



# Radboud Universiteit

## **Master's Thesis**

The effect of integrated reporting, culture and board gender diversity on European firms' value relevance

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## General information

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## **Preface**

This Master's Thesis presents my research into the effect of integrated reporting, long- versus short-term cultural orientation and board gender diversity on the value relevance of European firms. With this research, I complete my studies at the Radboud University, where I followed a Bachelor's course in Economics and Business Economics, with the specialization Business Economics, and a Master's course in Economics, with the specialization Accounting and Control.

During the process of writing this Master's Thesis, several people have supported me. First of all, I would like to thank Flynth adviseurs en accountants and dr. Ferdy van Beest for the opportunity to do a thesis internship. During this internship, I got to know Flynth as a company but also got extra support from dr. Ferdy van Beest. Dr. Ferdy van Beest not only helped me form the topic of this thesis but kept supporting me and giving feedback until the final version of this thesis was done. Furthermore, I would like to thank dr. Koos Wagenveld RA, my supervisor at the Radboud University, for his feedback and support and dr. Geert Braam RA for being the second reader. Last, but certainly not least, I would like to thank my friends and family for their continuous support over the past years and during the process of writing this Master's Thesis.

## **Abstract**

This study researches the effect of integrated reporting (IR), long- versus short-term cultural orientation and board gender diversity on the value relevance of European firms. In addition, the moderation effects of a long- versus short-term cultural orientation and board gender diversity on the relation between IR and value relevance are tested. For this study, a panel data set including 782 European firms with 5471 observations over the time period 2011-2017 is used. The findings indicate that IR, a long-term cultural orientation and a high level of board gender diversity have a positive effect on value relevance. Furthermore, a long-term cultural orientation and a high level of board gender diversity both have a complementary effect on the relation between IR and value relevance. However, due to the presence of autocorrelation and heteroskedasticity these findings should be interpreted with caution.

## Table of contents

|  |    |
|--|----|
| <b>1. Introduction</b> .....                                       | 6  |
| 1.1 Societal contribution .....                                    | 8  |
| 1.2 Scientific contribution .....                                  | 8  |
| <b>2. Theoretical background</b> .....                             | 10 |
| 2.1 Value Relevance .....  | 10 |
| 2.2 Integrated Reporting .....                                     | 11 |
| 2.3 Culture .....  | 14 |
| 2.4 Board gender diversity .....                                   | 16 |
| 2.5 Integrated reporting, culture and board gender diversity ..... | 18 |
| <b>3. Research design</b> .....                                    | 21 |
| 3.1 Conceptual model .....   | 21 |
| 3.2 Research Method .....  | 21 |
| 3.3 Variables .....  | 22 |
| 3.2.1 Dependent variable .....                                     | 22 |
| 3.2.2 Independent variables .....                                  | 22 |
| 3.2.3 Control variables .....                                      | 23 |
| 3.4 Regression analyses and hypotheses .....                       | 26 |
| 3.5 Dataset .....  | 28 |
| <b>4. Results</b> .....  | 29 |
| 4.1 Assumptions tested .....                                       | 29 |
| 4.2 Regression analysis .....                                      | 30 |
| 4.2.1 Random Effects model .....                                   | 30 |
| 4.2.2 Random effects VCE model .....                               | 32 |
| 4.2.3 Regression per year .....                                    | 33 |
| 4.3 Robustness checks .....  | 33 |
| <b>5. Discussion and conclusion</b> .....                          | 35 |
| <b>Bibliography</b> .....  | 39 |
| <b>Appendix 1 Normal distribution variables</b> .....              | 46 |
| <b>Appendix 2 VIF tests</b> .....                                  | 46 |
| <b>Appendix 3 Wooldridge test for autocorrelation</b> .....        | 47 |
| <b>Appendix 4 Breusch-Pagan test for homoscedasticity</b> .....    | 47 |
| <b>Appendix 5 Random effects model with VCE</b> .....              | 47 |
| <b>Appendix 6 Regressions per year</b> .....                       | 49 |
| <b>Appendix 7 Regression robustness check BGD</b> .....            | 53 |
| <b>Appendix 8 Distribution DummyG</b> .....                        | 53 |

**Appendix 9 Robustness check logarithms ..... 53**

## 1. Introduction

Non-financial reporting and the number of companies integrating this information into their annual reports have been growing since 1993 (KPMG, 2017). Subsequently, the use of non-financial information by investors has been increasing, as well as their demand for integrated reports (EY, 2018). However, companies do not always label their reports as integrated reports when the information is integrated, only 14% of all companies studied by KPMG (2017) do this. Not only is the number of organizations issuing non-financial information increasing, but also the assurance of this information has increased from 30% in 2005 to 67% in 2017 within the world's 250 largest companies by revenue (KPMG, 2017). Non-financial information is thus a growing part of not only organizations' reporting, but also of the work of public accountants.

Integrated reporting (IR) is one of the many ways to issue non-financial information, others are for example sustainability reports, environmental reports, corporate responsibility reports and CSR reports. IR is a framework in which financial and non-financial information are integrated into one report (Villiers et al., 2017), with the objective to explain to stakeholders how an organization creates value over time (IIRC, 2013). To do this, the integrated report focusses not only on the financials but also on the non-financial performance (Abeysekera, 2013). This way, the annual report reflects the organization's strategy, its performance, its influence on the environment and the risks the organization is exposed to.

IR is promoted by the International Integrated Reporting Council (IIRC), which is a body that includes regulators, investors, companies, standard setters, the accounting profession, academia and NGOs. The IIRC has developed a principle-based framework for integrated reporting (IIRC, 2013). The purpose of this framework is to guide the user regarding the content of an integrated report and to explain the concepts used in the report.

One of the incentives to engage in IR comes from the signalling theory. According to the signalling theory organizations that perform well will disclose non-financial information voluntarily to reveal the nature of their true performance and to potentially increase their market value. The market value can be increased due to reassurance that risk is being managed, a reduction of the risk of adverse selection and a reduction of cost of capital (Zijl et al., 2017).

This aligns with the idea that disclosing non-financial information is value relevant to investors (Amir and Lev, 1996), because value relevance is the ability of information disclosed to capture and summarize firm value (Kargin, 2013). In other words, information is value relevant when you can observe a market response after new information has been disclosed (Scott, 2015, p.153). The market response can be observed by looking at the current share price which is influenced by the current

period earnings, the expected future earnings and the expected future dividends (Nichols and Wahlen, 2004). The non-financial information helps to form these expectations because it gives more explanation about the numbers on which the expectations are based. As stated before, IR is a specific way of disclosing financial and non-financial information and could, therefore, influence the value relevance.

The purpose of this research is to gain insight into the effect of IR combined with net income on the value relevance of an organization. The value relevance of environmental information in combination with financial statement information has been researched in Swedish firms where there was a negative relation (Hassel et al., 2005). This has also been investigated in U.S. firms, where the disclosure of environmental information in combination with financial information was found to be value relevant (Belkaoui, 1976; Bhat, 1999; Cormier et al., 1993). When separating financial and non-financial disclosure in the analysis, research has shown that financial environmental disclosure is value relevant, but non-financial environmental disclosure is not (Moneva and Cuellar, 2009). Due to these contradicting results, Hassel et al. (2005) state that future research is needed to clarify the value relevance. For this future research, they suggest using data from European firms and different measures of environmental performance. As stated before, IR is one of the many ways to report environmental information. Furthermore, researchers have pointed out that it is needed to research to which extent potential users of IR consider such information relevant (Cheng et al., 2014).

The effect of IR has been tested for organizations in South Africa (Baboukardos and Rimmel, 2016; Barth et al., 2017), where IR is de facto mandatory, due to a voluntary apply or explain basis (Dumay et al., 2016). This research focuses on the effect of IR when this is adopted voluntarily. This focus is chosen because prior research has shown that there is a difference in the effect of IFRS adoption on accounting quality when this is adopted voluntarily or mandatory due to a difference in incentives (Christensen et al., 2015). The adoption of IR could also have different effects depending on the reason for adopting. When the reason for adopting is because it is mandatory, the incentives could be different compared to when a firm publishes an integrated reported voluntarily. Therefore, this research focuses on the effect of IR when it is adopted voluntarily. Data will be gathered from European firms where IR is not mandatory. However, the EU does have a directive that large companies with more than 500 employees must disclose non-financial statements in their annual reports from 2018 onwards (European Commission, n.d.). Therefore, the data used in this research is from before 2018 to ensure the decision to use IR has been made voluntarily.

The amount of compliance with IFRS requirements for financial reporting is influenced by both company- and country-level variables (Glaum et al., 2012). In the same way, IR is influenced by different level variables. At the country level, IR is influenced by culture (Garcia-Sanchez et al., 2013)



and at the company level, it is influenced by characteristics of the board of directors (Prado-Lorenzo and Garcia-Sanchez, 2010). Garcia-Sanchez et al. (2013) have researched the effect of culture on IR and found that collectivist and feminist values have a positive effect on publishing integrated reports, which contain relevant and comparable information for decision making. Another dimension of culture is long-term versus short-term orientation (Hofstede, 2011). When a company applies IR, managers will have to shift their focus from short-term financial performance to long-term sustainability performance (Villiers et al., 2017). This shift could be influenced by the long-term versus short-term cultural orientation of a nation. Therefore, the long-term versus short-term dimension can influence the relation between IR and value relevance and will be taken into account in this research.

Prado-Lorenzo and Garcia-Sanchez's (2010) research shows that the characteristics of the board of directors can influence the information disclosed by an organization. Multiple papers have shown that there is a difference in the characteristics of males and females (Borghans et al., 2009; Dalton and Ortegren, 2011; Eckel and Grossman, 2008; Ho et al., 2015; Ibrahim and Angelidis, 1994). Board gender diversity could thus influence the information disclosed by an organization and the value relevance. Therefore, board gender diversity is taken into account in this research.

By studying IR, culture and board gender diversity in European firms and the effect of these factors on the value relevance of these firms this study aims to get an answer on the research question: *What is the effect of integrated reporting, culture and gender diversity on the value relevance of European firms?*

In order to answer this research question, a quantitative approach is used. The sample consists of European firms from before 2018. The data used is retrieved from Thomson Reuters Eikon and will be analysed by conducting a panel data regression analysis.

### 1.1 Societal contribution

Most value relevance studies are not only of interest for an academic audience but also for a non-academic audience. Often their findings are of interest to financial statement preparers and users, bank managers, bank analysts, regulators of financial institutions and other policymakers because it helps to understand the effect of accounting information on capital formation and allocation (Barth et al., 2000). This study will add to the value relevance literature and can be of interest for the audience named above, but also to companies in general who are considering the use of IR. Therefore, this study is seen as practically relevant.

### 1.2 Scientific contribution

As mentioned before, the value relevance of environmental information has been researched before (Belkaoui, 1976; Bhat, 1999; Cormier et al., 1993; Hassel et al, 2005; Moneva and Cuellar, 2009),

but due to contradicting outcomes, there is still a research gap remaining. Hassel et al., (2005) suggest that future research uses European data to fill this gap. Furthermore, there is a research gap regarding the extent to which potential users of IR consider such information relevant (Cheng et al., 2014). This research contributes to both these research gaps by gaining insight into the effect of IR, combined with net income, on the value relevance of an organization.

The effect of IR has been tested for organizations in South Africa (Baboukardos and Rimmel, 2016; Barth et al., 2017), but IR is de facto mandatory in this country. Prior research has shown that the effect of IFRS adoption on accounting quality differs when this is adopted voluntarily compared to a mandatory adoption. This difference is due to a difference in incentives (Christensen et al., 2015). Since IR is de facto mandatory in South Africa, this could lead to different incentives and therefore have a different effect than when it is applied voluntarily. Therefore, this research focusses on European firms where IR is not mandatory. Even though IR is not mandatory in Europe, the EU does have a directive that large companies with more than 500 employees must disclose non-financial statements in their annual reports from 2018 onwards (European Commission, n.d.). For this reason, this research only looks at the effect of IR on the value relevance of European firms before 2018.

The effect of culture on IR has been studied before (Garcia-Sanchez et al., 2013). This research expands this topic by researching the effect of culture on the relation between IR and value relevance. Prior research has also looked into the effect of board characteristics on information disclosed (Prado-Lorenzo and Garcia-Sanchez, 2010). Since males and females differ in their characteristics (Borghans et al., 2009; Dalton and Ortegren, 2011; Eckel and Grossman, 2008; Ho et al., 2015; Ibrahim and Angelidis, 1994), board gender diversity could affect the information disclosed and thus the information disclosed using IR as well.

The remainder of the thesis is organized as follows. The second chapter focuses on the theoretical background of the main concepts used in this study, after which the hypotheses are formed. In the third chapter, the research design is explained. The results are presented in chapter four and chapter five discusses the discussion and conclusion.

## 2. Theoretical background

### 2.1 Value Relevance

Researchers have examined the relationship between information and market value for at least 50 years, but the term value relevance was only introduced in 1993 (Barth et al., 2000). Value relevance is the ability of information disclosed to capture and summarize firm value (Kargin, 2013). When information is found to be value relevant, one can observe a market response after this new information has been disclosed (Scott, 2015, p. 153). In other words, value relevance is visible when financial and non-financial reporting captures information that affects share values (Francis and Schipper, 1999). To measure this, the Ohlson model (1995) can be used because this model looks at the relationship between the market value of equity and the book value and net income.

The market value of a firm can be measured with the current share price (Beisland, 2009). The current share price is influenced by current period earnings, expected future earnings and expected future dividends, which all influence each other as well (Nichols and Wahlen, 2004) as shown in figure 1. The current period earnings influencing the expected future earnings indicates that those numbers provide relevant information that can be used to estimate future earnings. This estimation of future earnings is used to form an expectation about the firm's future possibilities to pay dividends and that expectation influences the current share price (Nichols and Wahlen, 2004). This aligns with the idea that accounting information can help investors to evaluate the return potential of investment opportunities (Beyer et al., 2010). So, the current share price, and thus the market value, is influenced by what investors expect to earn in the future and this expectation is based on relevant information.

