Association between corporate social responsibility and goodwill impairment: evidence from the European Union

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Abstract: I examine the association between corporate social responsibility (CSR) and goodwill impairment (GWI) in the European Union. A stream of literature indicates that CSR is associated with determinants of GWI. Prior literature has shown that each CSR component could generate individual effects. Therefore, I focus on disaggregating CSR into its main categories: environmental, social, and governance (ESG). I believe it is beneficial to provide evidence on the individual effects of ESG on GWI, as CSR affects multiple mergers and acquisitions (M&A) processes as well as the post-merger deal performance. Governance activities are in short-term associated with GWI, while social activities reveal a longer-term association (until $t + 3$). Furthermore, I investigate the association between ESG and the discretionary (unexpected) GWI losses. The results show that managers who engage in governance and environmental activities seem to act more ethically regarding earnings management behaviour.

Keywords: corporate social responsibility; CSR; goodwill impairment; GWI; mergers and acquisitions; environmental social and governance; ESG.

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Biographical notes: Alexander Nevrela works as a researcher at the Professorship of General Business, esp. Finance and Accounting at the University of Bremen (Germany). His current research projects combine two major research streams – goodwill impairment and corporate social responsibility. He studied at the University of Bremen and at the Macau University of Science and Technology (special administrative region of China). He graduated from the University of Bremen in 2015 with a Master's in Business Studies with a specialisation in finance.

1 Introduction

In this study, I investigate the association between corporate social responsibility (CSR) and goodwill impairment (GWI) in the European Union (EU).

GWI (no impairment) is an indicator of bad (good) mergers and acquisition (M&A) deal decisions. Finding reliable determinants of GWI could improve early-stage prediction of post M&A deal performance, which is one of the most frequently discussed issues for practitioners and researchers. CSR is considered to be one of the key driver before, while and after M&A transactions. This study reveals whether individual CSR activities (environmental, social, governance, ESG) are further indicators associated with GWIs and, thus, affect post-merger deal performance. Furthermore, the study sheds light on the ongoing controversial discussion about the effectiveness of CSR activities for executive companies.

For DAX, MDAX and TecDAX indices, the balance sheet item goodwill nearly doubled since 2004, while the total assets increased only about 40%–50% in the same period (Zuelch and Stork, 2017). This growth might be because of M&A market booms[1], or because manager may use the discretion in GWI opportunistically and do not write-off goodwill when it would have been necessary (e.g., Ramanna and Watts, 2012; Detzen and Zülch, 2012). GWIs signal deficient investment decisions and are one of the main indicators for a poorer future firm performance than initially expected (e.g., Li et al., 2011; Bostwick et al., 2016; Baugh and Mauldin, 2018). GWI announcements lead to significantly negative market reactions (e.g., Li et al., 2011; Knauer and Wöhrmann, 2016). It is worth predicting the post-merger deal performance early enough to correct the strategic behaviour, thus preventing a failed merger and consequently GWIs. The failure rate[2] of M&A deals is estimated in about 70%–90% of all cases (e.g., Christensen et al., 2011; Koi-Akrofi, 2016; Joshi et al., 2020). These failures are mostly related to poor strategic planning, overpayment, lack of communication and integration of the employees, culture clashes and in general, poor stakeholder management (e.g., Balmer and Dinnie, 1999; Gadiesh and Ormiston, 2002; Lynch and Lind, 2002; Nguyen and Kleiner, 2003; Steger and Kummer, 2007; Koi-Akrofi, 2016).

The intended goal of CSR-activities goes beyond the scope of improving social and environmental behaviour, though. Primarily, positive CSR-activities should lead to a sustainable long-term firm performance.[3] Investors increasingly use firms' CSR performance for their investment decision making progress (USSIF 2018). As such, firms are generally expected to be punished by investors for socially bad behaviour and, in the long term, rewarded for socially responsible activities (e.g., Dhaliwal et al., 2014; Bhandari and Kohlbeck, 2016).

