of investor protection and other institutional factors. Research by Han et al. (2010) finds that uncertainty avoidance and individualism affect managers' earnings discretion, but with different levels of intensity, depending on investor protection within each country. Similarly, Salter et al. (2013) found 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.

Overall, when including institutional variables in the analysis, the impact of cultural factors appears less relevant in explaining the development of accounting values and behaviors (Heidhues & Patel, 2011). These results support the idea of jointly analyzing institutional and cultural factors, in order to understand the relative role of the two kinds of variables. Even though the impact of culture on accounting practices has been analyzed

in depth, so far we do not have any evidence of how cultural differences affect the adoption, magnitude and transparency of NGFMs. This is one of the main aims of the current research.

2.4 The dimensions of the NGFM phenomenon analyzed and the research questions

In order to analyze the NGFMs phenomenon we chose three main aspects: i) the decision to include at least one NGFM in the press release (the disclosure of the NGFMs), ii) the magnitude of the adjustments (the materiality of the NGFMs) and iii) the information provided about the causes of the adjustments (the transparency of the NGFMs). Several reasons led to the selection of these three dimensions.

First of all, we have already explained in the introduction the choice to select only objectively measurable dimensions. While previous research has often been focused on the unobservable and often subjectively measured concept of opportunism, our study is based on three neutrally quantifiable dimensions.

Secondly, the three aspects represent fundamental dimensions of the NGFMs phenomenon, and have been widely analyzed by previous studies.

The decision to include at least one NGFM in the press release is not casually the first dimension analyzed, because it defines the boundaries of the phenomenon, separating the companies that use the NGFMs from the ones that don't. Consequently, this dimension provides central information about the diffusion of the phenomenon and its dynamics over the time period covered by the research.

Several studies focus their attention on the company-related variables affecting the decision to include the NGFMs in the financial information presented to the analysts and investors. Some researches show a higher propensity for disclosure when profitability and financial results are satisfactory (Haniffa & Cooke, 2002; Lim et al., 2007), with the aim to overcome the adverse selection mechanism, and to favorably distinguish themselves from less well-performing competitors (Dye, 1985; Miller, 2002; Verrecchia, 1983; Welker, 1995; Dainelli et al., 2013).

On the other hand, Bhattacharya et al. (2004) provide evidence that firms reporting NGFMs have consistently lower profitability indicators and higher leverage and book-to-market ratios. Similarly, Francis et al. (2005) found that firms in industries with greater external financing needs have higher voluntary disclosure levels, and consistently, Lougee and Marquardt (2004) show that highly indebted firms are more prone to disclosing adjusted financial indicators in their corporate communications.

Furthermore, several studies show a positive correlation between a company's size and its level of disclosure, motivated by a total cost of disclosure affected by economies of scale (Freeman, 1987; Lang and Lundholm, 1993). According to prior studies (Kasznik & Lev, 1995; Skinner, 1994) larger firms are more likely to communicate additional non-mandatory information in order to minimize litigation risks. More recent studies confirm the positive relationship between size and voluntary disclosure (Karim et al., 2013) and specifically NGFMs (Choi & Young, 2015).

As it's easy to see from this short review, all of the studies focus their attention on company-specific factors, such as profitability, debt levels or company size. Nothing is said about the role played by the institutional and cultural environment on the choice to disclose NGFMs, with the exception of research

regarding the role of regulations (mainly Reg G. in the U.S.) in reducing the use of the NGFMs (Black et al., 2012; Heflin & Hsu 2008; Jennings & Marques, 2011).

The materiality of the adjustments, the second dimension analyzed, reveals the impact of the phenomenon on the information provided to the analysts and shareholders. Adjustments with limited materiality have negligible impacts on the decisions of the investors, because they are not able to affect the overall view of future profits and cash flows. Consequently, the materiality of the adjustments limits the threshold between what is trivial and what is relevant. Indeed, according to the accounting standards, a fact is material when its omission or false representation can affect the decision of investors (Adams et al., 1999; Heitzman et al., 2010; Lo, 2010).

The materiality of the adjustments has been analyzed mainly as a proxy of opportunism. For instance, several researches classify NGFMs exceeding GAAP earnings as opportunistic (Entwistle et al., 2006b; Epping & Wilder, 2011). Other studies classify the adjustments as opportunistic only when they are material enough to avoid a loss (Black & Christensen, 2009) or to reach the benchmark set by the financial analysts (Heflin & Hsu, 2008; Jennings & Marques, 2011).

Finally, also the transparency in providing information is a crucial aspect of NGFMs' disclosure, because without information the investors cannot assess the correctness and opportunity of the adjustment itself. This is the reason why the transparency of the adjustment process is one of the main targets of regulators all around the world. Most of the regulations and recommendations are essentially aimed at increasing the information provided to the investors, not at outlining acceptable and non-acceptable behaviors.

If we examine the research on the transparency of the adjustments, several studies have focused on the impact of regulation (mainly Reg G. in the U.S.) on transparency, showing a generally positive effect (Jennings & Marques, 2011; Kolev et al., 2008; Nichols et al., 2005). Kolev et al. (2008) point out that the SEC intervention prevented firms from releasing NGFMs with lower quality adjustments. Zhang and Zheng (2011) observe that the reconciliation provision imposed by Regulation G reduces the extent of mis-pricing. Elliot (2006) carried out an experiment to show that the quantitative reconciliation between GAAP and NGFMs leads analysts to consider NGFMs as more reliable. Consequently, a lack of transparency has been considered as a good proxy for detecting opportunistic behaviors (Hitz, 2010).