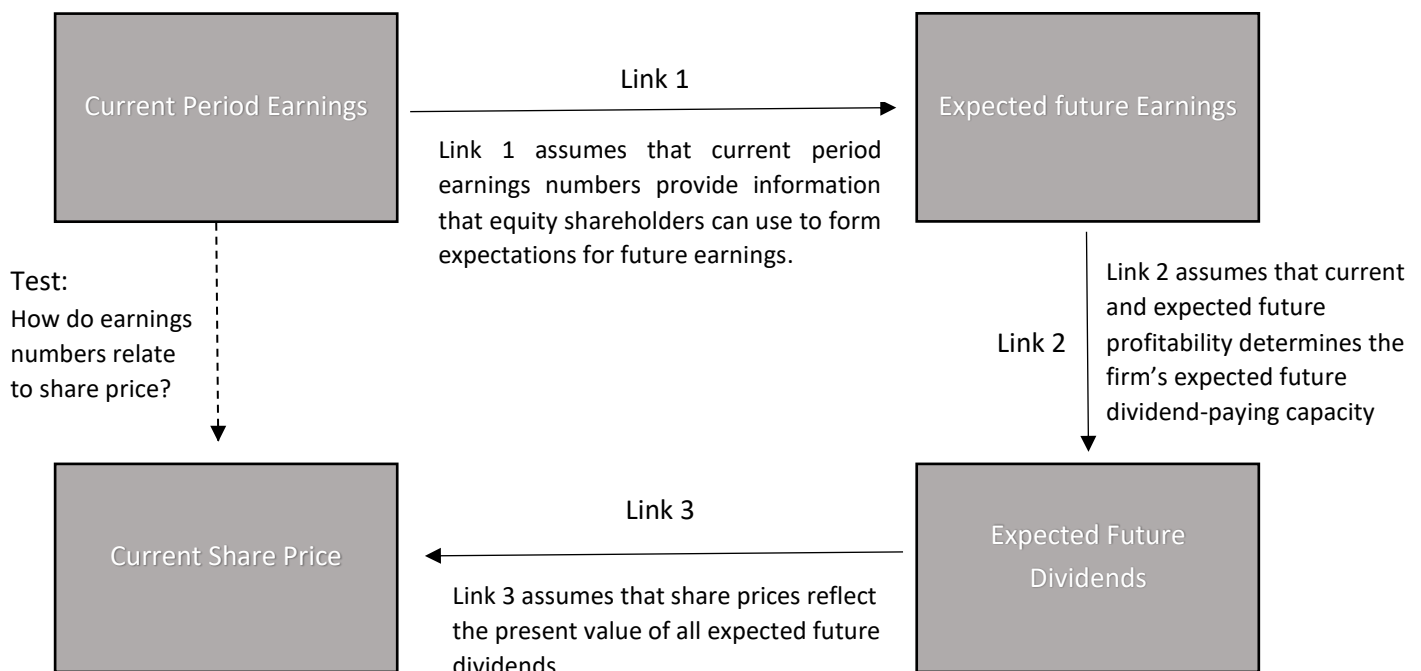


Figure 1 (Nichols and Wahlen, 2004)

Implementing IR will cost the firm money in the short term because a firm must make substantial changes to the management information system they use (Steyn, 2014), which would lower the current period earnings. Following the model of Nichols and Wahlen (2004), this would lead to a decrease in the current share price. In the long term, it could increase the current period earnings because voluntary non-financial disclosure lowers the cost of equity capital and lowers absolute forecast errors and dispersion (Dhaliwal et al., 2011). Following the model in figure 1, this would lead to an increase of the current share price.

Value relevance studies have mainly focussed on financial reporting and show, among others, that book values and earnings are value relevant. Furthermore, the value relevance of the balance sheet increases when fair values are used instead of historical costs, but the value relevance of the income statement decreases in that case (Beisland, 2009). This effect is due to the presence of more unexpected earnings when using fair value accounting in comparison to historical costs accounting (Hann et al., 2007). The value relevance of non-financial reporting has also been examined, but these studies show contradicting results. On the one hand, U.S. research shows that the disclosure of environmental information in combination with financial statement information is value relevant (Belkaoui, 1976; Bhat, 1999; Cormier et al., 1993), but Swedish research, on the other hand, shows a negative relation (Hassel et al., 2005). Furthermore, when financial and non-financial disclosure are separated in the analysis, the disclosure of non-financial information is not value relevant (Moneva and Cuellar, 2009).

## 2.2 Integrated Reporting

Stakeholders want more non-financial information about the strategy of an organization, the risks and how they will be managed, and about the impact the organization has on its environment. This information can be given in separate reports, but also in an integrated report (NBA, 2013). In an integrated report financial and non-financial information are integrated into one report (Villiers et al., 2017) with the objective to explain to stakeholders how an organization creates value over time (IIRC, 2013). By reporting on all the sources that create value instead of only the financial sources, users of the report will not only get more data but also more context (Hoque, 2017).

The IIRC (2013) created a principles-based framework, which includes requirements that have to be applied. With this approach, the IIRC aims at creating a balance between flexibility and prescription. This will make it possible to create comparability across organizations without ignoring the variation in circumstances and organizations. To reach this goal, they have created seven guiding principles and eight content elements, which should be applied when preparing the integrated report. The guiding principles are strategic focus and future orientation, connectivity of information, stakeholder relationships, materiality, conciseness, reliability and completeness, and consistency and

comparability. The content elements are organization overview and external environment, governance, business model, risks and opportunities, strategy and resource allocation, performance, outlook and basis of preparation and presentation. By connecting these, the dynamic and systemic interactions of the organization's activities as a whole are shown.

The use of IR leads to three classes of benefits: internal benefits, external market benefits and managing risk (Eccles and Armbrester, 2011; Hoque, 2017). The internal benefits are that using the IIRC framework can help firms to add structure in their business strategy and the systematic reporting of it (NEMACC, 2013). To report in a systematic way, departments must give feedback on their activities which can increase the interaction between departments and improve the internal information flow (Vitolla and Raimo, 2018). In complex firms, e.g. firms with high intangible assets, multiple business segments or large firms, this improves the informational environment (Lee and Yeo, 2016). This can lead to different perspectives and it provides insight into the business models used and the risks of a company. Furthermore, the use of IR forces a firm to not only focus on financial performance but also on non-financial performance. Focusing on non-financial performance, including social and environmental performance, will allow managers to show their employees that it is not all about the money (NEMACC, 2013). This can lead to greater involvement of employees (Vitolla and Raimo, 2018).

The external market benefits of using IR includes a decrease in analyst forecast error (Dhaliwal et al., 2011), which means that the information in an integrated report is helpful to analysts when forecasting the earnings of an organization. Furthermore, issuing an integrated report that is aligning with the IR framework decreases the cost of equity capital and the realized market returns (Dhaliwal et al., 2011; Zhou et al., 2017). This result shows that when the information risk decreases, investors will accept a lower rate of return. This effect is stronger for companies that have a lower analyst following (Zhou et al., 2017). Not only does the information risk decrease due to IR, but also the quality of information increases and the information asymmetry decreases (Cho et al., 2013). Furthermore, due to lower information asymmetry, the firm valuations are higher (Lee and Yeo, 2016).

The third benefit is the benefit of managing (regulatory) risk. By implementing IR, an organization is prepared for a future wave of legislation and reporting guidelines which most likely will take place in the coming years. Presumably, stock exchanges will follow this wave and have new regulations. Organizations that have implemented IR will most likely comply with these regulations. When these new legislation, guidelines and regulations are created, frameworks and standards will have to be created as well. Due to having IR implemented, organizations will be able to participate in this process (Eccles and Armbrester, 2011). These legislation changes can already be seen in South Africa where IR became de facto mandatory, in France where ESG reporting has been mandatory for firms with more than 500 employees since 2010 (Ecoact, 2017) and in the EU as a whole with the

directive that large companies with more than 500 employees must disclose non-financial statements in their annual reports from 2018 onwards (European Commission, n.d.). These regulatory risk benefits will not occur immediately when organizations apply IR, but they will when IR becomes a regulatory requirement.

The positive effects of applying IR are explained by the signalling theory. According to this theory firms that perform well on non-financial aspects will disclose information about this performance voluntarily. This way they can reveal the nature of their true performance and potentially increase their market value because the information disclosed will give reassurance that risk is being managed, reduce the risk of adverse selection and reduce the cost of capital (Zijl et al., 2017). Thus, firms hope that due to disclosing new information, the market value increases, which would indicate value relevance.

Firms do not only disclose integrated reports due to the benefits explained above, but also to meet the expectations of their stakeholders. Stakeholders have different interests and expectations regarding the performance of a firm which leads to different expectations regarding the contents of a report (Hess, 2008). These interests and expectations might differ from the interest and expectations of firms. Financial and non-financial reporting can serve as a control mechanism to align the interests of managers and stakeholders (Frias-Aceituno et al., 2013).

Despite these benefits of IR, only 14% of the world's 250 largest companies by revenue labelled their report as an integrated report in 2017 (KPMG, 2017), even though they might be integrating non-financial information in their annual reports. Not issuing an integrated report could be due to a lack of clear guidelines, the costs and knowledge needed to create such a report and the risk of disclosing competitive information (NBA, 2014; NEMACC, 2013).

Based on the signalling theory, disclosing non-financial information leads to an increase of the market value, which indicates a market response, which would indicate value relevance. Empirical research shows three types of benefits of applying IR: internal benefits, external market benefits and managing risk (Cho et al., 2013; Dhaliwal et al., 2011; Eccles and Armbrester, 2011; Hoque, 2017; Lee and Yeo, 2016; NEMACC, 2013; Vitolla and Raimo, 2018; Zhou et al., 2017). The external market benefits show responses of the market after applying IR and therefore indicates value relevance. Based on the theory and empirical research, the expectation is that IR has a positive influence on the value relevance of firms.

*Hypothesis 1: Integrated reporting has a positive influence on the value relevance of firms.*

### 2.3 Culture

Culture is described by Hofstede (2011, p. 3) as “the collective programming of the mind that distinguishes the members of one group or category of people from others”. A group can be a tribe, ethnic group, nation or organization, but culture can also be applied to occupations, genders, generations or social classes. The adoption of culture differs between groups. For example, the culture that people acquire at a young age is deeper rooted in the human mind than the culture acquired at school or on the job. Thus, a nation can have a certain culture, but that does not mean that every person in that nation has the same culture (McSweeney, 2002). This is because one person belongs to multiple groups and therefore adopts and combines the cultures of multiple groups, but they all share the same national culture.

Culture on the national level influences firm behaviour regarding IR, which is partly due to the need to meet expectations of shareholders and other stakeholders. These expectations are the same due to the shared national culture of all the stakeholders (Garcia-Sanchez et al., 2013). When companies operate on a multinational level, they have local and global stakeholders who can have different cultures which then can lead to different expectations (Bustamante, 2011). Not only can culture influence expectations, but it also influences interest in disclosure on non-financial information (Fernandez-Feijoo et al., 2011). Furthermore, culture can influence and explain the behaviour in social systems (Gray, 1988). For example, cultures differ in their moral judgements and ethical views (Singhapakdi et al., 1994).

Culture not only influences the interest and demand of stakeholders regarding information disclosed, but it also influences what information firms disclose. For example, it has an influence on the contents of corporate codes of ethics (Langlois and Schlegelmilch, 1990) and the amount and contents of voluntarily disclosed environmental information (Buhr and Freedman, 2001). The level of information disclosure is also influenced by other cultures in which a firm is operating, besides its home country, since a firm that operates in the global culture often exceeds the locally desired level of disclosure (Zarzeski, 1996).

A prevalent model used for national culture is the Hofstede model (1980) in which he divides national culture into four different dimensions: power distance, uncertainty avoidance, individualism versus collectivism and masculinity versus femininity. Later he added a fifth dimension called long-versus short-term orientation (Hofstede, 1991) and a sixth dimension called indulgence versus restraint (Hofstede, 2011).

Since IR can shift the focus of managers from short term financial performance to long term sustainability performance (Villiers et al., 2017), this research focuses on the cultural dimension of

long-term versus short-term orientation. This dimension is about whether the focus of people's efforts is the future or the present and past (Hofstede, 2011). When scoring low on this dimension, societies view societal change with suspicion, while scoring high means that a society has a more pragmatic approach and for example encourages thrift and efforts in modern education to prepare for the future (Hofstede Insights, n.d.). Being more long-term orientated can also affect the way the natural environment is handled by a society (Hofstede and Minkov, 2010). In earlier research, there was found a significant relationship between long- versus short-term orientation and economic growth, but for the period 1995-2005 no significant relation was found (Hofstede and Minkov, 2010).

Multiple other studies have used the framework of Hofstede and analysed the influence of the different cultural dimensions. Culture, including long-term vision, influences capital structure, which influences financial performance. Therefore, culture has an indirect effect on financial performance. Culture is also found to have a positive effect on operational performance measures (Gleason et al., 2000). Furthermore, culture has an influence on the adoption of innovations. Everdingen and Waarts (2003) found that national culture has a strong influence on the adoption of ERP systems, the uncertainty avoidance index, masculinity index and power distance index all had a significant negative effect while the long-term orientation had a significant positive effect on the adoption.

Wang and Bansal (2012) researched new ventures and found that a long-term orientation has a positive effect on their financial performance because this orientation forces the organizations to think about innovation and the development of strategic resources. Their results also show a positive moderation effect of a long-term vision on the relationship between CSR activities and financial performance, which suggests that this orientation increases the value of the benefits gained from the CSR activities. Rappaport (2006) also emphasizes the importance of a long-term vision in his principles to increase shareholder value.

Thus, the cultural environment in which a company is located influences the company on different aspects like financial and operational performance, and the adoption of innovations (Everdingen and Waarts, 2003; Gleason et al., 2000; Hofstede and Minkov, 2010). Furthermore, culture can influence the wishes, expectations and interest in non-financial information of the stakeholders (Bustamante, 2011; Fernandez-Feijoo et al., 2011; Garcia-Sanchez et al., 2013). Following the model of Nichols and Wahlen (2004) stakeholders influence the market value of a firm, therefore culture can influence the value relevance. A long-term vision forces organizations to think about innovation and the development of strategic resources which has a positive effect on financial performance (Wang and Bansal, 2012). Furthermore, it has been found that a long-term vision has a positive effect on the relation between CSR activities and financial performance (Gleason et al., 2000; Wang and Bansal,



2012). Based on these findings the expectation is that a long-term vision has a positive effect on the value relevance of firms.