Most studies investigated the impact of an aggregated CSR-score or CSR disclosure. The majority of studies reveal progressive tendencies that CSR-activities have positive effects on GWI determinants such as accounting-based and/or market-based performance indicators, accounting quality, earnings management incentives or management skill levels (e.g., Carnegie and Napier, 2010; Cho et al., 2013; Jo and Harjoto, 2013; Scholtens and Kang, 2013; Bozzolan et al., 2015; Melián-González et al., 2015; Friede et al., 2015; Velte, 2017; Brooks and Oikonomou, 2018). Other studies reveal no or negative effects by CSR-activities, arguing that CSR is rather costly, opportunistically used for greenwashing purposes and inconsistent with the shareholders' interests and the shareholder value, (e.g., Margolis and Walsh, 2003; Orlitzky et al., 2003; Nelling and Webb, 2009; Krueger, 2015; Nollet et al., 2016), which maintains a controversial discussion. The contradictory findings are often explained by different variables of ESG or firm performance (Velte, 2017).

According to a survey by PWC (2012) many companies integrate ESG-factors into the evaluation of risk management and company valuation. Therefore, strong ESG activity is associated with a higher willingness to complete an M&A transaction (PWC, 2012) Furthermore, CSR activity is an important indicator for a company's culture, values and visions. M&A transactions with two companies highly engaging in CSR are considered to have a better 'cultural fit', less integration issues and therefore a better post-merger success (Bereskin et al., 2018). If ESG factors are legit risk indicators, higher CSR performance is likely to be associated with less GWIs.

To the best of our knowledge, only one study examined the relationship between CSR and GWI. The study by Golden et al. (2018) found that in the US context, the aggregated CSR-score is positively associated with the probability that GWI occurs and negatively associated with the magnitude of GWI.

However, the individual impact of CSR main categories remains principally unclear, as most studies investigated the impact of an aggregated CSR-score or CSR disclosure. A few studies have shown different effects of individual CSR activities on financial performance indicators (e.g., Cho et al., 2010; Velte, 2017). While governance activities are emphasised as a key driver of CSR effects, social activities seem to rather have longer-term effects (e.g., Kim et al., 2012; Deng et al., 2013; Velte, 2017; Golden et al., 2018). Accordingly, there is still a research gap regarding the distinct association of each CSR category, however, as well as the association in a longer-term perspective and the different effects between CSR and non-discretionary or discretionary GWI. The latter provides information about how CSR affects GWI through firm performance and earnings management incentives separately.

Using an overall CSR-Score makes it difficult to assess the performance effects generated by different CSR dimensions (Christensen et al., 2019). Especially investors rather focus on certain CSR dimensions that are associated with value relevant performance indicators (Amel-Zadeh and Serafeim, 2018). Accordingly, I focus on disaggregating CSR to observe the individual effects of environmental, social, and governance activities (ESG activities). I also analyse the associations from a longer-term perspective, as long-term effects are stated as one of the main goals of CSR. Additionally, I examine the effect of CSR on discretionary and non-discretionary GWIs.

I find that governance activities are associated with a lower likelihood of GWI in the short-term, while social activities show a significant negative association with the likelihood of an impairment loss in a longer-term (1–3 years) perspective. Governance and social activities seem to affect performance characteristics. Environmental and governance activities are associated with slightly more ethical behaviour regarding opportunistically impairment discretion.

This study contributes to the still controversial literature about the economic effects caused by CSR activity. I focus on effects in the context of post-M&A performance indicators by examining the association between the individual CSR categories and GWI within the EU.

The remainder of this paper is organised as follows: In Section 2, I describe the link between CSR and GWI based on prior literature and develop our hypotheses. I outline the research methodology and describe the data sample selection process in Section 3. In Section 4, I provide empirical findings, and I provide a summary in Section 5.

2 The link between CSR and GWI

Considering the two streams of literature within the past decade, there are indications that CSR is associated with GWI. Prior literature rudimentarily shows the importance of disaggregating CSR into main categories that measure its economic impact. Each category may have an individual impact on a firm. Here, I will point out the main findings from the literature on how CSR is linked to GWI. This will lead us to the hypotheses for our analysis.

In 2004, the EU issued a regulation requiring that all publicly traded companies in the EU apply the impairment-only approach in their annual reports (Commission Regulation (EC) No. 1606/2002). The intended goal is that goodwill better reflects the economic value, and that managers use the discretion of this approach to communicate positive private information about the firm's future performance to investors (signalling theory) and thus, increase the information usefulness (IAS 36, BC. 131). The derivative goodwill provides information about the expected economic usefulness and the expected synergies of an acquired company for the acquiring company. This has shown a significant positive association of synergies and the recognised goodwill (Detzen and Zülch, 2012). It also supports the purposed explanatory intention of the balance sheet item derivative goodwill. The higher the expected benefits, the higher the derivative goodwill, the closer the actual benefit to the expected benefit of an acquisition over time, the lower the GWI.