Despite the relevance posed on the transparency of the disclosure by regulators and researchers, we have no examples of studies focusing their attention on what drives transparency, and particularly on the role played by the institutional and cultural environment.

Starting from the literature review here conducted, we can finally derive the three research questions (henceforth RQs) analyzed by the study:

RQ1: Does the institutional and cultural context affect the decision to disclose NGFMs?

RQ2: Does the institutional and cultural context affect the materiality of the adjustments?

RQ3: Does the institutional and cultural context affect the transparency of the adjustments?

3. Research design and variables measurement

In Table 5 all the dependent, independent and control variables are listed and briefly described.

[Insert Table 5 about here]

Section 3.1 presents how we measured the dependent variables of the three research questions and how we defined the statistical models. In section 3.2 we show how the independent and control variables have been measured.

3.1. Dependent variables

3.1.1 Research Question 1 (RQ1): NGFMs Disclosure

The first research question (RQ1) aims to understand the extent to which institutional and cultural factors affect the propensity to include NGFMs in press releases. The dependent variable PRESENCE is a dummy variable Y equal to 1 if at least one NGFM is included in the report, 0 otherwise.

The model is the following:

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

where $\text{logit}(Y_{it})$ is the logit of Y observed at time t for firm i . The $\text{logit}(Y_{it})$ is the logarithm of the odds $P(Y_{it} = 1)/P(Y_{it} = 0)$ where $P(Y_{it})$ is the probability that at time t firm i has at least one NGFM in the press release (PRESENCE=1). The estimation method uses the maximum likelihood technique that maximizes the binomial likelihood function (Baltagi, 1995; Wooldridge, 2002).

3.1.2 Research Question 2 (RQ2): The Materiality of Adjustments

In accordance with previous studies on NGFMs (Webber et al., 2013), we measure materiality through the Gray Index (Gray, 1980), calculated as follows:

$$\text{MATERIALITY} = 1 - \frac{\text{NetIncomeGAAP} - \text{NetIncomeadjusted}}{|\text{NetIncomeGAAP}|}$$

If there are no adjustments, the index is equal to 1, and the more positive the adjustments, the higher the value of the index. On the other side, negative adjustments lead to an index value below 1. The value of the ratio can be extremely high when net profit is very low. To mitigate this problem, and in accordance with prior studies (Gray et al., 2009; Webber et al., 2013), we consider the values of the empirical distribution function.

For the purpose of RQ2, we focus on the subsample of firms with an adjusted net income. The statistical model analyzed here is as follows:

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

where Y_{it} is *MATERIALITY* observed at time t for firm i . The model is a pooled panel regression model (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 uses the ordinary least squares method that provides the best linear unbiased estimator when the two previous assumptions are satisfied.

3.1.3 Research Question 3 (RQ3): Transparency of Adjustments

As for RQ3, we measure transparency with two variables related to the presence of: a) an explicit statement disclosing the reasons why management considers NGFMs useful to investors (MOTIVATION); b) a numerical reconciliation between NGFMs and the most comparable GAAP financial measures (RECONCIL).

MOTIVATION is a dummy variable coded 1 if this explicit statement exists, 0 otherwise.

The second dependent variable (RECONCIL) concerns the most important information associated with transparency, which market regulators explicitly require. According to CESR (2005, Sect. 25) a firm “should explain the differences between both [GAAP and non-GAAP] measures; this might be through a reconciliation of figures to provide investors with enough information to fully understand the results [...]”. RECONC is a dummy variable coded 1 if a numeric reconciliation exists, 0 otherwise.

Both variables are required by most regulations on NGFMs, but reflect two different aspects of transparency. The paragraph on motivation is a generic disclaimer signaling the usefulness of adjusted indicators, but does not provide any information on specific adjustments, their causes, nor magnitude. Only a clear reconciliation of the values enables a reliable assessment of the adjustments.

Accordingly, we consider MOTIVATION as a proxy of “formal” transparency and RECONC as a proxy of “substantial” transparency. We treat both as dependent variables to evaluate the different effects of institutional and cultural variables on the different aspects of transparency. The model analyzed here is:

$$\text{logit}(Y_{it}) = \beta_0 + \beta_1 SIZE_{it} + \beta_2 PROF_{it} + \beta_3 DEBT_{it} + \beta_4 MTB_{it} + \beta_5 USGAAP_{it} + \beta_6 LOCGAAP_{it} \\ + \beta_7 REGULATION_{it} + \beta_8 MARKET_{it} + \beta_9 LEGAL_{it} + \beta_{10} ANTIDIR_{it} + \beta_{11} PDI_{it} + \beta_{12} IDV_{it} \\ + \beta_{13} MAS_{it} + \beta_{14} UAI_{it} + \beta_{15} LTO_{it} + \beta_{16} IND_{it} + \varepsilon_{it} \quad (3)$$

where Y_{it} is a dummy variable between MOTIVATION and RECONC observed at time t for firm i , which has a binomial probabilistic distribution, and $\text{logit}(Y_{it})$ indicates the logarithm of the odds $P(Y_{it} = 1)/P(Y_{it} = 0)$. Both are logistic regression models using the maximum estimation method.