*Hypothesis 2: A long-term orientation of a countries culture has a positive influence on the value relevance of firms.*

#### 2.4 Board gender diversity

Not only do country-level indicators play an important role, but also variables at company-level like board gender diversity. The board of directors is responsible for the performance of an organization in the field of corporate social responsibility and the disclosure of information on this topic. Therefore, the characteristic of the board can influence the information disclosed (Prado-Lorenzo and Garcia-Sanchez, 2010). There are differences in the characteristics between men and women. Women are, for example, found to be more ethical (Ho et al., 2015), which is partly due to the effect of women wanting to behave more socially desirable (Dalton and Ortegren, 2011).

These differences between men and women are also found in corporate boards. Women are found to be more philanthropically driven, while men are more economically oriented (Ibrahim and Angelidis, 1994). Women are also more risk-averse (Borghans et al., 2009; Eckel and Grossman, 2008) and initially respond more favourable to ambiguity than men. However, when ambiguity increases the difference between men and women decreases (Borghans et al., 2009).

Women not only have different characteristics, but they also influence the board they are part of. In a study conducted on German firms, it is found that in case at least 30% of the board members are female the firm performance improves (Joecks et al., 2013). In a study conducted on the emerging economy of Mauritius, the presence of women on the board of directors also has a positive influence on firm performance (Mahadeo et al., 2012). Research based on U.S. firms also shows a positive relationship between board diversity, defined as the percentage of women in the board, and firm performance (Carter et al., 2003; Erhardt et al., 2003).

However, some studies show a negative relationship between board diversity and firm performance. In 2003, Norway implemented a gender quota. As a result there was a substantial decline in Tobin's Q and a negative stock price reaction, especially for firms with no female directors before the announcement (Ahern and Dittmar, 2012). Research based on U.S. firms shows that a more gender diverse board has a positive effect when a firm has weak governance, but that the effect of board diversity on performance is negative when a firm has strong governance (Adams and Ferreira, 2009). These studies show that forcing firms to add women to their board of directors does not have a positive effect. This difference in the effect of a mandatory or voluntary change is also visible in the effect of IFRS adoption on accounting quality. Research showed that the effect differs because having to change

mandatory or voluntary leads to different incentives (Christens et al., 2015), which could also be the case with gender diverse boards.

Furthermore, there are also studies that show no relationship between board diversity and firm performance. Carter et al. (2003) found a positive relationship, but in more recent research, in which they used a different sample and a longer time period, they found no significant relationship between gender diversity of the board and financial performance (Carter et al., 2010). Research on Fortune 500 firms also found no direct relationship between board gender diversity and firm performance when control variables were added to the regression. The authors argue that this could be due to a missing moderator variable regarding the organizational environment factors, like the influence that female board members have (Miller and del Carmen Triana, 2009). The influence that female board members have can depend on the percentage of female board members, as explained in the critical mass theory. This theory states that the effect of women in the board is only visible when a percentage of 30% is exceeded (Dahlerup, 2006; Grey, 2006; Joecks et al., 2013).

Thus, the board of directors is responsible for the performance and the disclosure of information about this performance and the characteristics of the board have an influence on this (Prado-Lorenzo and Garcia-Sanchez, 2010). Research shows that there is a difference between the characteristics of men and women (Borghans et al., 2009; Dalton and Ortegren, 2011; Eckel and Grossman, 2008; Ho et al., 2015; Ibrahim and Angelidis, 1994), which affects the board of directors. However, when looking at the effects of board gender diversity research shows different outcomes. Studies have found a positive relationship between firm performance and board gender diversity (Carter et al., 2003; Erhardt et al., 2003; Joecks et al., 2013; Mahadeo et al., 2012), but also negative relations when females are added on a mandatory basis, due to a gender quota for example (Adams and Ferreira, 2009; Ahern and Dittmar, 2012). Furthermore, some studies found no relation (Carter et al., 2010; Miller and del Carmen Triana, 2009) which, according to the authors, could be due to missing moderator variables regarding the influence the female board members have, for example (Miller and del Carmen Triana, 2009). Following the model of Nichols and Wahlen (2004), an increase in firm performance leads to an increase in the share price and thus the market value, which shows an increase in value relevance. Since the negative outcomes in previous studies could be influenced by gender quotas, this will be controlled for to see if this indeed has a negative effect on the value relevance. Therefore, the expectation is that board gender diversity will positively influence the value relevance of a firm.

*Hypothesis 3: Board gender diversity has a positive effect on the value relevance of firms.*

## 2.5 Integrated reporting, culture and board gender diversity

Research has already shown that some of the cultural dimensions influence IR. Garcíá-Sánchez et al. (2013) show that companies located in a society which is collectivist and feminist are more likely to publish integrated reports. This could be because these societies focus more on the common good and aim to improve the quality of life. For that reason, organizations provide more social and environmental information in the form of an integrated report to help their stakeholders with their decision-making. Companies that have better growth opportunities are, on the other hand, less likely to publish integrated reports, which can be explained by the fact that managers in those companies have privileged knowledge about investment opportunities and insights (Garcíá-Sánchez et al., 2013; Prado-Lorenzo and Garcia-Sanchez, 2010).

When a country has a long-term orientation, this means that a society has a more pragmatic approach and for example encourages thrift and efforts in modern education to prepare for the future (Hofstede Insights, n.d.). As Villiers et al. (2017) argue, IR can shift the focus of managers from short-term financial performance to long-term sustainability performance. This shift can be a result of the visibility of the long-term consequences of the decisions made by management that is shown in the integrated reports (Jensen and Berg, 2012).

Research shows that firms with a long-term orientation often emphasize innovation (Miller and Friesen, 1982; Venkatraman, 1989) and the development of strategic resources (Hamel and Prahalad, 1994), which do not have short-term value. In the case of new firms, this leads to a positive moderation of a long-term orientation on the relation between CSR activities and financial performance (Wang and Bansal, 2012). This indicates that a long-term orientation increases the value of the benefits from CSR activities.

Furthermore, Flammer and Bansal (2017) have shown that a long-term orientation is value-enhancing because it forces managers to adopt long-term incentives. Adopting long-term incentives allows companies to align managers' interests with long-term value creation. The interest of the company is visible due to an increase in long-term investments like innovation and stakeholder relationships. The change of managers is visible due to an increase in operating performance in the long run, while it has a decrease in the short run. This suggests that managers are willing to invest in projects that are costly in the short run, but profitable in the long run. The company benefits from this because a positive stock market reaction appears after a long-term compensation proposal is accepted (Flammer and Bansal, 2017). These results show that a long-term orientation is value relevant, because of the positive stock market reaction. Furthermore, these patterns suggest that the long-term orientation moderates the decision to focus on long-term benefits, even though these might be costly in the short-run.

Based on these previous studies that show a change in the behaviour of both managers and firms due to a long-term orientation (Hamel and Prahalad, 1994; Miller and Friesen, 1982; Venkatraman, 1989), an increase in the financial and operating performance of the firms (Flammer and Bansal, 2017; Wang and Bansal, 2012) and a positive reaction of investors (Flammer and Bansal, 2017), it is expected that a long-term orientation affects the relation between IR and value relevance. Since IR can cause a shift in the long-term vision of managers (Jensen and Berg, 2012; Villiers et al., 2017), there is an overlap with the cultural long-term vision. This overlap causes the moderator effect to be a substitution effect. A substitution effect means that the marginal benefit decreases when the other variable increases (Voss et al., 2010). This indicates that a long-term orientation has a positive effect on the relation of IR and value relevance, but the positive effects of both IR and a long-term orientation decrease. Therefore, the expectation is that a long-term orientation of a country's culture substitutes the relation between IR and the value relevance of firms.

*Hypothesis 4: A long-term orientation of a country's culture has a substitutionary effect on the relation between integrated reporting and the value relevance of firms.*

When looking at the relationship between sustainability reporting and board gender diversity, research shows that in the Kenyan banking sector a higher ratio of women directors on a board of directors increases the level of social information disclosed (Barako and Brown, 2008). Women also have an increased sensitivity to CSR and participative decision-making style which can lead to enhanced corporate responsibility strength ratings. However, this influence is small when there is one female director, but increases as the number of women on the board increases (Bear et al., 2010), which aligns with the critical mass theory (Dahlerup, 2006; Grey, 2006; Joecks et al., 2013).

Based on these empirical findings, the expectation is that the effect of IR on value relevance differs between firms due to a difference in board gender diversity. Since research shows that a higher ratio of women on the board of directors increases the level of social information (Barako and Brown, 2008; Bear et al., 2010), it is expected that a higher level of board gender diversity affects the relationship between IR and value relevance. This effect is expected to be a complementary effect, which means that the marginal benefit of the variables increases due to an increase of the other variable (Voss et al., 2010). Therefore, the expectation is that board gender diversity has a complementary effect on the relation between IR and the value relevance of a firm.

*Hypothesis 5: Board gender diversity has a complementary effect on the relation between integrated reporting and the value relevance of firms.*

The hypotheses formed in this chapter are based on theories and empirical research. In the following table, it is summarized per hypothesis on what theory and empirical research it is based.

| Hypothesis          | Theory   | Empirical  |
|---------------------|--|--|
| <b>Hypothesis 1</b> | Signalling theory<br>Stakeholder theory<br>Ohlson market model | Three types of benefits: internal benefits, external market benefits and managing risk.  |
| <b>Hypothesis 2</b> | Hofstede model   | National culture influences financial and operational performance and the adoption of innovations. National culture influences the wishes, expectations and interest in non-financial information of the stakeholders. |
| <b>Hypothesis 3</b> | Critical mass theory   | Board characteristics influence information disclosed.<br>Different characteristics males and females.   |
| <b>Hypothesis 4</b> |  | Culture influences IR.<br>IR shifts focus to long term orientation.  |
| <b>Hypothesis 5</b> |  | Higher level women in board leads to an increase in social disclosure.<br>Women increased sensitivity to CSR and participative decision style.   |

Table 1 Hypotheses

### 3. Research design

In this chapter, the design of the research is discussed. First, the conceptual model is explained, followed by the research method used. After that, the dependent, independent and control variables are described. Next, the regressions used to test the hypotheses are displayed and the interpretation of them is given. Lastly, it is explained how the dataset used for this research is formed.

#### 3.1 Conceptual model

In the conceptual model, shown in figure 2, the expected relationships are visualized. A direct relationship is expected between IR and value relevance, culture and value relevance and board gender diversity and value relevance. Furthermore, it is expected that both culture and board gender diversity affect the relationship between IR and value relevance.

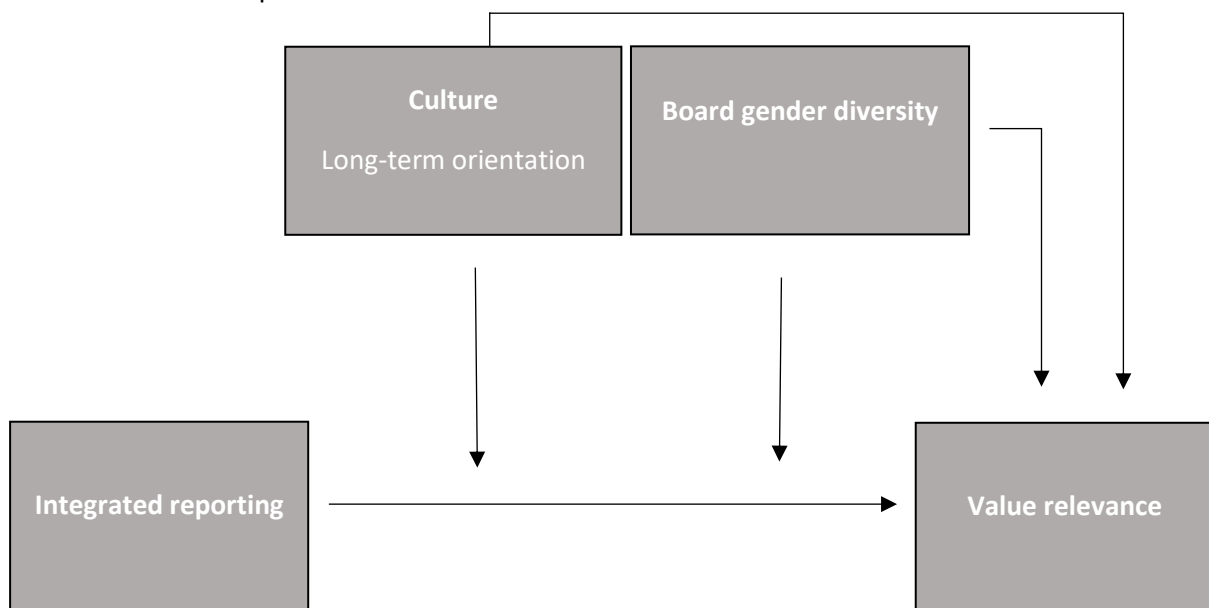


Figure 2 Conceptual model

#### 3.2 Research Method

This study is quantitative in nature and uses panel data regressions to test the hypotheses. With a panel data regression, multiple moments in time and multiple economic entities are used, but the economic entities stay the same through time (Hsiao, 2007). Using panel data has multiple advantages compared to a time series or cross-sectional data. First, it has more accurate inference of model parameters due to more degrees of freedom and more sample variability, which improves the efficiency of econometric estimates. Second, it is more capable to capture the complexity of human nature like testing complicated behavioural hypotheses, uncovering dynamic relationships and generating more accurate predictions for individual outcomes. And third, it can simplify computation and statistical inference which you would expect when combining time-series and cross-sectional data (Hsiao, 2007). Data sets on both firm and country-level are used, which are obtained via Eikon and the

website of Geert Hofstede, the social psychologist who developed the culture index used in this research.