GWIs are economically significant, and financial analysts revise their expectations downwards after a GWI announcement (e.g., Li et al., 2011; Darrough et al., 2014). It consists of two parts. On one hand, there is a non-discretionary GWI that relates to what is determined by firm performance indicators. The vast majority of studies show that capital market-based and accounting market-based performance indicators often have a significantly negative association with the magnitude of GWI and with the probability that GWI occurs (binary) (e.g., Ramanna and Watts, 2012; Chao and Horng, 2013; Glaum et al., 2015; Golden et al., 2018). Firms with higher returns tend to be economically healthy, so there is less of a need for impairments. Furthermore, some studies reveal that GWIs are often caused by an overpayment, which, in turn, correlates with a manger's skill level (e.g., Hayn and Hughes, 2006; Bhattacharya and Jacobsen, 2018).

CSR has a strong impact on the aforementioned influencing factors of GWI and is considered to have a direct impact on post-M&A performance indicators such as GWI. One of the main goals of CSR is a sustainable and increasing long-term firm performance (BMAS). In 2002, a worldwide study by Ernst & Young found that 94% of companies thought that sustainable strategies might lead to better financial performance. According to the Forum for Sustainable and Responsible Investment (USSIF) (2018), the total amount in socially responsible investments (SRI) increased to $12 trillion by 2018, about six times more than in 2005 (about $2 trillion) and a 38% growth since 2016 (USSIF, 2018).

The majority of studies show that high CSR is associated with an improvement of various firm performance indicators (e.g., Margolis and Walsh, 2003; Margolis et al., 2009; Peloza, 2009; Horváthová, 2010; Dhaliwal et al., 2011; Cho et al., 2013; Gao and Zhang, 2015, Brooks and Oikonomou, 2018). The aforementioned evidence supports the stakeholder view that higher CSR leads to a higher CFP (Freeman, 1984). The main reason for an improvement in financial performance through CSR activities might be the satisfaction of stakeholders. Increasing the satisfaction of employees, suppliers, and

customers, for example, can lead to a higher commitment, stable relations, and a better long-term firm performance. Another reason might be a long-term cost reduction caused by CSR activities. The engagement in environmental, social and governance issues leads to fewer negative reactions from society, to tax advantages and hence, to a decrease in a firm's overall costs (Carroll and Shabana, 2010).

However, there are further explanations for a direct link between CSR and GWI. An M&A transaction are considered to generate uncertainty among different stakeholder (Joshi, 2013). A high CSR performance is supposed to reduce stakeholders' uncertainty and therefore increases the stakeholders' support towards the company contributing to a long-term profitability and efficiency (e.g., Edmans, 2011; Deng et al., 2013; Arouri et al., 2019). One of the reasons for less uncertainty relies on the companies' trustworthiness regarding the adherence to implicit contracts with their stakeholder. High CSR has an impact on the firms' reputation about the reliability to adhere to these implicit contracts (e.g., Klein et al., 2012; Deng et al., 2013; Liang et al., 2017). Additionally, prior literature show that high CSR firms reduce a probable conflict of interest between shareholder and stakeholder by a much better consideration of both parties welfare (Deng et al., 2013). This leads to less uncertainty, a lower probability of deal failure and a better post M&A-deal performance, which indicates a lower possibility of GWIs.

Over time, CSR has become a more relevant key success factor for M&A transactions (Meckl and Theuerkorn, 2015). CSR can also be seen as a risk indicator. Accordingly, many investors include ESG factors to their risk assessment processes and company valuations (PWC, 2012). ESG factors are associated with the investors' expectations about the pre-and post-M&A deal success (e.g., PWC, 2012; Arouri et al., 2019). Consequently, ESG factors play an important role in the negotiations before an M&A transaction (PWC, 2012). In addition, a better stakeholder relationship enables a better estimation of post-acquisition issues (Bettinazzi and Zollo, 2017). This risk assessment ability can be very important as some companies underestimated CSR-related risks, which therefore led to an impairment (Lucks and Meckl, 2015).