3.2 Independent variables

As for the country-specific institutional variables, we consider the institutional aspects of the countries in which the firms are registered, including: development of the financial market (MARKET), quality of the legal system (LEGAL), level of legal protection for minority shareholders (ANTIDIR), specific accounting standards adopted (US GAAP, IFRS or local GAAP), and the presence of a specific regulation or recommendation on NGFMs disclosure (REGULATION).

We obtained figures for market development by starting from two variables from the World Bank's "World Development Indicators Database": total market capitalization of the listed firms and average total value of stocks traded as a percentage of GDP during the period 2008-2012. We ran a principal component analysis on the two variables and found that over 94% of the total variance is explained by the first component, which we consider as market development (MARKET)³.

A similar procedure was followed to define the quality of the legal system for each country (LEGAL). We started from the data relating to four different variables: "Regulatory Quality", "Voice and Accountability", "Rule of Law", and "Control of Corruption" from the Worldwide Governance Indicators (Kaufmann et al., 2010)⁴. The principal component analysis revealed a first component responsible for 92.7% of total variance⁵.

The level of protection for minority shareholders (ANTIDIR) is represented by Djankov et al.'s (2008) "anti-self-dealing index". The GAAPs adopted by firms were obtained from the OSIRIS database (Bureau van Dijk)⁶.

³ The selection of the first component is consistent with the Kaiser criterion (the eigenvalues are 1.880 for the first component and 0.119 for the second), and the scree plot, which plots variances against the number of principal components. The two variables contribute in the same way to the linear combination of the first principal component with a coefficient equal to 0.707.

⁴ Regulatory quality captures perceptions of the government's ability to formulate and implement sound policies and regulations that permit and promote private sector development. Voice and accountability captures perceptions of 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 free media. Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and particularly 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 of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the "capture" of the state by elites and private interests (source: World Bank website [www.worldbank.org](http://info.worldbank.org/governance/wgi/index.aspx#home)). The 2015 updated database is available at <http://info.worldbank.org/governance/wgi/index.aspx#home>. Data collected on 20 February 2015.

⁵ The selection of the first principal component is supported by the Kaiser criterion (the eigenvalues of the correlation data matrix are 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 are: -0.504, -0.473, -0.512 and -0.510 respectively.

⁶ The covariate of the accounting standards adopted is introduced through two dummy variables *LOC GAAP* and *US GAAP* to express the effect of the use of the local GAAP and US GAAP respectively on the dependent variable with respect to the effect of IFRS, which is the reference category.

REGULATION represents the existence of specific rules (at least as a recommendation) on NGFMs disclosure in the main stock exchanges where the firms are listed, which is a dummy variable coded 1, if such regulation exists, 0 otherwise.

As for the country-specific cultural variables, the variables representing the culture of each country in which the firms are registered were obtained from Hofstede's list: power distance (PDI), uncertainty avoidance (UAI), masculinity (MAS), individualism (IDV), long-term orientation (LTO), and indulgence (IND). The numeric value for each variable was derived from Hofstede's website.

Finally, to obtain a comprehensive model, we introduced the firm-specific financial measures included in prior NGFMs studies as control variables. Firm size (SIZE) is the natural logarithm of total assets. Profitability (PROF) is the ratio between net income and net sales. Leverage (DEBT) is the natural logarithm of the ratio between total liabilities and total assets. The market-to-book ratio (MTB) is the ratio between the market capitalization and the book value of equity. All financial data were extracted from OSIRIS (Bureau van Dijk)⁷.

4. Sample selection and data collection

The study includes all firms in the oil and gas (O&G) industry listed in Standard & Poor's Global Oil Index. We chose a specific industry as any given industry is subject to specific trends, regulations, accounting practices, economies of scale, and capital intensity (Misund et al., 2008). Consequently, industry-based research maximizes the comparability of management and accounting behaviors as well as their profitability trends (Fairfield et al., 2009).

We chose the O&G industry because NGFMs play a particularly important role in this industry. Earnings and stock prices in the O&G industry are strictly linked to the price of oil (Dayanandan & Donker, 2011) and hence characterized by high variability. Accordingly, O&G firms could use NGFMs to constrain earnings variance. In this context, GAAP earnings may not be the most value-relevant measures for information users.

The S&P Global Oil Index includes 120 companies registered in different countries and listed on various stock exchanges. This is a relevant difference compared to prior studies, since most analyze firms listed on the same stock exchange (i.e., NYSE) and are therefore subject to the same NGFMs disclosure rules.

This study analyses firms located in 23 different countries, with different institutional and cultural values and listed on 22 different stock exchanges with specific rules (or none) for NGFMs disclosure. The number of countries involved in the study significantly surpasses the minimum number (8-10) required for obtaining a significant analysis of the effect of culture on managerial behaviors (Franke & Richey, 2010).

We hand-collected information on NGFMs⁸ from press releases announcing financial results on a quarterly basis. The period analyzed begins with the full-year (and fourth quarter) of 2008 and ends with the

⁷ 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 converted these into US dollars using the exchange rate on 31 December 2012.

⁸ According to previous studies (Black & Christensen, 2009; Black et al., 2012), the so-called EB-metrics (Hitz, 2010) are not included within NGFMs, unless they are adjusted for some non-recurrent event. These metrics are communicated by the majority of companies, considered conventional benchmarks, and generally accepted by the business community.

half-year (and second quarter) of 2012. For each firm, we analyzed a panel of 15 documents with potentially 1,800 firm-quarter observations⁹. We collected all other firm-specific information from OSIRIS.