### 3.3 Variables

#### 3.2.1 *Dependent variable*

The dependent variable in this research is value relevance. As mentioned before, value relevance is measured as the ability of financial and non-financial reporting to capture information that affects share values (Francis and Schipper, 1999). In other words, value relevance can be measured by a change in the stock market values or return (Kargin, 2013), which can be measured using the Ohlson model (1995). Prior research has used a modified version of this model to measure the effects of financial and non-financial information on the market value, where the market value is dependent on the book value of equity, accounting earnings and a form of non-financial reporting as a proxy for other value-relevant information (Moneva and Cuellar, 2009; Schadewitz and Niskala, 2010). The simplified Ohlson model is

$$\text{Market Value} = \text{Book Value Equity} + \text{Net Income} + \text{Other value} - \text{relevant information}$$

In this equation, the market value is the dependent variable and the book value of equity, net income and other value-relevant information are the independent variables. The data of the market value is retrieved from Eikon and is measured by multiplying the share price by the number of ordinary shares in issue.

#### 3.2.2 *Independent variables*

The independent variables within this research are the book value of equity and net income, as well as IR, culture and board gender diversity. The book value of equity is measured as total shareholders' equity and the net income is measured as the net income after preferred dividends that the company uses to calculate its basic earnings per share. Both these variables are retrieved from Eikon.

Variables often used in prior research for the operationalization of IR are the environmental, social and governance (ESG) score and the corporate governance vision and strategy (CGVS) score. The ESG score is a score that measures the ESG performance of a firm (Thomson Reuters Eikon, 2018), it says something about the performance but not about the quality of disclosure. The CGVS score can be described as "A company's management commitment and effectiveness towards the creation of an overarching vision and strategy integrating financial and extra-financial aspects. It reflects a company's capacity to convincingly show and communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes" (Serafeim, 2015, p. 14-15). In other words, it combines integrated thinking in the first part with IR in the second part of the

description. However, this score has been removed from the ASSET4/Eikon database and therefore is not useable for this research. Another measure of IR is the CSR strategy score. This is a score ranging from 0 to 100 and it reflects “a company’s practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes” (Thomson Reuters Eikon, 2018). The higher the score, the better the company communicates that it integrates these dimensions. The score overlaps with the second part of the description of the CGVS score. For this research, the CSR strategy score is used to operationalize IR and the data is retrieved from Eikon. The score is transformed into a median split in which value 1 indicates that a firm has a high CSR strategy score and value 0 indicates a low CSR strategy score.

Culture is defined using the Hofstede model in which he divides national culture into six dimensions: power distance, uncertainty avoidance, individualism versus collectivism, masculinity versus femininity, long- versus short-term orientation and indulgence versus restraint with scores ranging from 0 to 100 (Hofstede Insights, n.d.). For this research, only the long- versus short-term orientation is used. A high score for this dimension means that the country is more long-term oriented, while a low score means the country is more short-term oriented (Hofstede, 1991). The data for this variable is retrieved from the dataset published on the website of Geert Hofstede and transformed into a median split in which value 1 indicates that a country has a long-term orientation above the median and a value of 0 indicates a short-term orientation.

Board gender diversity is measured by dividing the number of woman in the board of directors with the total number of board members to obtain the percentage of female board members. Thereafter, the variable is transformed into a median split in which value 1 indicates high board gender diversity and value 0 low board gender diversity. The date used for this variable is retrieved from Eikon.

### *3.2.3 Control variables*

Not only do IR, culture and board gender diversity influence value relevance, but other variables might as well. Control variables are added to the analyses to avoid biased outcomes. Since this research uses data from multiple years, the variable year is added as one of the control variables to control for possible year effects.

Furthermore, previous research often adds industry as a control variable to their analyses (Baboukardos and Rimmel, 2016; Barth et al., 2017; Bear et al., 2010; Garcia-Sanchez et al., 2013; Prado-Lorenzo and Garcia-Sanchez, 2010), because it is assumed that when firms are active in the same industry, they behave similarly regarding, for example, disclosing information (Garcia-Sanchez et al., 2013; Prado-Lorenzo and Garcia-Sanchez, 2010). When firms do not behave similarly to the industry stakeholders could see this as something negative (Garcia-Sanchez et al., 2013) which could affect the



market value of the firm. Furthermore, stakeholders' areas of concern are influenced by the industry which leads to a difference in corporate transparency (Garcia-Sanchez et al., 2013). To control for these effects industry is added as a dummy.

Another control variable often used is leverage (Baboukardos and Rimmel, 2016; Qiu et al., 2016). Leverage is a measure of corporate financial health and captures the availability of financial resources in a firm (Brammer and Pavelin, 2008). Leverage can imply the level of control over insiders by creditors, but it can also be associated with higher costs of bankruptcy (Campbell and Minguez-Vera, 2008). Therefore, it is expected that leverage affects the attractiveness of a firm for potential shareholders which will influence the market value. Furthermore, prior research has found different outcomes when looking into the effect of leverage on environmental disclosure (Cormier et al., 2011) and this relation is thus unclear. To control for these effects leverage, measured as the ratio of total debt to total equity, is added.

Lastly, a dummy for gender quota is added. This dummy has value 1 when there is a gender quota and 0 otherwise. As said before there is a difference in the effect of IFRS adoption on accounting quality when the adoption is voluntarily or mandatory, due to a difference in incentives (Christensen et al., 2015). Having a gender quota makes it mandatory for firms to have female members of the board of directors, which creates different incentives compared to voluntarily adding female board members. Due to the different incentives, the effect of female board members could differ. By adding this dummy to the analysis, there is a control for a voluntary setting.

Prior research has also used the size of the board as a control variable because some studies show that this affected the dissemination of information, while other studies have found no significant effect when looking into this relation (Prado-Lorenzo and Garcia-Sanchez, 2010). Since the number of women in the board of directors is one of the independent variables in this research, the effect of the size of the board would be overlapping with this variable's effect (Bear et al., 2010). Therefore, board size is not added as a control variable.

Furthermore, prior research has added firm size, measured as the natural logarithm of total assets, to the equation because bigger firms are more likely to disclose information and are associated with higher (financial) performance (Baboukardos and Rimmel, 2016; Barth et al., 2017; Campbell and Minguez-Vera, 2008; Garcia-Sanchez et al., 2013; Prado-Lorenzo and Garcia-Sanchez, 2010). Since book value of equity is equal to the total assets minus the total liabilities, preferred stock and intangible assets this is already controlled for in this research.

In the following table, the dependent, independent and control variables are summarized. For every variable, its name, the abbreviation used in the analyses and the definition used to operationalize the variable are explained.

| Dependent variable                         | Abbreviation | Definition   |
|--|--------------|--|
| <b>Market Value</b>                        | MV           | Share price multiplied by the number of ordinary shares in issue in millions               |
| <b>Independent variable</b>                |              |  |
| <b>Book value of equity</b>                | BVE          | Total shareholders' equity in millions   |
| <b>Net income</b>                          | NI           | Net income after preferred dividends in millions   |
| <b>IR</b>                                  | CSR          | Value 0 when the CSR score is below the median, value 1 otherwise                          |
| <b>Long- versus short-term orientation</b> | CULTURE      | Value 0 when the culture score is below the median, value 1 otherwise                      |
| <b>Board gender diversity</b>              | BGD          | Value 0 when the percentage of female board members is below the median, value 1 otherwise |
| <b>Control variable</b>                    |              |  |
| <b>Year</b>                                | YEAR         | Year (dummy)   |
| <b>Industry</b>                            | IND          | SIC1, 4-digit industry code (dummy)  |
| <b>Leverage</b>                            | LEV          | Ratio total debt to total assets   |
| <b>Gender quota</b>                        | GQ           | Value 1 in case of a gender quota, value 0 otherwise                                       |

Table 2 Variables

### 3.4 Regression analyses and hypotheses

To test the hypotheses formed in section 2, multiple regressions are performed. The definition of the abbreviations used in the regression models are described in table 2 in section 3.3

The effect of IR on value relevance is described in hypothesis 1: *“Integrated reporting in European firms has a positive influence on the value relevance of these European firms”*. To test this hypothesis the following regression model is used.

$$MV = \alpha + \beta_1 BVE + \beta_2 NI + \beta_3 CSR + \beta_4 NI * CSR + \beta_5 YEAR + \beta_6 IND + \beta_7 LEV + \beta_8 GQ + \varepsilon$$

To confirm hypothesis 1, that IR has a positive influence on the value relevance,  $\beta_4 NI * CSR$  has to be positive and significant. This means that the relation between net income and market value differs between firms with different CSR scores. That means that IR influences the relation between net income and market value. This relation is used to measure value relevance, which means that a positive interaction term shows that IR has a positive influence on value relevance. Because there is an interaction term used in this analysis, the coefficients of NI and CSR represent their value for the situation in which the other variable has value zero.

Hypothesis 2, which describes the relation between culture and value relevance, is as follows *“A long-term orientation of a countries culture has a positive influence on the value relevance of European firms”*. To test the effect of a long-term orientation on value relevance the following regression model is used.

$$MV = \alpha + \beta_1 BVE + \beta_2 NI + \beta_3 CULTURE + \beta_4 NI * CULTURE + \beta_5 YEAR + \beta_6 IND + \beta_7 LEV + \beta_8 GQ + \varepsilon$$

To confirm hypothesis 2  $\beta_4 NI * CULTURE$  needs to be significant and positive because this would indicate that culture positively influences the relation between net income and market value. If it influences this relation it influences value relevance, because the relation between net income and market value is used to measure value relevance.

To test hypothesis 3 *“Board gender diversity in European firms has a positive effect on the value relevance of these European firms”* the following regression is used

$$MV = \alpha + \beta_1 BVE + \beta_2 NI + \beta_3 BGD + \beta_4 NI * BGD + \beta_5 YEAR + \beta_6 IND + \beta_7 LEV + \beta_8 GQ + \varepsilon$$

Board gender diversity has a positive effect on market value if  $\beta_4 NI * BGD$  is significant and positive because this shows that board gender diversity positively influences the relation between net income and market value. Since the relation between net income and market value is a way of

measuring value relevance, influencing this relation means that board gender diversity influences value relevance. Therefore, hypothesis 3 is confirmed when  $\beta_4NI*BGD$  is significant and positive.

To test whether culture has a substitution effect on the relation between IR and market value, as described in hypothesis 4 “*A long-term orientation of a countries culture substitutes the relation between integrated reporting and the value relevance European firms*”, the following regression is used.

$$MV = \alpha + \beta_1BVE + \beta_2NI + \beta_3CSR + \beta_4CULTURE + \beta_5NI * CSR + \beta_6NI * CULTURE + \beta_7NI * CSR * CULTURE + \beta_8YEAR + \beta_9IND + \beta_{10}LEV + \beta_{11}GQ + \varepsilon$$

Hypothesis 4 is confirmed when  $\beta_7NI*CSR*CULTURE$  is significant and shows a substitution effect because a significant interaction term shows that the relationship between market value and the interaction term  $NI*CSR$  is influenced by the level of long-term orientation. In that case, the level of long-term orientation moderates the relationship between market value and  $NI*CSR$ , and as explained with the regression used to test hypothesis 1 this relation shows the relation between IR and value relevance. Therefore, a significant  $\beta_7NI*CSR*CULTURE$  shows that a long-term orientation moderates the relation between IR and value relevance. This moderation effect is a substitution effect when the positive effects of the variables separate have decreased. This is visible in a regression analysis when both the main effects have positive coefficients and the moderation effect has a negative coefficient or vice versa because that means the moderation effect decreases the positive effect of the main variables.

To test the moderation effect of board gender diversity as described in hypothesis 5 “*Board gender diversity has a complementary effect on the relation between integrated reporting and the value relevance of European firms*”, the following regression is used.

$$MV = \alpha + \beta_1BVE + \beta_2NI + \beta_3CSR + \beta_4BGD + \beta_5NI * CSR + \beta_6NI * BGD + \beta_7NI * CSR * BGD + \beta_8YEAR + \beta_9IND + \beta_{10}LEV + \beta_{11}GQ + \varepsilon$$

Hypothesis 5 is confirmed when  $\beta_7NI*CSR*BGD$  is significant and shows a complementary effect. If this variable is significant, it means that board gender diversity affects the relation between market value and the variable  $NI*CSR$ . Since the relation between market value and  $NI*CSR$  is used to measure the relation between IR and value relevance, it means that board gender diversity influences that relation. When the effects of IR and board gender diversity increase, it indicates that the effect is a complementary effect. This is visible in a regression when both the main effects as well as the moderation effect all have positive coefficients or all of them have negative coefficients because it shows that the moderator makes the effect of the main effects stronger.

### 3.5 Dataset

As described in section 3.3 all data, except the data for the long-term orientation, is obtained via Eikon. The data for the long-term orientation is retrieved from the dataset published on the website of Geert Hofstede, the social psychologist who developed the culture index used in this research.

The data is retrieved for the time period 2011 – 2017. The year 2011 has been chosen in order to have no missing observations for the CSR strategy score and to limit the number of missing observations for the other variables. An EU directive made it mandatory for firms with more than 500 employees to disclose non-financial statements in their annual reports from 2018 onwards (European Commission, n.d.). To be able to ensure that the decision to apply IR is made voluntarily, the year 2017 is chosen as the ending year of the time period used.

The sample originally consisted of 1159 firms. However, multiple observations and firms are eliminated from the sample. First, firms with missing observations for the CSR variable are eliminated. For one firm the industry is missing, therefore this firm is eliminated from the sample. Seven other firms are eliminated due to too much missing data considering MV and BGD. Three observations are eliminated due to missing BE, NI and LEVERAGE. For seven observations the MV is missing for the first or the first two years, these missing observations are replaced with the MV of the following year of the firm. The eliminations lead to a sample of 782 European firms and 5471 observations over the time period 2011-2017. The descriptive statistics of all variables used in this sample are shown in table 3.

| Variable | Obs   | Mean     | Std. Dev. | Min       | Max      |
|----------|-------|----------|-----------|-----------|----------|
| MV       | 5,471 | 9872.705 | 18609.58  | .73       | 248786.5 |
| BVE      | 5,471 | 6460.688 | 14276.92  | -7335.137 | 179695.6 |
| NI       | 5,471 | 533.2819 | 1729.904  | -19056.4  | 33083.16 |
| CSR      | 5,471 | .4989947 | .5000447  | 0         | 1        |
| CULTURE  | 5,471 | .4565893 | .4981575  | 0         | 1        |
| BGD      | 5,471 | .4715774 | .4992371  | 0         | 1        |
| YEAR     | 5,471 | 2014.001 | 2.000365  | 2011      | 2017     |
| IND      | 5,471 | 5.232133 | 2.80497   | 1         | 11       |
| LEV      | 5,471 | 109.3297 | 650.4556  | -25130.88 | 15475.06 |
| GQ       | 5,471 | .4960702 | .5000303  | 0         | 1        |

*Table 3 Descriptive statistics variables*

*MV is the share price multiplied by the number of ordinary shares in issue in millions. BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). BGD is a dummy (value 0 when the percentage of female board members is below the median, value 1 otherwise). Leverage is the ratio of debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.*

## 4. Results

In this chapter, the results obtained in performing the research are discussed. First, multiple assumptions are tested. In the following section, the results of the panel data regressions used to test the hypotheses are discussed. Finally, multiple robustness checks are performed and discussed to test the robustness of the results obtained in the second section.