If CSR is a reliable risk indicator and a major factor before, while and after an M&A transaction, higher (lower) CSR should decrease (increase) the probability of GWIs.

To the best of our knowledge, Golden et al. (2018) are the first who analysed the association between CSR performance and GWI. They use aggregated CSR strength (concerns) to measure responsible (irresponsible) CSR activities. The US-sample includes 19,172 firm-year observations with 1,776 impairments between 2002 and 2013. They found that firms with higher CSR activity seemed less likely to suffer GWI, but if such an impairment occurs, the positive CSR activity does not affect the magnitude, instead negative CSR is positively associated with the magnitude of GWI. Golden et al. (2018) also relied on the stakeholder theory, suggesting that firms have to satisfy the needs of different stakeholders. Stakeholder supports the firm by helping them achieving their goals, which might lead to better performance. Hence, it can be expected that socially responsible firms are less likely to suffer a goodwill write-off.

I want to shed light at three of the most discussed issues regarding the impact of CSR in prior literature. At first, I like to test whether all the impact derived from governance activities as some prior literature indicates. Measuring the effect of CSR, most studies have used an aggregated all-in-all CSR score, although some studies indicate that governance might be the key driver of CSR, as it correlates with the financial reporting behaviour and earnings informativeness (e.g., Bhagat and Bolton, 2008; Gao and Zhang,

2015). As for disaggregating CSR, some studies show that mainly governance activities affect the relationship between CSR and corporate financial performance (e.g., Revelli and Viviani, 2015; Nollet et al., 2016). For many investors CSR can be used as a risk indicator, where high CSR firms are less likely to suffer insolvency (e.g., Cox et al., 2004; Revelli and Viviani, 2015). Especially governance activities are expected to reduce companies' risk by better control and monitoring structures (Bassen et al., 2005). I thus propose and test the following hypothesis.

Hypothesis 1 The governance score is significantly negative associated with GWIs (binary and magnitude).

Second, many studies emphasise that CSR activities rather have long-term than short-term effects. Especially social-activities seem to develop competitive advantages in a longer-term perspective. Using a sample of around 600 mergers in the USA, Deng et al. (2013) examined the effect of firms' social activities on the success of mergers. They found that acquirers with high CSR activity exhibited higher merger announcement returns and an increase in post-merger long-term performance. Also, they needed less time to complete the transaction and lower the probability of a deal failure. One explanation is that high CSR firms usually have higher employee job satisfaction, which is an important determinant for the integrating process into the new firm structure after an M&A transaction. In Addition, these firms are expected to realise higher long-term abnormal stock returns (Edmans, 2011, 2012; Bereskin et al., 2018). Firms that engage more in CSR have a better reputation regarding commitments to stakeholders both during and after an M&A transaction process. In this case, stakeholders are more willing to cooperate and to contribute their efforts to the firm. Thus, the stakeholders and the shareholders benefit equally as it would increase the firm's long-term profit and efficiency (e.g., Jensen, 2001; Freeman, 2004; Deng et al., 2013). The positive effects of CSR on CFP have been observed in a longer-term perspective over four years (Flammer, 2015). Additionally, managers who engage in social activities are also considered more skilful overall, leading a firm to a better long-term financial performance (e.g., Moskowitz, 1972). Prior literature indicates that in short-term CSR could reveal negative performance effects but in long-term it often turns out to be positive (e.g., Barnett and Salomon, 2012; Nollet et al., 2016). CSR is costly and it could require a certain amount of investing time and money to transform it into beneficial effects. Especially social aspects are considered to have rather a long-term than a short-term impact. Therefore, I test the following hypothesis.

Hypothesis 2 In long-term (t + 1, 2 and 3) the social score is significantly negative associated with GWIs (binary and magnitude).

Third, GWI included a discretionary part, which is influenced by the discretionary behaviour of managers (signalling or opportunistically) and it is rather affected by earnings management incentives. Some managers do not use the discretion to convey private information about the firm's future performance, as initially intended (Ramanna and Watts, 2012). Prior studies point out that managers instead use discretion in GWI opportunistically (agency theory) (e.g., Beatty and Weber, 2006; Chalmers et al., 2011; Detzen and Zülch, 2012; Chao and Horng, 2013; Glaum et al., 2015; Giner and Pardo, 2015).