5. Descriptive evidence

Table 6 presents some evidence on the use and disclosure of NGFMs in the first quarter (Q4 2008), in the last quarter (Q2 2012) and the average values in the 15 quarters analyzed.

There is substantial dissimilarity in adoption levels in different geographical regions. Examining the data for the last available quarter, firms disclosing NGFMs range from 14.3% in South America, Oceania and Africa to 84.2% in Canada, while Europe and the US show intermediate values (46.9% and 56.3% respectively).

Considering the average values in the 15 quarters, over 80% of firms disclose NGFMs in Canada, just under 50% in the US and Europe and around 24% in the rest of the World.

Furthermore, the number of NGFMs included in each report is heterogeneous: 2.39 in Europe, just over 2 in the US and Canada, and 1.7 in the remaining countries. Of the total, around half the firms in the sample introduced NGFMs in their financial reports (47.4%), with an average 2.14 NGFMs per document.

The increasing trend in the use of NGFMs is evident. Comparing the values of the first and last quarter, the adoption rate has grown from 31.3% to 46.9% in Europe (+15.6%), from 29.5% to 56.3% in the US (+26.8%) and from 81.3% to 84.2% in Canada (+2.9%). Only the rest of the world registered a decrease from the initial 33.3% to 14.3% (-19%). In the overall sample, the adoption rate has risen from 38.2% to 50.8% in less than four years (+12.6%) while the number of NGFMs included in financial reports has changed significantly from 1.86 to 2.34 (+0.48).

Also, of interest is the percentage of positive adjustments to net income, with substantial variations from year to year in all geographic areas. Noteworthy is that on average in the 15 quarters, positive adjustments on net income account for less than 50% of the total (46.3%) and increase from 35.7% in the first quarter to 52.6% in the last quarter. A further 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 in the US (56.4%).

As for transparency practices, motivation for adjustments is more common in Canada (90.7%) than in the US (78.5%), Europe (67.9%) and remaining countries (50.2%). This trend is substantially replicated by the numeric reconciliation between the NGFMs and the closest GAAP values: 80.6% in Canada, 72.5% in the US, 69.8% in Europe and 37.2% in the remaining countries.

In terms of the trend in the overall sample, a general upsurge in transparency is evident: motivation for adjustments increases from 71.4% in the first quarter to 80.3% in the last quarter, while numeric reconciliation increases from 61.9% to 72.1%.

Globally, these values would seem to indicate the increasing relevance of the phenomenon (higher adoption rates, higher number of NGFMs disclosed, higher transparency) and a different approach to NGFMs

⁹ Only 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 were analyzed.

in different geographic areas. This descriptive evidence corroborates our interest in understanding whether and how the institutional and cultural context affects the use of NGFMs.

[Insert Table 6 about here]

6. Results and discussion

We analyzed the three research questions using logistic and pooled panel regression models. To obtain the estimated models with good statistical properties, multicollinearity was evaluated through the variance inflation factor (VIF). Hence, we analyzed each estimated model through the VIF, removing the variables with the highest VIF one at a time until the VIF for all covariates in the model was no greater than 10. The R software was used for all computations and specifically the PGLM (Panel Generalized Linear Model) package.

6.1 RQ1: The Impact of Institutional and Cultural Variables on Disclosure

To analyze RQ1, we used a multivariate logistic regression model. Before estimating the model in Eq. (1), we performed a multicollinearity analysis and the covariate PDI was removed¹⁰.

The model in Eq. (1) is a generalized linear regression model with a binomial dependent variable and logistic link function. Each regression coefficient 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. Table 7 shows the results of the estimated model.

[Insert Table 7 about here]

As for the institutional variables, we found a positive effect of REGULATION on the disclosure of NGFMs and a negative effect of MARKET, ANTIDIR, and accounting standards (LOCGAAP and USGAAP compared to IFRS).

The positive role of REGULATION on NGFMs' disclosure is partially surprising. Previous studies highlight a moderation in the use of adjustments after the introduction of Reg G (Entwistle et al., 2006b; Nichols et al., 2005) and a reduction of NGFMs being used opportunistically in particular (Heflin & Hsu, 2008).

Similarly, the results of MARKET, ANTIDIR and accounting standards conflict with Isidro and Marques (2015), who find that NGFMs disclosure increases in developed markets with strong legal systems and investor protection. This dissimilarity could be explained by the differing objectives of the analysis.

Isidro and Marques (2015), similarly to great part of the literature on the role of regulations, consider the subjective and unobservable concept of opportunism as a dependent variable, measured by selecting the

¹⁰ In this way, we obtain an estimated model with a VIF value of each covariate between 1.008 and 8.037.

positive adjustments that lead to meeting or exceeding analysts' expectations. Conversely, our study takes into account every type of adjustment, regardless of the aim.

Jointly considering this evidence and our results, we could conjecture that the presence of an NGFMs regulation has the effect of reducing the use of NGFMs for opportunistic purposes, but increases informative disclosure. Given the general negative perception of the NGFMs by many practitioners and regulators, firms using NGFMs for informative purposes may be afraid of being perceived as opportunistic, especially in a strong institutional environment, where opportunism could be sanctioned more severely. In this context, they may desire a clear set of rules on NGFMs, because as long as they respect these rules, the market will not consider their behavior as opportunistic, and investors may appreciate the additional information provided.