### 4.1 Assumptions tested

In order to perform the regressions correctly, multiple assumptions have to be met. These assumptions are tested beforehand. Firstly, the assumption of normality is tested. Since CSR, CULTURE, BGD, YEAR, IND and GQ are dummies and only contain the value 1 or 0, these are not normally distributed. When generating histograms, the variables MV, BVE, NI and LEV appear to not be normally distributed as shown in *appendix 1*. However, the central limit theorem indicates that if the sample size is large and obtained using random sampling with replacement, the sample is distributed normally regardless of the population distribution (Kwak and Kim, 2017). Due to the large sample of 782 firms used in this research, the sample can be assumed to be normally distributed.

Second, the assumption that the independent variables do not correlate is tested. To test this assumption, a correlation matrix, shown in table 4, is retrieved from Stata. This matrix shows the correlation between two variables. All correlations are below 0.6, which means that there is no high correlation between the independent variables.

|         | BVE     | NI      | CSR     | CULTURE | BGD     | YEAR    | IND    | LEV     | GQ     |
|---------|---------|---------|---------|---------|---------|---------|--------|---------|--------|
| BVE     | 1.0000  |         |         |         |         |         |        |         |        |
| NI      | 0.5483* | 1.0000  |         |         |         |         |        |         |        |
| CSR     | 0.2680* | 0.1823* | 1.0000  |         |         |         |        |         |        |
| CULTURE | 0.1243* | 0.0807* | -0.0224 | 1.0000  |         |         |        |         |        |
| BGD     | 0.1303* | 0.0889* | 0.1323* | 0.1683* | 1.0000  |         |        |         |        |
| YEAR    | 0.0340  | 0.0322  | 0.0673* | 0.0000  | 0.2878* | 1.0000  |        |         |        |
| IND     | -0.0130 | -0.0243 | 0.0161  | 0.0552* | -0.0034 | -0.0001 | 1.0000 |         |        |
| LEV     | 0.0483* | 0.0065  | 0.0215  | 0.0074  | -0.0202 | -0.0219 | 0.0058 | 1.0000  |        |
| GQ      | 0.1137* | 0.0369* | -0.0068 | 0.4307* | 0.1861* | 0.0004  | 0.0284 | 0.0490* | 1.0000 |

Table 4 Correlation matrix

\*  $p < 0.1$

*BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). BGD is a dummy (value 0 when the percentage of female board members is below the median, value 1 otherwise). Leverage is the ratio of debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.*

Since a correlation matrix only shows the correlation between two variables, a variance inflation factor (VIF) test is performed after every regression to test for multicollinearity and shown in *appendix 2*. All VIF coefficients are lower than 4, which indicates that multicollinearity is not an issue.

To test for autocorrelation the Wooldridge test for autocorrelation in panel data is used and shown in *appendix 3*. Autocorrelation is present in the data when the residuals correlate with each other. The test result has a probability of 0.0005 which indicates that the null hypothesis, that there is no first-order autocorrelation, has to be rejected, which means there is autocorrelation.

The last assumption tested is the assumption of homoscedasticity. The assumption to be met is that the residuals are homoscedastic instead of heteroscedastic. The residuals are heteroscedastic when the variability is unequal for different values of the predicting variable. To test for this, the Breusch-Pagan test is performed after every regression and the results are shown in *appendix 4*. All the tests are significant, which means that the 0 hypotheses should be rejected and it should be concluded that heteroscedasticity is present in the data.

The assumptions of normality, correlation and multicollinearity are met, while the assumptions of autocorrelation and heteroskedasticity are not. Therefore, the models are tested with a normal regression and regressions that correct for autocorrelation and heteroskedasticity.

## 4.2 Regression analysis

### 4.2.1 Random Effects model

Because the regressions include a variable that does not vary over time (CULTURE), a fixed-effects model cannot be used. Therefore, a random-effects model is used. A random-effects model does not assume similar effectiveness for all groups, which means that every firm can have a different effect. The average effect is based on these different effects per firm. The results of this model can be found in table 5.

In model 1 it is expected that IR has a positive effect on value relevance. The results show a significant effect at the 1% level for the interaction term of NI\_CSR, indicating that the relation between NI and MV differs between firms with different CSR strategy scores. Since the relation between NI and MV is used to measure value relevance, this means that the CSR strategy score influences value relevance. The coefficient of the variable is positive (0.38629), showing that a high CSR strategy score has a positive effect on the value relevance compared to a low CSR strategy score.

Therefore, IR has a positive effect on the value relevance of a firm and hypothesis 1 is supported by empirical evidence.

In model 2 the expectation that a long-term cultural orientation positively influences the value relevance of a firm is tested. The interaction term NI\_CULTURE is significant at the 1% level, showing that the relation between NI and MV differs between countries with different cultural orientations. The coefficient is positive (0.39984), which indicates that a long-term orientation has a positive effect on the relation between NI and MV compared to a short-term orientation. Therefore, a long-term cultural orientation has a positive effect on value relevance and hypothesis 2 is supported by empirical evidence.

The expectation that board gender diversity has a positive effect on value relevance is tested in model 3. The variable NI\_BGD is significant at the 1% level and has a positive effect (0.79756). This shows that the relation between NI and MV, which is used to measure value relevance, differs between firms with different levels of board gender diversity. The positive coefficient (0.79756) shows that a high level of board gender diversity positively affects value relevance compared to a low level of board gender diversity and, therefore, hypothesis 3 is supported by empirical evidence.

In model 4 the moderating effect of culture was tested, it is expected that a long-term orientation has a substitution effect on the relation between IR and value relevance. This moderating effect is measured with the variable NI\_CSR\_CULTURE which is significant at the 1% level, indicating that a long-term effect does indeed influence the relation between IR and value relevance. The coefficient is positive (0.43395) which indicates that a long-term orientation has a positive effect compared to a short-term orientation. Since NI\_CSR and CULTURE both have a positive coefficient as well as NI\_CSR\_CULTURE, a long-term orientation increases the effect of the relation between IR and value relevance. Thus, this moderation effect is not a substitution as expected, but a complementary effect and, therefore, hypothesis 4 is not supported by empirical evidence.

The last expectation is that board gender diversity has a complementary effect on the relation between IR and value relevance, which is tested in model 5. The expected complementary effect is measured with the variable NI\_CSR\_BGD which is significant at the 1% level, indicating a difference in the relation between IR and value relevance for firms with high board gender diversity and low board gender diversity. The coefficient is positive (0.67463) which shows that a high level of board gender diversity has a positive moderating effect compared to a low level of board gender diversity. Our model confirms that the moderation effect is a complementary effect because the positive coefficient shows that a high level of board gender diversity increases the relation between IR and value relevance. Therefore, hypothesis 5 is supported by empirical evidence.



| VARIABLES         | Model 1                | Model 2                | Model 3                 | Model 4                 | Model 5                 |
|-------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
| BVE               | 0.86008***<br>(46.43)  | 0.85819***<br>(45.75)  | 0.82735***<br>(43.53)   | 0.85737***<br>(46.21)   | 0.83672***<br>(44.66)   |
| NI                | 0.41116***<br>(2.85)   | 0.55606***<br>(7.06)   | 0.32533***<br>(4.29)    | 0.46354***<br>(3.20)    | 0.43319***<br>(3.02)    |
| CSR               | 511.58084**<br>(1.98)  |                        |                         | 494.49625*<br>(1.91)    | 520.74524**<br>(2.02)   |
| NI_CSR            | 0.38629***<br>(2.60)   |                        |                         | 0.13088<br>(0.80)       | -0.01509<br>(-0.10)     |
| CULTURE           |                        | 1,303.61780*<br>(1.83) |                         | 1,357.65027**<br>(1.96) |                         |
| NI_CULTURE        |                        | 0.39984***<br>(3.49)   |                         |                         |                         |
| BGD               |                        |                        | 216.47424<br>(1.02)     |                         | 336.90024<br>(1.58)     |
| NI_BGD            |                        |                        | 0.79756***<br>(8.57)    |                         |                         |
| NI_CSR_CULTURE    |                        |                        |                         | 0.43395***<br>(3.64)    |                         |
| NI_CSR_BGD        |                        |                        |                         |                         | 0.67463***<br>(7.01)    |
| LEV               | -0.27977**<br>(-2.49)  | -0.28551**<br>(-2.56)  | -0.25705**<br>(-2.32)   | -0.27462**<br>(-2.44)   | -0.27225**<br>(-2.44)   |
| GQ                | -42.26909<br>(-0.07)   | -727.49396<br>(-1.03)  | -99.14225<br>(-0.15)    | -723.49243<br>(-1.05)   | -97.74686<br>(-0.16)    |
| Constant          | 2,168.35522*<br>(1.93) | 2,212.61035*<br>(1.90) | 2,792.52148**<br>(2.43) | 1,881.37781*<br>(1.65)  | 2,366.70508**<br>(2.10) |
| Observations      | 5,471                  | 5,471                  | 5,471                   | 5,471                   | 5,471                   |
| Number of isin    | 782                    | 782                    | 782                     | 782                     | 782                     |
| Overall R-squared | 0,6465                 | 0,6437                 | 0,6459                  | 0,6486                  | 0,6489                  |
| Year              | YES                    | YES                    | YES                     | YES                     | YES                     |
| Industry          | YES                    | YES                    | YES                     | YES                     | YES                     |

z-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5 Random-effects model

BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). BGD is a dummy (value 0 when the percentage of female board members is below the median, value 1 otherwise). Leverage is the ratio of debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.

#### 4.2.2 Random effects VCE model

Since the assumptions of no autocorrelation and no heteroscedasticity are not met, the models are also run with a correction for these two problems. This correction generates robust standard errors and therefore shows a difference in standard errors and significance, while the coefficients stay the same. The corrected models are shown in *appendix 5*, showing that the only significant effects after correction are NI\_BGD (5% level) and NI\_CSR\_BGD (10% level). This indicates that we should interpret

the previous results with caution due to the presence of autocorrelation and heteroscedasticity in the data.

#### 4.2.3 Regression per year

Autocorrelation means that the residuals are correlated over time. If you measure a score over time, the measures are independent, but they might correlate due to the score of the previous year influencing the score of the current year. To control for this effect, the models are run for each year independently and are shown in *appendix 6*. Since the regressions are run per year, the control variable Year is left out of these analyses. When comparing the random effects regressions as shown in table 5 and the regressions per year a difference in coefficients, significance and R-squared is visible. The R-squared differs for every year, but in general it is higher than the R-squared of the models when using the random effects regression.

The significance and coefficients of variables differ between the years. The coefficients not only differ in absolute values due to differences in data but also in negative and positive effects. For example, in model 1 NI\_CSR is significant in all years, but 2013 and 2017. The coefficient of this variable is positive for all years, but 2017. In model 2 NI\_CULTURE is significant in all years, but 2013 and 2016. The coefficients are negative for the years 2011, 2012, 2013 and 2016, while they are positive for the years 2014, 2015 and 2017. In model 3 NI\_BGD is significant at the 1% or 5% level for all years, but 2013. The coefficients of this variable are positive for the period 2011-2013 and negative for the period 2014-2017. In model 5 a similar pattern is visible where 2013 is the only year without a significant effect for NI\_CSR\_BGD and the coefficients are positive for the period 2011-2013 and negative for the period 2014-2017. In model 4 NI\_CSR\_CULTURE is not significant in the years 2011, 2013 and 2016, while the variable is significant at the 1% level for the years 2012, 2014, 2015 and 2017. The coefficients in the period 2011-2013 are negative, while the coefficients in the period 2014-2017 are positive.

The difference in coefficients and significance of the variables when analysed per year compared to all years together shows that the results in the random effects models should be interpreted with caution due to the presence of autocorrelation in the data.

#### 4.3 Robustness checks

Since prior studies state that the effect of women in the board is only visible when the number of women is at least 30%, as explained in the critical mass theory (Dahlerup, 2006; Grey, 2006; Joecks et al., 2013), a robustness check regarding this percentage is added. With this robustness check the regressions including board gender diversity are run with a dummy which has value 1 if the percentage female board members is 30% or higher and 0 if the percentage is below 30%, instead of the median split used before. Both regressions are shown in *appendix 7* and show that the overall R-squared decreases and the effects of NI\_BGD and NI\_CSR\_BGD become insignificant. These changes could be

due to the low number of observations that are above the critical mass, as shown in *appendix 8* only 21,68% of all observations are above 30%. Therefore, the use of the critical mass theory is found not to be an improvement of our model.

Since not all variables appeared to be normally distributed and skewness is visible, this was controlled for by running the regressions with the logarithms of the variables. By changing the values to the logarithms of the values, the normal distribution becomes smaller which can decrease the skewness. The use of logarithms led to a slightly higher R-squared of the models, but with lower observations and a lower number of firms. This decrease in observations and firms is due to observations having the value 0, which cannot be transformed into a logarithm. Negative values also cannot be transformed into logarithms, however, these values were changed to positive values, transformed into logarithms and changed to negative values again. Therefore, the decrease in observations and firms is limited. The models shown in *appendix 9* show a change in both coefficients and significance. NI\_CSR became significant in all three models, but the coefficient changed to a negative instead of positive value. NI\_CULTURE went from being significant at the 1% level to being significant at the 5% level and the coefficient became negative as well. NI\_CSR\_CULTURE is not significant anymore and the coefficient turned negative. The variables NI\_BGD and NI\_CSR\_BGD did not change in significance and kept the positive coefficient they had in the original models.