The generally mixed results regarding the effect of CSR do not only relate to the performance of a firm. It also applies to the impact of CSR on earnings management

behaviour. A stream of studies indicate that managers use CSR opportunistically and to strengthen their reputation (e.g., Hemingway and Maclagan, 2004; Petrovits, 2006; Prior et al., 2008). Managers who manipulate earnings divert the attention from earnings manipulating accounting methods to socially responsible activities (Grougiou et al., 2014). In contrast, prior literature suggests that CSR increases accounting quality, (e.g., Laux and Leuz, 2009; Carnegie and Napier, 2010) and/or that high CSR firms are less likely to use earnings management (e.g., Chih et al., 2008; Kim et al., 2012; Scholtens and Kang, 2013; Bozzolan et al., 2015). Managers who exhibit socially responsible behaviour tend to also be more responsible when it comes to earnings manipulations. Furthermore, CSR mitigates earnings smoothing and earnings loss avoidance but increases earning aggressiveness (Chih et al., 2008).

Therefore, I predict a negative direction of the association between CSR and the discretionary part of GWI. I thus propose and test the following hypothesis:

Hypothesis 3 Governance, social, and environmental scores are significantly negative associated with discretionary GWI.

To sum up, there is still a lack of research about the association between CSR and GWI in different countries/regimes, especially in the EU. In the study by Golden et al. (2018) a CSR all-in-all measure is used but they do not differ between certain CSR sub-components. As with several other studies in GWI research, it is reasonable to differentiate between discretionary GWI (influenced by earnings management) and non-discretionary (economic) GWI (influenced by firm performance).

3 Research design and data sample

3.1 Methodology

Most studies used the MSCI database (formerly known as the KLD database) to measure CSR and are constrained to a US-dataset. This study measures CSR-activity using ESG-data available from Thomson Reuters Datastream, which enables to focus on the European market. Generating the ESG measures, Thomson Reuter's collected 400 company-level ESG measures of which they used the 178 most comparable for the scoring process. Most importantly, Thomas Reuters Datastream provides single scores for each CSR category. In line with prior research, I separately measured positive (responsible CSR) and negative (irresponsible) CSR activities (e.g., Cho et al., 2012; Golden et al., 2018). The all-in-all scores show positive CSR activity (avESGSCORE; ESGSCORE1) and the other negative CSR activity (ESGCON) respectively controversies, which takes into account whether a scandal such as a lawsuit had occurred.

I used three main single scores for each of the three ESG categories environmental (ESGENV), social (ESGSOC), and governance (ESGGOV). ESGENV, the environmental score, comprises firms' use of resources, innovation processes to improve environmental protection, and their emission reduction. ESGSOC, the social score, consists of firms' human rights practices, how they protect public health, and how they approach business ethics, among other. And ESGGOV, the governance score, contains measures such as firms' equal treatment of shareholders. All accounting and financial market data are also collected from Thomas Reuters Datastream.

Based on prior literature, I use the following regression models and variables to test the association between the CSR-activities ESG and GWI:

$$\begin{aligned} binGWIMP = {} & \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} \\ & + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 MTB_{i,t} + \beta_7 OCF_{i,t} + \beta_8 LEV_{i,t} \\ & + \beta_9 ROA_{i,t} + \beta_{10} GW_{i,t} + \beta_{11} RET_{i,t} + \beta_{12} REV + \beta_{13} BATH \\ & + \beta_{14} SMOOTH + \beta_{15} BIG4 + \beta_{16} ENF + \beta_{17} SEG + \beta_{18} NOSHFF \\ & + \beta_{19} VOLA + Country, Industry\ and\ Year\ Indicators + \varepsilon_{i,t} \end{aligned} \quad (1)$$

$$\begin{aligned} tGWIMP = {} & \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} \\ & + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 MTB_{i,t} + \beta_7 OCF_{i,t} + \beta_8 LEV_{i,t} \\ & + \beta_9 ROA_{i,t} + \beta_{10} GW_{i,t} + \beta_{11} RET_{i,t} + \beta_{12} REV + \beta_{13} BATH \\ & + \beta_{14} SMOOTH + \beta_{15} BIG4 + \beta_{16} ENF + \beta_{17} SEG + \beta_{18} NOSHFF \\ & + \beta_{19} VOLA + Country, Industry\ and\ Year\ Indicators + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where *binGWIMP* is the binary GWI, which is 1 if GWI occurs and 0 otherwise. *tGWIMP* captures the magnitude of GWI, indicating whether the independent variables are associated with the amount of GWI, if an impairment occurs. I use several accounting-based and market-based performance indicators that have been used by others and have been most significant in a vast amount of prior literature.