On the other hand, the introduction of regulations opportunistic behaviors, by requiring firms to disclose more information, thus bringing undesired behaviors to the attention of the investors.

As for the role of the accounting standards, where IFRS are adopted the disclosure of NGFMs is higher, particularly if compared to environments where U.S. GAAP are adopted. Furthermore, the regression coefficient is very high, highlighting a very important role. The results are consistent with Solsma and Wilder (2015), that find that US-listed foreign firms applying IFRS report pro forma disclosures more frequently than firms using the USA's GAAP.

A potential interpretation of this result is that with the introduction of IFRS many firms have lost the opportunity to clearly represent the effect of non-recurrent events in their financial statements. This affected numerous firms only relatively recently (in Europe in 2005 following European Regulation 1606/2002). As a consequence, we can assume that firms fulfil the need to clearly distinguish the effect of non-recurrent events through the use of NGFMs.

This result would suggest a significant number of companies using NGFMs with informative aims, for compensating the loss of additional information generated by the adoption of the IFRS. The "persistence" of former accounting behaviors following the adoption of a new set of accounting standards has previously been reported (D'Arcy, 2001).

As for the cultural variables, the results show a negative impact of Uncertainty Avoidance and Long Term Orientation, and a positive impact of Individualism, while the other variables do not have a statistically significant effect.

If we look at Gray's model, the use of NGFMs can be considered an expression of the "professionalism/flexibility" societal value. Indeed, Gray describes professionalism as "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" (Gray 1988, p.8), that is exactly what a company does with the disclosure of the NGFMs. Through the decision of disclosing adjusted values the company 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, less connected with standard rules (the accounting standards).

Consequently, if we look at the expected impact of the cultural values on professionalism/flexibility (Table 4), the roles played by Uncertainty Avoidance, Indulgence and Long Term Orientation are consistent

with Gray's model and with our view of previous results as well. They seem to confirm the presence of a significant number of companies willing to use NGFMs for informative purposes, yet afraid that they could be perceived as opportunistic. Coherently, this perception is greater, and NGFM's diffusion lower, in cultural environments where Uncertainty Avoidance is strong, the targets are mainly focused on the long term and Indulgence is low. This is explained by the fact that in these contexts subjective and non-codified behaviors, focused on the short term, are not accepted by the society.

Among the control variables, we signal the highly positive role played by the level of debt in affecting the use of NGFMs. Coherently with the prevalent literature about voluntary disclosure, companies with huge levels of debts need to provide the market with more information about their financial performance, regardless of the opportunistic or informative aim of this communication.

All in all, the results show that environments with weak institutional systems (low financial development, low investor protection) and low uncertainty avoidance tend to encourage the use of NGFMs, particularly where a regulation is present. Contrarily, more developed and regulated countries, with big financial markets and high investor protection constrain the use of NGFMs, particularly where uncertainty avoidance is not compensated by the presence of a regulation about the use of NGFMs.

6.2 RQ2: The Impact of Institutional and Cultural Values on the Materiality of Adjustments

To analyze the impact of institutional and cultural factors on the materiality of adjustments, we employed a pooled panel regression model¹¹. Here, we worked on the subsample of firms with adjusted net income.

Starting from the model in Eq. (2), the covariates PDI, MARKET, and IDV were removed on the basis of the VIF¹². Table 8 shows the results of the estimated model.

[Insert Table 8 about here]

While institutional and cultural values play an important role in affecting NGFMs disclosure, they have a limited effect on the materiality of adjustments when controlling for financial variables.

Among all the institutional factors, only the quality of the legal system negatively affects MATERIALITY in a statistically significant way (at least 0.05 significance level). Following the interpretation of the previous results, we could conjecture that material adjustments could be perceived as opportunistic and consequently subject to sanctions in environments with strong legal systems.

If we also consider statistically relevant factors at the 0.1 level, REGULATION has a positive impact on MATERIALITY. This result would conflict with the previously mentioned role of regulations moderating the opportunistic use of NGFMs (Heflin and Hsu, 2008).

¹¹ Note that the estimated coefficients and their significance level are practically identical to those obtained if we use a two-way fixed effects panel regression model.

¹² The procedure leads to an estimated model with a VIF value between 1.089 and 7.659 for each covariate.

Again, coherently with the findings of the previous research question, it would seem that the presence of a regulation increases the propensity to use NGFMs, also regarding the materiality of adjustments. No other institutional factor plays any role in affecting the materiality of adjustments. This result is consistent with Gassen et al. (2006), who find that the effect of the legal regime on the aggressive use of financial measures is not significant if verified for company-specific financial variables.

As for the cultural variables, we would have expected an impact on the materiality of the adjustments. This is because materiality could be considered as inversely affected by the accounting conservatism, the second accounting value included by Gray in the model describing the impact of culture on accounting. Conservatism represents, in Gray's own words, a "cautious approach to measurement" (Gray 1988, p.8), therefore it should contain the materiality of adjustments. Consequently, the relationships linking the cultural variables to the materiality of adjustments should be the opposite of the ones linking them to conservatism (see Table 4). Conversely, Table 8 clearly highlights that the cultural environment does not affect MATERIALITY at all.

As for the control variables, profitability plays a key role in reducing materiality: the higher the financial results, the lower the materiality. This is in line with the fact that well-performing firms do not need to show higher profits to the market through material adjustments.