Even though the R-squared of the model slightly increased, the change in coefficients is striking. This change was not shown in the previous random-effects models shown in table 5 and *appendix 5*. When the regressions were run per year there were also some changes in coefficients, however, none of these changes were the constant for all the years. Therefore, using the logarithm of variables to control for skewness is not seen as an improvement of the model used in this research.

## 5. Discussion and conclusion

This study examines the effect of IR, culture and board gender diversity on the value relevance of European firms. In addition, the moderation effects of a long- versus short-term cultural orientation and board gender diversity on the relation between IR and value relevance are tested. This research answers the research question: *What is the effect of integrated reporting, culture and gender diversity on the value relevance of European firms?*

To answer this question 5 hypotheses are formed, based on existing theories and prior empirical research. The first hypothesis expects a positive effect of IR on the value relevance of firms. The second hypothesis expects that a long-term orientation of a countries culture has a positive influence on the value relevance of firms. Thirdly, the hypothesis that board gender diversity has a positive effect on the value relevance of firms is formed. The fourth hypothesis expects that a long-term orientation of a countries culture has a substitutionary effect on the relation between IR and value relevance. Finally, the fifth hypothesis expects that board gender diversity has a complementary effect on the relation between IR and the value relevance of firms.

To test these hypotheses a panel data set including 782 European firms with 5471 observations over the time period 2011-2017 is used. All data, except the long- versus short-term orientation, is retrieved from the Thomson Reuters Eikon database. The national scores for Hofstede's cultural dimension long- versus short-term orientation are retrieved from the dataset published on the website of Geert Hofstede. To measure value relevance a modified version of the Ohlson model (1995) is used, in which the market value is dependent on the book value of equity, the net income and other value-relevant information. To measure IR the CSR strategy score is used and transformed into a median split. Culture is defined using the data from the Hofstede model and changed into a median split as well. Board gender diversity is measured with a median split based on the percentage of female board members.

First, the effect of IR on value relevance is tested. The regression analysis shows a significant positive effect of NI\_IR. This indicates that IR has a positive effect on the value relevance of firms, which is in line with the expectation. Furthermore, this is in line with the signalling theory, disclosing non-financial information leads to an increase of the market value (Zijl et al., 2017), which is used to measure value relevance in this thesis, and previous empirical findings that IR had a positive effect on external market benefits which leads to higher firm valuations (Lee and Yeo, 2016).

Second, the effect of culture on the value relevance of firms is tested. The results show that the variable NI\_CULTURE has a significant and positive effect. This indicates that a long-term orientation has a positive effect on the value relevance of firms compared to a short-term orientation,

which is in line with the expectation. This result is in line with multiple studies that showed a link between a long-term orientation and the financial performance (Gleason et al., 2000; Wang and Bansal, 2012) because, according to the model of Nichols and Wahlen (2004), the financial performance affects the share price which is used to measure value relevance. Furthermore, this is in line with the claim that a long-term vision is important to increase shareholder value (Rappaport, 2006).

Third, the effect of board gender diversity on value relevance is tested. The results show a significant and positive effect of NI\_BGD, indicating that a high level of board gender diversity has a positive effect on the value relevance of firms compared to a low level of board gender diversity. This result is in line with the expectation. Furthermore, this result is in line with the previous studies that showed a positive relation between board gender diversity and firm performance (Joecks et al., 2013; Mahadeo et al, 2012), since, as mentioned before, firm performance affects the market value which is used to measure value relevance.

Next, the moderation effects of both culture and board gender diversity are tested. Model 4 shows that the variable NI\_CSR\_CULTURE has a significant and positive effect. This indicates that a long-term orientation has a positive effect on the relation between NI\_CSR, which is used to measure the effect of IR on the value relevance, compared to a short-term orientation. The expectation was that culture had a substitution effect, however, the results show a complementary effect instead. Thus, the results are not in line with the expectations. The expectation of a substitution effect was based on the idea that IR can shift the focus from managers from short-term financial performance to long-term sustainability performance (Villiers et al., 2017) which would overlap with the long-term cultural orientation. However, the results show a complementary effect, meaning that the positive effect of IR on value relevance increased more due to the effect of the long-term orientation. The expected overlap between managers' focus and the cultural orientation is not present, which could be due to IR being relatively new, the IIRC's IR framework was published in 2013 (IIRC, 2013). It is possible that managers have not completely integrated this framework and, therefore, have not changed their focus to the long-term. The fact that in 2017 only 14% of the world's 250 largest companies by revenue labelled their reports as integrated reports, even though they might be integrating financial and non-financial in those reports (KPMG, 2017) supports this idea of managers not fully integrating IR.

The last model shows that the variable NI\_CSR\_BGD has a significant and positive effect. This indicates that a high level of board gender diversity has a positive effect on the relation between IR and value relevance, which is measured with NI\_CSR, compared to a low level of board gender diversity. Since a high level of board gender diversity increases the relation between IR and value relevance, the moderation effect is a complementary effect which is in line with the expectation. This

aligns with previous studies that showed a higher level of social information when the ratio of women on the board of directors is higher (Barako and Brown, 2008; Bear et al., 2010).

This study contributes to the existing literature by adding new results to help reduce two research gaps. First, prior research on the value relevance of environmental information has contradicting results (Belkaoui, 1976; Bhat, 1999; Cormier et al., 1993; Hassel et al, 2005; Moneva and Cuellar,2009). Hassel et al. (2005) suggested that European data should be used to fill this gap. Second, there is a research gap regarding the extent to which potential users of IR consider such information relevant (Cheng et al., 2014). This research uses data from European firms to gain insight into the effect of IR, which is a way of reporting environmental information, combined with net income on the value relevance of an organization. The results of this study show that IR positively affects the relation between net income and market value, which is used to measure value relevance. Furthermore, this study adds to the existing literature on the effects of national culture and board gender diversity by showing the positive effects of both a long-term orientation and board gender diversity on value relevance as well as the complementary effect both variables have on the relation between IR and value relevance.

This study is subject to several limitations. The first limitation is the validity of the measure of IR. In this study, the CSR strategy score is used as a measure of IR, because its definition overlaps with the definition of the ESG score which is often used in previous studies to measure IR. However, both these scores have limitations. First, the scores focus on the amount of social and environmental information disclosed, which is not equal to high-quality IR. Second, often information from other sources than the integrated report, like the media and private information, are used to form the scores. This indicates that the score is more about the performance than the disclosure (de Villiers et al., 2017). De Villiers et al. (2017) state that other options for proxies of IR are to use a measure of IR quality from an external source or to hand collect data yourself. With an external source, the sample size is limited by the sample evaluated by the external source, while hand collecting data would limit the sample size due to the time limit of this research. Therefore, the CSR strategy score is used despite its limitations. However, future research should focus on creating a good IR proxy.

A second limitation is that there is autocorrelation and heteroscedasticity present in the data used for this study. The autocorrelation could be due to the use of scores which have a high chance of correlating with the scores of previous years or due to a missing variable. Heteroscedasticity is due to the variability of the dependent variable being unequal over the range of values of the independent variable. When correcting for these effects, differences in the significance and coefficients of the variables were visible. Therefore, the results of this study should be interpreted with caution.

A third limitation is that IR is a relatively new topic. The IR framework developed by the IIRC was published in 2013 (IIRC, 2013). Since the data used in this research is from the time period 2011-2017, it could be the case that IR was not completely developed and integrated into the firms during that time. Future research should focus on a time period in which IR is more developed and implemented in firms.

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## Appendix 1 Normal distribution variables

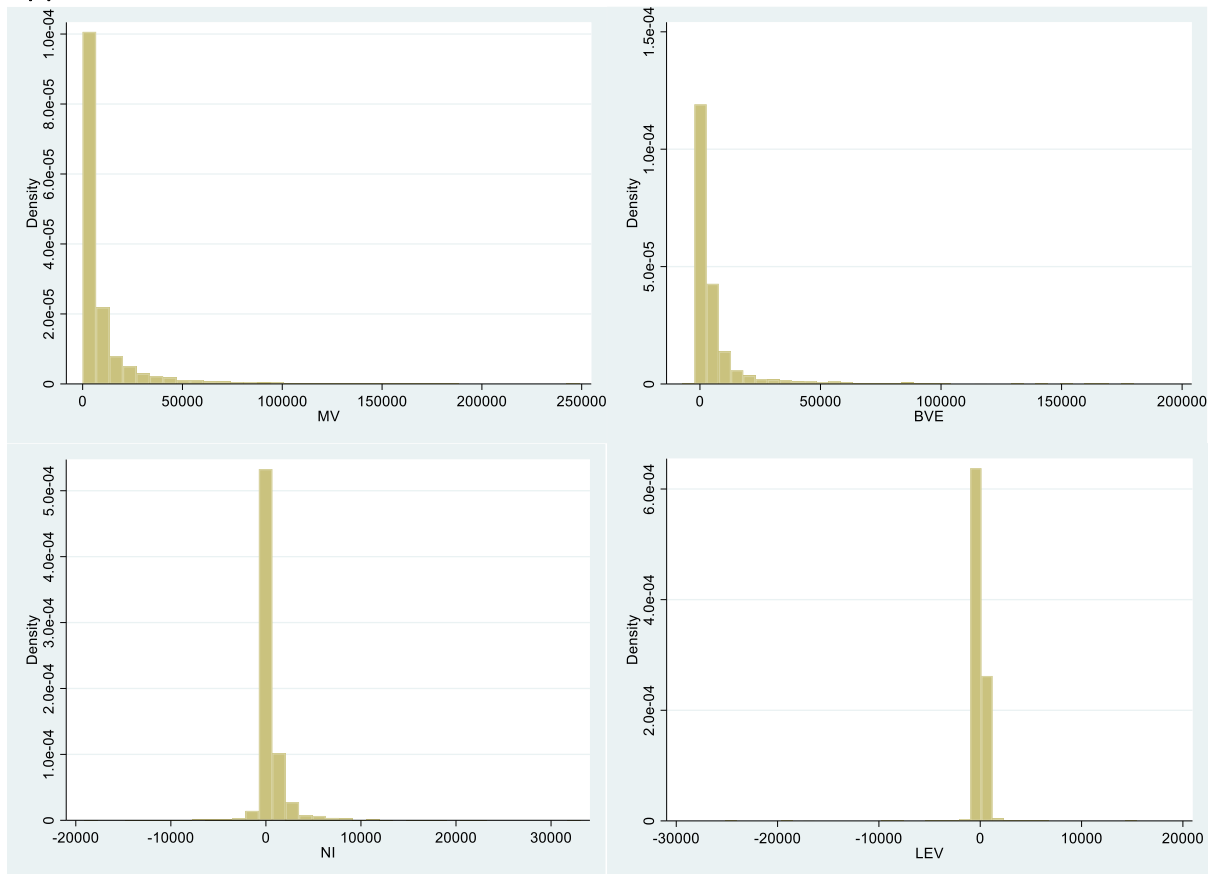


Figure 3 Histograms

## Appendix 2 VIF tests

| Variable       | Model 1 |          | Model 2 |          | Model 3 |          | Model 4 |          | Model 5 |          |
|----------------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
|                | VIF     | 1/VIF    | VIF     | 1/VIF    | VIF     | 1/VIF    | VIF     | 1/VIF    | VIF     | 1/VIF    |
| BVE            | 1.65    | 0.605496 | 1.60    | 0.624539 | 1.59    | 0.629677 | 1.67    | 0.599015 | 1.66    | 0.603094 |
| NI             | 9.61    | 0.104014 | 2.57    | 0.389587 | 2.69    | 0.372337 | 9.65    | 0.103597 | 9.65    | 0.103672 |
| CSR            | 1.22    | 0.816972 |         |          |         |          | 1.23    | 0.816062 | 1.24    | 0.807004 |
| NI_CSR         | 9.54    | 0.104846 |         |          |         |          | 10.86   | 0.092090 | 11.08   | 0.090283 |
| CULTURE        |         |          | 1.35    | 0.738307 |         |          | 1.33    | 0.750149 |         |          |
| NI_CULTURE     |         |          | 2.42    | 0.413719 |         |          |         |          |         |          |
| BGD            |         |          |         |          | 1.24    | 0.803797 |         |          | 1.23    | 0.811309 |
| NI_BGD         |         |          |         |          | 2.39    | 0.418016 |         |          |         |          |
| NI_CSR_CULTURE |         |          |         |          |         |          | 2.32    | 0.430559 |         |          |
| NI_CSR_BGD     |         |          |         |          |         |          |         |          | 2.46    | 0.407026 |
| YEAR           |         |          |         |          |         |          |         |          |         |          |
| 2012           | 1.71    | 0.583780 | 1.71    | 0.583640 | 1.72    | 0.582912 | 1.71    | 0.583739 | 1.72    | 0.582834 |
| 2013           | 1.71    | 0.583230 | 1.71    | 0.583304 | 1.73    | 0.579357 | 1.71    | 0.583215 | 1.73    | 0.579261 |
| 2014           | 1.71    | 0.583434 | 1.71    | 0.583519 | 1.75    | 0.572299 | 1.71    | 0.583420 | 1.75    | 0.572259 |
| 2015           | 1.72    | 0.582069 | 1.72    | 0.582690 | 1.77    | 0.563910 | 1.72    | 0.582063 | 1.77    | 0.563641 |
| 2016           | 1.72    | 0.581453 | 1.72    | 0.582555 | 1.79    | 0.557477 | 1.72    | 0.581395 | 1.79    | 0.557106 |
| 2017           | 1.72    | 0.580096 | 1.72    | 0.581828 | 1.81    | 0.552094 | 1.72    | 0.580062 | 1.81    | 0.551517 |
| IND            |         |          |         |          |         |          |         |          |         |          |
| 2              | 2.51    | 0.398688 | 2.49    | 0.401363 | 2.49    | 0.401508 | 2.52    | 0.397122 | 2.52    | 0.396969 |
| 3              | 1.70    | 0.588071 | 1.70    | 0.588469 | 1.70    | 0.588511 | 1.70    | 0.587290 | 1.70    | 0.587188 |
| 4              | 1.64    | 0.611535 | 1.65    | 0.606231 | 1.63    | 0.613016 | 1.66    | 0.604041 | 1.64    | 0.611434 |