The market-to-book ratio (MTB) is calculated as market value/book value. An MTB of less than one indicates that the market expects a GWI. Various findings show a significant positive (negative) association between the MTB (Book-to-market-ratio) and GWIs (e.g., Beatty and Weber, 2006; Ramanna and Watts, 2012; Giner and Pardo, 2015; Glaum et al., 2015). A firm's leverage (total debt/total assets) is indicated as LEV. To prevent debt covenants, firms with high leverage are expected to have less GWI by exercising loss avoiding discretion (e.g., Riedl, 2004; Lapointe-Antunes et al., 2008; Abu Ghazaleh et al., 2011). The return on asset (ROA) is net income/total assets. The yearly mean stock return (RET) and ROA are implemented in most GWI studies and have often shown a significant negative association between the magnitude of GWI and the probability that GWI occurs (binary) (e.g., Chao and Horng, 2013; Glaum et al., 2015; Golden et al., 2018). Firms with high returns tend to be economically healthy, so there is less of a need for an impairment. I complement a firm's economic health with the firms' revenues (REV) and the operating cash flow (OCF).

Furthermore, I implement variables for earnings management incentives such as bath-accounting (BATH) and earnings smoothing (SMOOTH). BATH (SMOOTH) is a dichotomous variable, which is 1 if the absolute value of the negative (positive) change in the scaled EBIT is below (above) the negative (positive) industry median change.

Prior studies provide contradicting evidence whether bath-accounting leads to more earnings management through GWI discretion. To some extent, managers recognise more GWI if the earnings goals cannot be achieved anyway. The purpose of this strategy is to lower the probability of future impairments to avoid future losses leading to better subsequent earnings performance. Income smoothing is another incentive for firms to utilise the discretion of GWI to lower the earnings. Prior surveys show a positive association between SMOOTH and binary GWI or discretionary GWI (e.g., Chao and Horng, 2013; Giner and Pardo, 2015; Glaum et al., 2015).

I also control for size (SIZE) through a natural logarithm of total assets, determine the natural logarithm of a firms amount of goodwill (GW), and use a weighted country-specific enforcement score (ENF) developed by Brown et al. (2014). The number of a firms segment (SEG) is based on the number of SIC CODES and the ratio of shares in free float to the total number of shares (NOSHFF).

For our regression analysis, I use a logit regression with robust standard errors with the binary GWI as a dependent variable. With the magnitude of GWI as a dependent variable, I run a Tobit regression with robust standard errors. In line with Glaum et al. (2018), I check for industry, country, and year fixed effects, and according to Golden et al. (2018), I clustered the standard errors at the firm level for all regressions I have made.

To test whether CSR is associated with GWI through the impact on firm performance or earnings management behaviour, I distinguish between discretionary and non-discretionary GWI. In the first step, I predict the economic (expected) GWI losses based on a function of economic determinants, which is in line with Chao and Horng (2013). The independent variables consist of ESG-Score based on a principal component analysis, accounting-and market-based performance indicators, and firm characteristics as control variables. Therefore, I use the following model to predict non-discretionary GWI:

$$\begin{aligned} tGWIMP = {} & \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} \\ & + \beta_4 ESGCON_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 MTB_{i,t} + \beta_6 OCF_{i,t} \\ & + \beta_7 ROA_{i,t} + \beta_8 GW_{i,t} + \beta_9 RET_{i,t} + \beta_{10} REV + \beta_{11} VOLA \\ & + \beta_{12} SEG + Country, Industry\ and\ Year\ Indicators + \varepsilon_{i,t} \end{aligned} \tag{3}$$

The discretionary part of GWI is unobservable. Hence, in the second step, I calculate the discretionary GWIs by subtracting the non-discretionary (expected) from the reported (actual) GWI. This procedure is applied by Chao and Horng (2013).