6.3 RQ3: The Impact of Institutional and Cultural Factors on the Transparency of Adjustments

We analyzed the impact of institutional and cultural factors on transparency using the multivariate logistic regression model in Eq. (3) by varying the dependent variables between MOTIVATION and RECONC. The regression coefficients β_i can be interpreted along the lines of the model in Eq. (1). Due to multicollinearity, the covariates PDI, MARKET, and IND were removed in both models¹³. Table 9 shows the results of the obtained models.

[Insert Table 9 about here]

As for the dependent variable MOTIVATION, the most important positive driver appears to be REGULATION. This is consistent with the literature that highlights the positive role of market regulatory body interventions in favoring NGFM transparency.

The minority shareholders' protection level positively affects the transparency of the adjustments, consistent with prior studies (Dilla et al., 2013; Heflin & Hsu, 2008; Kolev et al., 2008; Zhang & Zheng, 2011).

Accounting standards also affect transparency, as local GAAP-firms are more inclined to present the motivation for NGFMs disclosure compared to US GAAP and IFRS-adopters.

The impact of the institutional variables differs when considering the RECONCILIATION. We still register higher transparency of local GAAP adopters but lose the effect of investor protection (ANTIDIR).

¹³ The obtained models show a VIF value of each covariate between 1.003 and 6.099.

More relevantly, REGULATION shows a statistically significant negative effect on transparency.

We consider MOTIVATION as a proxy of formal transparency and RECONC as a proxy of substantial transparency. Our results suggest that the presence of an NGFMs regulation is able to increase the former, but not the latter. An interesting finding for regulators is that such regulation is unable to increase the quality of the information on the adjustments “per se”. These results are also consistent with minority literature (Black et al., 2017; Kolev et al., 2008; Nichols et al., 2005) claiming that an NGFMs regulation is only partially able to constrain the misuse of NGFMs.

If we examine the role played by the cultural variables, we register a positive effect of Uncertainty Avoidance and (with a lower level of statistical significance) Individualism on MOTIVATION, while Masculinity plays a negative role. Uncertainty Avoidance and Individualism also positively affect RECONCILIATION.

The results are not consistent with what we would expect starting from the Gray’s model, except for the role of Individualism. Indeed, Transparency of adjustments should be negatively affected by Secrecy, the third accounting value included in Gray’s model, described as “opposed to a more transparent, open and publicly accountable approach” (Gray 1988, p.8). Therefore, we would expect that cultural factors would affect the Transparency of NGFMs in the opposite way to that assumed by Gray for Secrecy (Table 4), but the results are not consistent with these expectations. A low level of Transparency/a high level of Secrecy is not considered a good means of avoiding uncertainty and a high level of Masculinity does not reduce Secrecy as suggested by Gray (1988). Again, these results seem to confirm the presence of companies with informative aims, but afraid of being perceived as opportunistic by the market.

In this context, firms provide information to the market to reduce the risk of being considered a “black box” by investors or, even worse, opportunistic in disclosing financial results. As a consequence, the higher the Uncertainty Avoidance in the country in which the firm is located, the higher the transparency of its accounting behaviors.

7. Conclusions

The objective of this study was to understand whether and how country-specific institutional and cultural factors affect the propensity to disclose NGFMs in press releases, the materiality of adjustments, and their transparency.

Our results support the contingent view about the use of the NGFMs by showing that different kinds of environments enforce different kinds of behaviors.

As for the institutional factors, NGFMs disclosure is fostered by the regulations defined by standard-setters and market authorities, while limited by developed institutional environments (developed stock market and high investor protection). A high-quality legal system reduces the materiality of adjustments.

Based on our results, we argue that in an institutional context with developed markets and strict rules protecting minority shareholders, managers may be reluctant to disclose financial measures differing from GAAP values, such as NGFMs. Moreover, even when choosing to disclose NGFMs, they limit the materiality

of adjustments, as the strong external institutional environment may perceive these as opportunistic.

The introduction of a regulation clarifying the admitted behaviors reduces these barriers and leads to introduce NGFMs and increase their materiality. Given this view of the phenomenon, the introduction of regulations can be interpreted as a “risk reduction” for firms wanting to disclose more reliable results, but afraid of departing from the strongly regulated and law-compliant GAAP values. This interpretation is also confirmed by the negative impact of uncertainty avoidance on NGFMs disclosure.

This view is further reinforced if we look at the impact of the institutional environment on transparency. The results show that the presence of NGFMs regulations, together with investor protection, increases formal transparency, but reduces the substantial explanation of adjustments. Firms feel legitimized in the presence of NGFMs regulations (higher disclosure and materiality), but often provide only partial information on the adjustments. This result offers other interesting insights to regulators and standard-setters that should encourage greater and substantial respect of the rules.

Furthermore, IFRS-adopters show a much higher propensity to adjust their GAAP results compared to local GAAP adopters and particularly US GAAP adopters. We suggest the reason is based on the need to provide investors with further information, which was at least partially fulfilled by pre-IFRS accounting standards.

Cultural values affect the willingness to disclose NGFMs but do not play any role in affecting the materiality of adjustments and have a limited role in affecting transparency.

Our results show the prevalent role of uncertainty avoidance, the only factor affecting the disclosure of NGFMS and both “formal” and “substantial” transparency. This result is coherent with previous studies on the impact of culture on accounting (Doupnik, 2008; Han et al., 2010; Sudarwan & Fogarty, 1996).