|          |      |          |      |          |      |          |      |          |      |          |
|----------|------|----------|------|----------|------|----------|------|----------|------|----------|
| 5        | 2.70 | 0.370414 | 2.65 | 0.377091 | 2.66 | 0.376300 | 2.70 | 0.370058 | 2.71 | 0.369491 |
| 6        | 1.60 | 0.623232 | 1.59 | 0.629360 | 1.59 | 0.629887 | 1.61 | 0.622068 | 1.61 | 0.622569 |
| 7        | 2.65 | 0.376956 | 2.65 | 0.377178 | 2.65 | 0.377303 | 2.66 | 0.376178 | 2.66 | 0.376336 |
| 8        | 1.61 | 0.622904 | 1.60 | 0.626043 | 1.60 | 0.626298 | 1.61 | 0.622451 | 1.61 | 0.622603 |
| 9        | 1.44 | 0.693039 | 1.42 | 0.705383 | 1.42 | 0.705931 | 1.44 | 0.692149 | 1.44 | 0.692480 |
| 10       | 1.48 | 0.677361 | 1.48 | 0.677631 | 1.48 | 0.676472 | 1.48 | 0.677224 | 1.48 | 0.675936 |
| 11       | 1.47 | 0.679582 | 1.47 | 0.679903 | 1.47 | 0.680698 | 1.47 | 0.678783 | 1.47 | 0.679103 |
| LEV      | 1.02 | 0.978737 | 1.02 | 0.980120 | 1.02 | 0.978759 | 1.02 | 0.978443 | 1.02 | 0.977700 |
| GQ       | 1.04 | 0.962963 | 1.27 | 0.788134 | 1.07 | 0.932299 | 1.27 | 0.787619 | 1.08 | 0.928571 |
| Mean VIF | 2.42 |          | 1.78 |          | 1.78 |          | 2.44 |          | 2.45 |          |

Table 6 VIF tests

BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). BGD is a dummy (value 0 when the percentage of female board members is below the median, value 1 otherwise). Leverage is the ratio of debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.

### Appendix 3 Wooldridge test for autocorrelation

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

$$F(1, 781) = 12.153$$

$$\text{Prob} > F = 0.0005$$

Figure 4 Wooldridge test

### Appendix 4 Breusch-Pagan test for homoscedasticity

#### Model 1

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of MV

$$\text{chi2}(1) = 19329.96$$

$$\text{Prob} > \text{chi2} = 0.0000$$

#### Model 2

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of MV

$$\text{chi2}(1) = 18945.76$$

$$\text{Prob} > \text{chi2} = 0.0000$$

#### Model 3

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of MV

$$\text{chi2}(1) = 17624.99$$

$$\text{Prob} > \text{chi2} = 0.0000$$

#### Model 4

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of MV

$$\text{chi2}(1) = 19936.76$$

$$\text{Prob} > \text{chi2} = 0.0000$$

#### Model 5

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of MV

$$\text{chi2}(1) = 18557.38$$

$$\text{Prob} > \text{chi2} = 0.0000$$

Figure 5 Breusch-Pagan tests

### Appendix 5 Random effects model with VCE

| VARIABLES | Model 1              | Model 2              | Model 3              | Model 4              | Model 5              |
|-----------|----------------------|----------------------|----------------------|----------------------|----------------------|
| BVE       | 0.86008***<br>(9.20) | 0.85819***<br>(9.17) | 0.82735***<br>(8.64) | 0.85737***<br>(9.29) | 0.83672***<br>(8.78) |
| NI        | 0.41116              | 0.55606*             | 0.32533*             | 0.46354              | 0.43319              |



|                   |               |               |                |               |               |
|-------------------|---------------|---------------|----------------|---------------|---------------|
|                   | (1.35)        | (1.72)        | (1.75)         | (1.57)        | (1.41)        |
| CSR               | 511.58084*    |               |                | 494.49625*    | 520.74524**   |
|                   | (1.90)        |               |                | (1.82)        | (1.98)        |
| NI_CSR            | 0.38629       |               |                | 0.13088       | -0.01509      |
|                   | (1.01)        |               |                | (0.31)        | (-0.04)       |
| CULTURE           |               | 1,303.61780*  |                | 1,357.65027*  |               |
|                   |               | (1.65)        |                | (1.72)        |               |
| NI_CULTURE        |               | 0.39984       |                |               |               |
|                   |               | (0.83)        |                |               |               |
| BGD               |               |               | 216.47424      |               | 336.90024     |
|                   |               |               | (0.95)         |               | (1.54)        |
| NI_BGD            |               |               | 0.79756**      |               |               |
|                   |               |               | (2.27)         |               |               |
| NI_CSR_CULTURE    |               |               |                | 0.43395       |               |
|                   |               |               |                | (0.81)        |               |
| NI_CSR_BGD        |               |               |                |               | 0.67463*      |
|                   |               |               |                |               | (1.84)        |
| LEV               | -0.27977***   | -0.28551**    | -0.25705***    | -0.27462***   | -0.27225***   |
|                   | (-2.76)       | (-2.54)       | (-2.69)        | (-2.74)       | (-2.74)       |
| GQ                | -42.26909     | -727.49396    | -99.14225      | -723.49243    | -97.74686     |
|                   | (-0.05)       | (-0.73)       | (-0.12)        | (-0.73)       | (-0.12)       |
| Constant          | 2,168.35522** | 2,212.61035** | 2,792.52148*** | 1,881.37781** | 2,366.70508** |
|                   | (2.26)        | (2.27)        | (2.77)         | (1.98)        | (2.39)        |
| Observations      | 5,471         | 5,471         | 5,471          | 5,471         | 5,471         |
| Number of isin    | 782           | 782           | 782            | 782           | 782           |
| Overall R-squared | 0,6465        | 0,6437        | 0,6459         | 0,6486        | 0,6489        |
| Year              | YES           | YES           | YES            | YES           | YES           |
| Industry          | YES           | YES           | YES            | YES           | YES           |

Robust z-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7 Random effects VCE cluster

BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). BGD is a dummy (value 0 when the percentage of female board members is below the median, value 1 otherwise). Leverage is the ratio of debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.

# Appendix 6 Regressions per year

| VARIABLES      | 2011<br>Model 1          | 2011<br>Model 2         | 2011<br>Model 3          | 2011<br>Model 4          | 2011<br>Model 5          | 2012<br>Model 1          | 2012<br>Model 2          | 2012<br>Model 3          | 2012<br>Model 4         | 2012<br>Model 5         |
|----------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|
| BVE            | 0.71796***<br>(25.02)    | 0.77965***<br>(27.19)   | 0.75175***<br>(26.47)    | 0.71437***<br>(24.82)    | 0.69770***<br>(24.40)    | 0.57850***<br>(19.51)    | 0.64682***<br>(22.60)    | 0.64829***<br>(23.34)    | 0.57741***<br>(20.06)   | 0.59905***<br>(20.38)   |
| NI             | 0.55556<br>(1.48)        | 2.60153***<br>(11.44)   | 1.98348***<br>(10.95)    | 0.55854<br>(1.49)        | 0.60377<br>(1.63)        | 0.72130**<br>(2.05)      | 2.62945***<br>(10.17)    | 1.41061***<br>(6.65)     | 0.67113*<br>(1.96)      | 0.66541*<br>(1.92)      |
| CSR            | 3,106.24829***<br>(5.57) |                         |                          | 3,139.86816***<br>(5.63) | 2,962.82739***<br>(5.38) | 2,030.10791***<br>(3.20) |                          |                          | 1,900.56775**<br>(3.09) | 1,805.88672**<br>(2.89) |
| NI_CSR         | 2.07605***<br>(5.32)     |                         |                          | 2.14993***<br>(5.25)     | 1.78747***<br>(4.58)     | 1.82190***<br>(4.57)     |                          |                          | 3.46612***<br>(7.71)    | 1.22746***<br>(3.00)    |
| CULTURE        |                          | 1,194.82776**<br>(1.97) |                          | 1,047.90979*<br>(1.81)   |                          |                          | 708.00342<br>(1.05)      |                          | 1,355.13428**<br>(2.10) |                         |
| NI_CULTURE     |                          | -0.64229**<br>(-2.42)   |                          |                          |                          |                          | -1.04343***<br>(-3.33)   |                          |                         |                         |
| BGD            |                          |                         | -990.66803<br>(-1.54)    |                          | -426.70303<br>(-0.70)    |                          |                          | 191.50626<br>(0.29)      |                         | 609.80164<br>(0.95)     |
| NI_BGD         |                          |                         | 2.18906***<br>(6.34)     |                          |                          |                          |                          | 2.37956***<br>(6.96)     |                         |                         |
| NI_CSR_CULTURE |                          |                         |                          | -0.16161<br>(-0.60)      |                          |                          |                          |                          | -2.39756***<br>(-7.12)  |                         |
| NI_CSR_BGD     |                          |                         |                          |                          | 1.62827***<br>(4.83)     |                          |                          |                          |                         | 1.88846***<br>(5.32)    |
| LEV            | -1.48907***<br>(-2.80)   | -1.70917***<br>(-3.11)  | -1.59082***<br>(-2.96)   | -1.47027***<br>(-2.75)   | -1.40163***<br>(-2.67)   | -0.81692<br>(-1.24)      | -1.45399**<br>(-2.17)    | -0.91767<br>(-1.42)      | -0.92294<br>(-1.44)     | -0.80814<br>(-1.25)     |
| GQ             | 661.96136<br>(1.27)      | 81.02966<br>(0.14)      | 302.51624<br>(0.57)      | 261.09982<br>(0.46)      | 572.69440<br>(1.11)      | -853.66351<br>(-1.45)    | -924.95941<br>(-1.40)    | -1,006.79047*<br>(-1.72) | -943.62732<br>(-1.50)   | -960.92645*<br>(-1.65)  |
| Constant       | 1,139.19189<br>(1.17)    | 2,482.82715**<br>(2.55) | 3,558.25488***<br>(3.76) | 793.32794<br>(0.80)      | 1,576.63721<br>(1.62)    | 2,930.01880***<br>(2.68) | 3,478.06470***<br>(3.24) | 3,993.23413***<br>(3.85) | 2,172.54419**<br>(2.02) | 3,026.83057**<br>(2.81) |
| Observations   | 782                      | 782                     | 782                      | 782                      | 782                      | 780                      | 780                      | 780                      | 780                     | 780                     |
| R-squared      | 0.79064                  | 0.77375                 | 0.78292                  | 0.79155                  | 0.79702                  | 0.68857                  | 0.67883                  | 0.69580                  | 0.70819                 | 0.70189                 |
| Industry       | YES                      | YES                     | YES                      | YES                      | YES                      | YES                      | YES                      | YES                      | YES                     | YES                     |

t-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

| VARIABLES          | 2013<br>Model 1          | 2013<br>Model 2         | 2013<br>Model 3          | 2013<br>Model 4         | 2013<br>Model 5         | 2014<br>Model 1          | 2014<br>Model 2       | 2014<br>Model 3        | 2014<br>Model 4       | 2014<br>Model 5        |
|--------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-----------------------|------------------------|-----------------------|------------------------|
| BVE                | 0.78142***<br>(23.50)    | 0.81761***<br>(25.16)   | 0.81990***<br>(24.40)    | 0.77974***<br>(23.35)   | 0.78347***<br>(22.77)   | 0.66928***<br>(17.81)    | 0.69811***<br>(18.79) | 0.72043***<br>(19.33)  | 0.65798***<br>(17.66) | 0.68556***<br>(18.30)  |
| NI                 | 3.37098***<br>(3.57)     | 3.73031***<br>(10.72)   | 3.36884***<br>(9.64)     | 3.33179***<br>(3.52)    | 3.22873***<br>(3.40)    | 2.99619***<br>(3.85)     | 4.08032***<br>(9.26)  | 6.45036***<br>(13.54)  | 3.02497***<br>(3.92)  | 2.81136***<br>(3.65)   |
| CSR                | 3,099.66064***<br>(3.96) |                         |                          | 3,112.24414**<br>*      | 2,943.71216<br>***      | 2,641.90723***<br>(3.35) |                       |                        | 2,567.04785**<br>*    | 2,351.26343*<br>**     |
| NI_CSR             | 0.15937<br>(0.17)        |                         |                          | 0.22974<br>(0.23)       | 0.18971<br>(0.19)       | 2.32040***<br>(2.84)     |                       |                        | 1.17513<br>(1.37)     | 3.99773***<br>(4.53)   |
| CULTURE            |                          | 529.05090<br>(0.65)     |                          | 530.30084<br>(0.67)     |                         |                          | -162.63667<br>(-0.19) |                        | 227.85716<br>(0.28)   |                        |
| NI_CULTURE         |                          | -0.32710<br>(-0.77)     |                          |                         |                         |                          | 1.93620***<br>(3.78)  |                        |                       |                        |
| BGD                |                          |                         | 1,194.67712<br>(1.55)    |                         | 996.53961<br>(1.32)     |                          |                       | 2,022.36768**<br>*     |                       | 1,664.19751*<br>*      |
| NI_BGD             |                          |                         | 0.33522<br>(0.78)        |                         |                         |                          |                       | -2.28550***<br>(-4.29) |                       |                        |
| NI_CSR_CULTU<br>RE |                          |                         |                          | -0.05994<br>(-0.14)     |                         |                          |                       |                        | 2.22433***<br>(4.29)  |                        |
| NI_CSR_BGD         |                          |                         |                          |                         | 0.23250<br>(0.54)       |                          |                       |                        |                       | -2.47679***<br>(-4.57) |
| LEV                | -0.39847<br>(-0.45)      | -0.27209<br>(-0.31)     | -0.16644<br>(-0.19)      | -0.40272<br>(-0.46)     | -0.33049<br>(-0.37)     | -0.08441<br>(-0.09)      | 0.19759<br>(0.21)     | 0.17221<br>(0.19)      | -0.11904<br>(-0.13)   | 0.02096<br>(0.02)      |
| GQ                 | -863.32880<br>(-1.23)    | -1,154.22571<br>(-1.48) | -1,253.29810*<br>(-1.74) | -1,078.18433<br>(-1.39) | -1,081.25403<br>(-1.51) | 169.60245<br>(0.24)      | -317.76065<br>(-0.40) | -82.39697<br>(-0.11)   | -405.60220<br>(-0.52) | 87.42857<br>(0.12)     |
| Constant           | 1,648.09558<br>(1.26)    | 3,153.47290**<br>(2.48) | 3,021.83423**<br>(2.39)  | 1,496.50574<br>(1.12)   | 1,489.45923<br>(1.13)   | 998.32520<br>(0.74)      | 2,788.94727*<br>*     | 1,360.42615<br>(1.04)  | 1,447.67468<br>(1.06) | 255.77058<br>(0.19)    |
| Observations       | 782                      | 782                     | 782                      | 782                     | 782                     | 781                      | 781                   | 781                    | 781                   | 781                    |
| R-squared          | 0.71223                  | 0.70599                 | 0.70726                  | 0.71239                 | 0.71317                 | 0.73034                  | 0.72659               | 0.72812                | 0.73748               | 0.73784                |
| Industry           | YES                      | YES                     | YES                      | YES                     | YES                     | YES                      | YES                   | YES                    | YES                   | YES                    |