I use earnings management incentives and CSR categories to analyse the determinants of the discretionary GWI.

$$\begin{aligned} discr\ tGWIMP = {} & \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} \\ & + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 GW_{i,t} + \beta_7 LEV_{i,t} \\ & + \beta_8 BATH + \beta_9 SMOOTH + \beta_{10} BIG4 + \beta_{11} ENF \\ & + \beta_{12} NOSHFF + Country, Industry\ and\ Year\ Indicators + \varepsilon_{i,t} \end{aligned} \tag{4}$$

Analysing model 4 according to test Hypothesis 3, I differentiate between positive and negative discretionary GWIs. Positive discretion indicates an overstatement, while negative indicates an understatement of GWI.

3.2 Sample selection

Our initial data sample covers the fiscal years 2010–2017 and comprises 42,822 firm-year observations of capital market-oriented firms from the 15 largest European countries based on their GDP.

To assure a reliable analysis, we required continuously available ESG-data. This reduced our dataset to 5,678 firm-year observations. Furthermore, we discarded observations without goodwill, the negative book value of equity (as the interpretation

would differ considerably), and other data errors and missing data. These adaptions lead to a sample of 4729 firm-year observations. Eventually, we eliminated all financial companies out of our sample (SIC Code 6,000–6,799) because of their different financial statement structure. For our empirical analysis, we end up with a final sample of 3,871 firm-year observations.

Table 1 Sample construction process

	Firm years
EU companies for financial years 2010–2017	42,822
Less: non-ESG data	37,144
Less: negative goodwill impairments	25
Less: negative book value of equity	128
Less: no goodwill	250
Less: missing goodwill data	490
Less: other missing data	105
Less: financial institutions	809
Final Sample	*3,871*
Goodwill impairers	680
Non-goodwill impairers	3,191

4 Empirical findings

4.1 Descriptive statistics and correlations

Panel A of Table 2 presents the descriptive statistics of all variables used in the main regression. For the variables SIZE, GW, MTB, VOLA (i.e., firms' average volatility), LEV, REV (i.e., revenue scaled by total assets), and SEG, we use untransformed values. Furthermore, we only use the arithmetic average ESG Scores for interpretation purposes. We split the sample into impairers and non-impairers.

On average, goodwill impairers recognize a loss of 1.7% of total assets (tGWIMP). As expected, firm-years with impairment tend to consist of significantly larger firms (SIZE). This is why the proportion of goodwill of total assets (GW) is, on average, slightly higher in firm-years without impairment (35.0%). Untabulated results show on average a considerably higher absolute goodwill for firm-years with impairment. ROA, operating cash flow scaled by total assets (OCF), revenue scaled by total assets (REV) are, on average, significantly higher in firm-years without goodwill impairments. This indicates that goodwill impairers show a significantly lower profitability, which is in line with our expectations and prior literature, as discussed in Section 2. The average market-to-book ratio for non-impairers is 3.696 and 3.326 for impairers, which indicates that firms with a lower MTB seem to have a higher probability that a goodwill impairment occurs, even if it is above 1, but also that the MTB might not be a reliable predictor for goodwill impairments on a stand-alone basis. On average, goodwill impairers reveal a significantly higher number of segments (SEG), which is a proxy for the number of cash-generating units (CGU) to which a goodwill is allocated. This is in line with prior literature, indicating that the probability of an impairment is lower for a

smaller number of SEGs (e.g., Beatty and Weber 2006; Lapointe-Antunes et al., 2008; Glaum et al., 2018).

The incentive for bath accounting (BATH) is significantly higher for firm-years with goodwill impairments. This supports the argument that managers generally tend to write-off more goodwill, the stronger the incentives for BATH increasing the probability for a future profitability (Abu Ghazaleh et al. 2011). The incentive for income smoothing (SMOOTH) is lower for goodwill impairers, which is in line with our expectations. Big four (BIG4), VOLA, LEV, the national accounting and auditing enforcement index (ENF) and NOSHFF do not show significant differences between the two sub-samples.

The all-in-all average ESG-score and the average of the single CSR categories environmental (avESGENV) and social (avESGSOC) show significantly higher values for firm-years with impairment, which supports the shareholder view rather than the stakeholder theory. In contrast, goodwill impairers show a slightly lower governance score (avESGGOV), which is an indication of governance as a key driver of CSR, as stated above. These results do not indicate the positive effects of CSR activities as initially expected. Untabulated descriptives have shown that the ESG-score seems driven by the firms' size. Larger firms generally exhibit higher CSR activity and a higher amount of goodwill, which relates to a higher probability of goodwill impairments. However, the multivariate results in the next section will enable deeper analysis.