The unexpected positive effect of uncertainty avoidance on transparency could provide an interesting contribution to Gray’s framework and his hypothesis that high uncertainty avoidance should reduce transparency (increasing secrecy), since the disclosure of information could generate risks for the firm. Our results overturn this hypothesis, as a higher level of transparency reduces the risk of being deemed opportunistic in the disclosure of accounting information.

More generally, we register a less relevant effect of cultural factors compared to country-specific institutional factors and company-specific financial control variables. These results are consistent with Jaggi and Low (2000) and Hope (2003) showing the prevalent role of institutional factors over cultural dimensions. Worth noting is that our sample mainly includes very large and multinational firms. The literature has already signaled that the role of cultural factors decreases as firms become more international (Zarzeski, 1996). Hence, our results can only be generalized to firms with similar characteristics.

Tables

Table 1

The main regulations on NGFMs around the world

Country	NGFMs regulation
U.S.A.	<p>2001 - the SEC issues Cautionary Advice and an Investor Alert, warning investors that the NGFMs could be misleading.</p> <p>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.</p> <p>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.</p>
Canada	<p>2008 - the Canadian Institute of Chartered Accountants issues illustrative guidelines on NGFMs containing the general principles for their proper disclosure. In the Canadian context, interventions regarding NGFM issues are included in the Canadian Securities Administrators' Staff Notice 52-306 (Revised in 2012) issued by the Ontario Securities Commission.</p>
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". Its purpose is to promote 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 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 on 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 within 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>
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Table 2

Description of societal values by Hofstede

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 & 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.

Table 3

Description of accounting values by Gray

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.
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.

Table 4

The hypothesized relationships between societal values and accounting values.

Source: 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	+	-	-	+	+	-

Table 5

List, description and source of the variables

Code	Description	Type	Source
PRESENCE	Presence of at least 1 NGFM in the press release of the company	Dependent variable RQ 1.	Data collected by the authors
MATERIALITY	Materiality of the adjustment on the net profit	Dependent variable RQ 2.	Data collected by the authors
MOTIVATION	Presence of an explicit statement in the press release disclosing the reasons why management considers NGFMs useful	Dependent variable RQ 3.	Data collected by the authors
RECONC	Presence of a numerical reconciliation between the NGFM and the closest GAAP value.	Dependent variable RQ 3.	Data collected by the authors
USGAAP	Use of US GAAP accounting standards	Institutional environment	Osiris database
LOC GAAP	Use of local accounting standards	Institutional environment	Osiris Database
REGULATION	Presence of a regulation about the NGFMs	Institutional environment	Data collected by the authors
MARKET	Development of the financial market	Institutional environment	Factor analysis on two indicators obtained from the World Bank's "World Development Indicators Database"
LEGAL	Strength of the legal system	Institutional environment	Factor analysis on five indicators obtained from the Worldwide Governance Indicators
ANTI DIR	Strength of the minority interests' protection	Institutional environment	Djankov et al.'s (2008) "anti-self-dealing index"
PDI	Power Distance	Cultural environment	Hofstede's website
IDV	Individualism	Cultural environment	Hofstede's website
MAS	Masculinity	Cultural environment	Hofstede's website
UAI	Uncertainty Avoidance	Cultural environment	Hofstede's website
LTO	Long Term Orientation	Cultural environment	Hofstede's website
IND	Indulgence	Cultural environment	Hofstede's website
SIZE	Size of the company	Control variable	Osiris Database
PROF	Profitability of the company	Control variable	Osiris Database
DEBT	Debt of the company	Control variable	Osiris Database
MTB	Market-to-Book ratio of the company	Control variable	Osiris Database

Table 6

Descriptive Data of NGFMs Adoption and Disclosure

Area	Countries	Time	Firms	% Firms disclosing NGFMs	Number of NGFMs per document	% Firms adjusting net income	% of positive adjustments	% Motivation	% Numeric reconciliation
EUROPE	Austria, Finland, France, Italy, Luxembourg, Netherlands, Norway, Portugal, Russia, Spain, Switzerland, U.K.	First Quarter (Q4 2008)	32	31.3%	2.40	40.0%	75.0%	70.0%	70.0%
		Last Quarter (Q2 2012)	32	46.9%	2.60	53.3%	75.0%	60.0%	60.0%
		Average	32	42.7%	2.39	51.2%	30.1%	67.9%	69.8%
U.S.A.	U.S.A.	First Quarter (Q4 2008)	44	29.5%	1.38	15.4%	50.0%	61.5%	46.2%
		Last Quarter (Q2 2012)	48	56.3%	2.30	70.4%	42.1%	85.2%	81.5%
		Average	45.5	47.9%	2.06	52.9%	56.4%	78.5%	72.5%
CANADA	Canada	First Quarter (Q4 2008)	16	81.3%	1.69	30.8%	0.0%	100.0%	92.3%
		Last Quarter (Q2 2012)	19	84.2%	2.25	56.3%	55.6%	93.8%	75.0%
		Average	18.1	80.1%	2.16	47.4%	45.5%	90.7%	80.6%
ASIA, OCEANIA, AFRICA AND SOUTH AMERICA	Australia, Brazil, China, Colombia, Hong Kong, India, Japan, South Africa.	First Quarter (Q4 2008)	18	33.3%	2.33	66.7%	25.0%	33.3%	16.7%
		Last Quarter (Q2 2012)	21	14.3%	2.00	66.7%	50.0%	66.7%	33.3%
		Average	19.8	24.2%	1.68	33.7%	44.6%	50.2%	37.2%