t-statistics in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

| VARIABLES          | 2015<br>Model 1         | 2015<br>Model 2              | 2015<br>Model 3         | 2015<br>Model 4         | 2015<br>Model 5         | 2016<br>Model 1         | 2016<br>Model 2       | 2016<br>Model 3              | 2016<br>Model 4         | 2016<br>Model 5          |
|--------------------|-------------------------|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-----------------------|------------------------------|-------------------------|--------------------------|
| BVE                | 0.93328***<br>(28.94)   | 0.94300***<br>(30.24)        | 0.97400***<br>(30.73)   | 0.93220***<br>(29.46)   | 0.95933***<br>(29.77)   | 0.68709***<br>(23.11)   | 0.70571***<br>(23.48) | 0.69372***<br>(23.62)        | 0.68112***<br>(22.56)   | 0.67731***<br>(22.74)    |
| NI                 | 2.81601***<br>(2.97)    | 3.95437***<br>(9.25)         | 8.15895***<br>(13.38)   | 2.75831***<br>(2.97)    | 2.50679***<br>(2.68)    | 2.34559***<br>(2.92)    | 4.02126***<br>(8.01)  | 5.52024***<br>(7.26)         | 2.28685***<br>(2.83)    | 2.22504***<br>(2.77)     |
| CSR                | 3,829.57813**<br>(4.13) |                              |                         | 3,854.50098**<br>(4.25) | 3,410.43384**<br>(3.69) | 4,022.96924**<br>(4.47) |                       |                              | 4,101.40234**<br>(4.56) | 3,686.14771***<br>(4.07) |
| NI_CSR             | 2.69782***<br>(2.80)    |                              |                         | 0.94662<br>(0.95)       | 5.87600***<br>(5.23)    | 1.63891*<br>(1.95)      |                       |                              | 1.47368<br>(1.56)       | 3.30561***<br>(2.99)     |
| CULTURE            |                         | 35.42925<br>(0.04)           |                         | 609.63745<br>(0.66)     |                         |                         | 1,193.29858<br>(1.24) |                              | 1,404.62646<br>(1.52)   |                          |
| NI_CULTURE         |                         | 2.53820***<br>(4.77)         |                         |                         |                         |                         | -0.21096<br>(-0.33)   |                              |                         |                          |
| BGD                |                         |                              | 1,954.81653**<br>(2.21) |                         | 1,109.46350<br>(1.28)   |                         |                       | 2,811.20044<br>***<br>(3.08) |                         | 2,206.95239**<br>(2.48)  |
| NI_BGD             |                         |                              | -3.42844***<br>(-5.04)  |                         |                         |                         |                       | -1.91273**<br>(-2.37)        |                         |                          |
| NI_CSR_CULTUR<br>E |                         |                              |                         | 3.06076***<br>(5.79)    |                         |                         |                       |                              | 0.32569<br>(0.51)       |                          |
| NI_CSR_BGD         |                         |                              |                         |                         | -3.58232***<br>(-5.22)  |                         |                       |                              |                         | -1.80655**<br>(-2.16)    |
| LEV                | 0.07537<br>(0.12)       | 0.16320<br>(0.25)            | 0.47995<br>(0.74)       | 0.02537<br>(0.04)       | 0.35333<br>(0.55)       | 0.12203<br>(0.20)       | 0.30278<br>(0.49)     | 0.21010<br>(0.34)            | 0.13412<br>(0.22)       | 0.07482<br>(0.12)        |
| GQ                 | -61.08760<br>(-0.07)    | -820.48407<br>(-0.88)        | -652.56110<br>(-0.77)   | -639.79633<br>(-0.71)   | -369.27112<br>(-0.44)   | 167.44069<br>(0.21)     | -590.67365<br>(-0.65) | -537.63800<br>(-0.64)        | -457.29611<br>(-0.51)   | -193.92903<br>(-0.23)    |
| Constant           | 1,924.63562<br>(1.20)   | 4,554.87402**<br>*<br>(3.00) | 3,606.31226**<br>(2.35) | 1,681.94385<br>(1.05)   | 1,743.04565<br>(1.09)   | -1,030.54553<br>(-0.66) | 1,307.01074<br>(0.88) | 312.41418<br>(0.21)          | -1,426.21362<br>(-0.91) | -1,823.19348<br>(-1.16)  |
| Observations       | 782                     | 782                          | 782                     | 782                     | 782                     | 782                     | 782                   | 782                          | 782                     | 782                      |
| R-squared          | 0.74693                 | 0.74289                      | 0.74370                 | 0.75865                 | 0.75573                 | 0.63597                 | 0.62029               | 0.62532                      | 0.63743                 | 0.64014                  |
| Industry           | YES                     | YES                          | YES                     | YES                     | YES                     | YES                     | YES                   | YES                          | YES                     | YES                      |

t-statistics in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

| VARIABLES          | 2017<br>Model 1          | 2017<br>Model 2        | 2017<br>Model 3          | 2017<br>Model 4          | 2017<br>Model 5              |
|--------------------|--------------------------|------------------------|--------------------------|--------------------------|------------------------------|
| BVE                | 0.75050***<br>(18.62)    | 0.69440***<br>(16.33)  | 0.75229***<br>(19.13)    | 0.65870***<br>(15.71)    | 0.73337***<br>(18.77)        |
| NI                 | 4.96083***<br>(5.42)     | 2.99471***<br>(9.01)   | 8.65337***<br>(11.47)    | 5.47850***<br>(6.07)     | 4.85706***<br>(5.49)         |
| CSR                | 4,654.60010***<br>(4.73) |                        |                          | 4,254.41992***<br>(4.42) | 3,800.67334*<br>**<br>(3.95) |
| NI_CSR             | -1.51656<br>(-1.64)      |                        |                          | -2.73873***<br>(-2.94)   | 3.82076***<br>(3.35)         |
| CULTURE            |                          | 149.11786<br>(0.14)    |                          | 273.07632<br>(0.27)      |                              |
| NI_CULTURE         |                          | 2.43877***<br>(5.05)   |                          |                          |                              |
| BGD                |                          |                        | 4,031.54956***<br>(4.00) |                          | 3,005.07300*<br>**<br>(3.07) |
| NI_BGD             |                          |                        | -5.43555***<br>(-7.28)   |                          |                              |
| NI_CSR_CULTUR<br>E |                          |                        |                          | 2.89512***<br>(6.01)     |                              |
| NI_CSR_BGD         |                          |                        |                          |                          | -5.62208***<br>(-7.47)       |
| LEV                | -1.61261***<br>(-4.27)   | -1.66303***<br>(-4.42) | -1.61064***<br>(-4.35)   | -1.66893***<br>(-4.53)   | -1.59311***<br>(-4.36)       |
| GQ                 | 1,210.61792<br>(1.37)    | -166.91890<br>(-0.17)  | 461.83224<br>(0.52)      | -6.49074<br>(-0.01)      | 911.47589<br>(1.03)          |
| Constant           | -1,865.49597<br>(-1.09)  | 2,045.55823<br>(1.29)  | -1,979.66260<br>(-1.21)  | -935.99066<br>(-0.55)    | 4,060.26172*<br>*<br>(-2.38) |
| Observations       | 782                      | 782                    | 782                      | 782                      | 782                          |
| R-squared          | 0.69512                  | 0.69780                | 0.70726                  | 0.71045                  | 0.71615                      |
| Industry           | YES                      | YES                    | YES                      | YES                      | YES                          |

t-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8 Regressions per year

BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). BGD is a dummy (value 0 when the percentage of female board members is below the median, value 1 otherwise). Leverage is the ratio debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.

## Appendix 7 Regression robustness check BGD

| VARIABLES         | Model 3                 | Model 5                |
|-------------------|-------------------------|------------------------|
| BVE               | 0.86267***<br>(45.16)   | 0.86548***<br>(46.15)  |
| NI                | 0.75364***<br>(11.56)   | 0.38658***<br>(2.68)   |
| CSR               |                         | 473.30392*<br>(1.83)   |
| DummyG            | 656.72919**<br>(2.53)   | 720.52527***<br>(2.80) |
| NI_DummyG         | -0.08901<br>(-0.84)     |                        |
| NI_CSR            |                         | 0.47198***<br>(3.09)   |
| NI_CSR_DummyG     |                         | -0.23222**<br>(-2.15)  |
| LEV               | -0.29111***<br>(-2.61)  | -0.28300**<br>(-2.52)  |
| GQ                | -163.21086<br>(-0.25)   | -160.45561<br>(-0.26)  |
| Constant          | 2,503.92285**<br>(2.18) | 2,166.85352*<br>(1.92) |
| Observations      | 5,471                   | 5,471                  |
| Number of isin    | 782                     | 782                    |
| Overall R-squared | 0,6423                  | 0,6473                 |
| Year              | YES                     | YES                    |
| Industry          | YES                     | YES                    |

z-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 9 Robustness check BGD dummy

BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). DummyG is a dummy (value 0 when the percentage of female board members is below 30%, value 1 otherwise). Leverage is the ratio of debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.

## Appendix 8 Distribution DummyG

| DummyG | Freq. | Percent | Cum.   |
|--------|-------|---------|--------|
| 0      | 4,285 | 78.32   | 78.32  |
| 1      | 1,186 | 21.68   | 100.00 |
| Total  | 5,471 | 100.00  |        |

Table 10 Distribution BGD dummy

## Appendix 9 Robustness check logarithms

| VARIABLES | Model 1    | Model 2    | Model 3    | Model 4    | Model 5    |
|-----------|------------|------------|------------|------------|------------|
| BVE       | 0.86008*** | 0.85819*** | 0.82735*** | 0.85737*** | 0.83672*** |

|                   |              |              |               |               |               |
|-------------------|--------------|--------------|---------------|---------------|---------------|
|                   | (46.43)      | (45.75)      | (43.53)       | (46.21)       | (44.66)       |
| NI                | 0.41116***   | 0.55606***   | 0.32533***    | 0.46354***    | 0.43319***    |
|                   | (2.85)       | (7.06)       | (4.29)        | (3.20)        | (3.02)        |
| CSR               | 511.58084**  |              |               | 494.49625*    | 520.74524**   |
|                   | (1.98)       |              |               | (1.91)        | (2.02)        |
| NI_CSR            | 0.38629***   |              |               | 0.13088       | -0.01509      |
|                   | (2.60)       |              |               | (0.80)        | (-0.10)       |
| CULTURE           |              | 1,303.61780* |               | 1,357.65027** |               |
|                   |              | (1.83)       |               | (1.96)        |               |
| NI_CULTURE        |              | 0.39984***   |               |               |               |
|                   |              | (3.49)       |               |               |               |
| BGD               |              |              | 216.47424     |               | 336.90024     |
|                   |              |              | (1.02)        |               | (1.58)        |
| NI_BGD            |              |              | 0.79756***    |               |               |
|                   |              |              | (8.57)        |               |               |
| NI_CSR_CULTURE    |              |              |               | 0.43395***    |               |
|                   |              |              |               | (3.64)        |               |
| NI_CSR_BGD        |              |              |               |               | 0.67463***    |
|                   |              |              |               |               | (7.01)        |
| LEV               | -0.27977**   | -0.28551**   | -0.25705**    | -0.27462**    | -0.27225**    |
|                   | (-2.49)      | (-2.56)      | (-2.32)       | (-2.44)       | (-2.44)       |
| GQ                | -42.26909    | -727.49396   | -99.14225     | -723.49243    | -97.74686     |
|                   | (-0.07)      | (-1.03)      | (-0.15)       | (-1.05)       | (-0.16)       |
| Constant          | 2,168.35522* | 2,212.61035* | 2,792.52148** | 1,881.37781*  | 2,366.70508** |
|                   | (1.93)       | (1.90)       | (2.43)        | (1.65)        | (2.10)        |
| Observations      | 5,471        | 5,471        | 5,471         | 5,471         | 5,471         |
| Number of isin    | 782          | 782          | 782           | 782           | 782           |
| Overall R-squared | 0,6465       | 0,6437       | 0,6459        | 0,6486        | 0,6489        |
| Year              | YES          | YES          | YES           | YES           | YES           |
| Industry          | YES          | YES          | YES           | YES           | YES           |

z-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 11 Robustness check with logarithms

BVE is the total shareholders' equity in millions. NI is net income after preferred dividends in millions. IR is a dummy variable (value 0 when the CSR score is below the median, value 1 otherwise). CULTURE is a dummy (value 0 when the culture score is below the median, value 1 otherwise). BGD is a dummy (value 0 when the percentage of female board members is below the median, value 1 otherwise). Leverage is the ratio of debt to total assets. GC is a dummy (Value 1 in case of a gender quota, value 0 otherwise). YEAR is a dummy for every year. IND is a dummy for every industry.