TOTAL	23 countries	First Quarter (Q4 2008)	110	38.2%	1.86	33.3%	35.7%	71.4%	61.9%
		Last Quarter (Q2 2012)	120	50.8%	2.34	62.3%	52.6%	80.3%	72.1%
		Average	115.4	47.4%	2.14	51.1%	46.3%	76.3%	70.9%

Notes: (Firms) = number of firms analyzed; (% Firms disclosing NGFMs) = percentage of firms analyzed reporting NGFMs; (Number of NGFMs per document) = average number of NGFMs included in each press release; (% Firms adjusting net income) = percentage of firms adjusting the net income on the total number of firms reporting NGFMs; (% of positive adjustments) = percentage of firms reporting positive adjustments on net income on the total; (% Motivation) = percentage of firms reporting global motivation of adjustments; (% Reconciliation) = percentage of firms reporting a numeric reconciliation between NGFMs and closest GAAP values.

Table 7

The impact of institutional and cultural variables on the use of NGFMs (Eq. 1)

		Coefficients	Std. error	t-value	Relevance
	Intercept	1.807	1.240	1.457	
Institutional variables	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	
	ANTIDIR	-0.379	0.087	-4.377	***
Cultural variables	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	**
Control variables	SIZE	0.099	0.048	2.055	*
	PROF	-0.001	0.002	-0.485	
	DEBT	1.752	0.230	7.632	***
	MTB	-0.208	0.040	-5.204	***

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

^o IFRS standard is the reference category

Notes: n=1731, maximized log-likelihood function=-1001.747, BFGS maximization method with 108 iterations.

As for the analysis of residuals, a random inspection suggests the lack of patterns in the scatter plot. Moreover, the Ljung-Box test is computed for each time series of each firm at lag from 1 to 14 (or up to the maximum available value of t for each firm) to evaluate whether the autocorrelation of the residuals at each distinct time lag is equal to zero. The results lead to concluding that the residuals of the firms are generally not autocorrelated, since the p-value of the test is almost always greater than 0.05. We run a robustness check using GLOBES cultural variables (House et al. 2004) instead of Hofstede's ones and the results remain basically the same.

Table 8

The impact of institutional and cultural variables on the materiality of adjustments (Eq. 2).

		Coefficients	Std. error	t-value	Relevance
	Intercept	-1.081	0.376	2.874	**
Institutional variables	LOCGAAP ^o	0.064	0.047	1.345	
	USGAAP ^o	0.025	0.053	0.467	
	REGULATION	0.081	0.047	1.713	
	LEGAL	-0.044	0.019	-2.311	*
	ANTIDIR	0.029	0.029	1.024	
Cultural variables	MAS	0.002	0.002	0.680	
	UAI	-0.001	0.002	-0.704	
	LTO	-0.001	0.002	-0.520	
	IND	0.001	0.003	0.286	
Control variables	SIZE	0.015	0.013	1.153	
	PROF	-0.100	0.018	-5.584	***
	DEBT	-0.139	0.084	-1.659	
	MTB	+0.023	0.010	2.282*	*

Table 9

The impact of institutional and cultural variables on motivation and reconciliation (Eq. 3).

		MOTIVATION				RECONCILIATION			
		Coefficients	Std. error	t-value	Relevance	Coefficients	Std. error	t-value	Relevance
Intercept		-0.767	1,846	-0.415		2,855	1,646	1.735	.
Institutional Variables	LOCGAAP ^o	0.693	0.341	2.030	*	0.815	0.275	2.967	**
	USGAAP ^o	0.027	0.298	0.091		-0.251	0.274	-0.915	
	REGULATION	0.787	0.334	2.355	*	-0.717	0.323	-2.222	
	LEGAL	-0.047	0.107	-0.437		0.206	0.109	1.884	
	ANTIDIR	0.614	0.148	4.144	***	-0.141	0.135	-1.047	
Cultural Variables	IDV	0.020	0.012	1.731	.	0.032	0.010	3.191	*
	MAS	-0.016	0.008	-2.096	*	0.002	0.008	0.256	
	UAI	0.036	0.011	3.340	*	0.035	0.009	4.121	**
	LTO	-0.006	0.008	-0.793		0.003	0.007	0.414	
Control Variables	SIZE	-0.229	0.082	-2.800	**	-0.291	0.075	-3.890	**
	PROF	0.008	0.029	0.268		0.158	0.125	1,258	
	DEBT	-1,123	0.482	-2.330	*	0.642	0.399	1,609	
	MTB	0.056	0.078	0.726		-0.194	0.064	-3.026	*

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

^o IFRS standard is the reference category

Notes: n=821. The maximized log-likelihood function is -389.539 (for the model with Y=Motivation) and -457.332 (for the model with Y=Reconciliation), BFGS maximization method with 91 iterations for the model with Motivation as dependent variable and 93 iterations for the model with Reconciliation as dependent variable. As for the residuals analysis, of which the results are available on request, a casual inspection suggests the lack of patterns and influent outliers in the scatter plot. Moreover, the Ljung-Box test computed a lag from 1 to 14 for each time series (or up to the maximum available value of t for each firm) which leads to the conclusion that the residuals of the firms are generally not autocorrelated. We ran a robustness check using GLOBEs cultural variables (House et al. 2004) instead of Hofstede's one and the results remain basically the same.

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