Panel B of Table 2 presents a correlation analysis for our dataset. Other than expected, three of the four key variables positively correlate with the amount of GWI (tGWIMP) and the probability that GWI occurs (binGWIMP). The average social (avESGSOC) and average environmental score (avESGENV), along with the all-in-all average ESG-score (avESGSCORE) are significantly positive correlated, while the governance score (avESGGOV) is insignificantly negative correlated with tGWIMP and binGWIMP. This indicates that just governance activities seem to pay off by fewer impairments. Again, the correlation support that the ESG scores, profitability, goodwill, and GWI are strongly driven by SIZE, which shows a significant positive correlation with all ESG measures. Furthermore, it correlates significantly negative with most of the performance measures (ROA, OCF, REV, RET). As expected and mentioned above, SIZE is highly positively correlated with a firms' goodwill (GW) and thus, with GWI (tGWIMP and binGWIMP). The number of Segements (SEG) also positively correlates with SIZE, tGWIMP and binGWIMP. However, OCF and ROA are negatively correlated with all ESG scores, which is possibly due to the correlation between both profitability and SIZE as well as SIZE and ESG scores. BATH and SMOOTH are positively, respectively, negatively correlated with GWIs.

The descriptive and correlations of the control variables are mostly in line with prior literature. Yet, the correlations of the ESG scores rather support the shareholder view and therefore, the minority of studies suggested any negative effects of CSR activities on performance and GWI. However, GWIs also seem driven by other factors, for which multivariate analyses will give better explanations.

As expected, some of the ESG scores are highly correlated with each other. Other variables, however, do not show such high correlations. Still, I tested for multicollinearity. The test results indicated that I do not face multicollinearity problems as the variance inflation factor (VIF) meets the tolerance (VIF < 10, tolerance > 0.1).

Table 2 Descriptive statistics and correlation matrix

Panel A: Descriptive statistics for determinants of goodwill impairment										
	Firm–years without goodwill impairment				*Firm–years with goodwill impairment*				*Difference mean*	*T–test*
Variable	*N*	*Mean*	*Median*	*Std. dev.*	*N*	*Mean*	*Median*	*Std. dev.*	*0–1*	*T–value*
avESGENV	3,191	63.352	65.306	19.905	680	67.631	70.327	18.838	–4.279	–5.157
avESGSOC	3,191	61.920	63.783	20.717	680	65.110	68.437	19.308	–3.190	–3.659
avESGGOV	3,191	52.292	52.255	20.358	680	52.263	52.955	20.258	0.029	0.034
avESGSCORE	3,191	64.948	66.181	17.454	680	67.883	69.888	16.490	–2.934	–4.020
Size	3,191	13,800,000	3,893,571	32,400,000	680	2.7E+07	6,449,421	51,100,000	–13,000,000	–8.514
GW	3,191	0.350	0.155	0.827	680	0.279	0.168	0.590	0.071	2.296
tGWIMP	3,191	0	0	0	680	0.017	0.003	0.039	–0.017	–24.473
binGWIMP	3,191	0	0	0	680	1	1	0	–1	.
ROA	3,191	0.057	0.049	0.074	680	0.023	0.031	0.087	0.034	10.402
MTB	3,191	3.696	2.310	9.069	680	3.326	1.710	24.775	0.370	0.646
RET	2,739	0.002	0	0.014	553	0.002	0	0.014	0.000	0.143
OCF	3,191	0.096	0.085	0.072	680	0.082	0.073	0.061	0.014	4.815
REV	3,191	0.960	0.829	0.628	680	0.903	0.758	0.555	0.057	2.197
BIG4	3,191	0.950	1	0.219	680	0.946	1	0.227	0.004	0.298
SEG	3,191	4.681	5	2.260	680	4.981	5	2.207	–0.300	–3.275
ENF	3,191	46.611	45	12.541	680	46.141	45	12.765	0.470	1.131
LEV	3,191	0.245	0.238	0.158	680	0.256	0.251	0.142	–0.011	–1.671
VOLA	3,191	0.020	0.018	0.016	680	0.020	0.018	0.008	0.000	–0.437
NOSHFF	3,184	0.724	0.790	0.230	674	0.709	0.770	0.243	0.015	1.516
BATH	3,191	0.181	0	0.385	680	0.264	0	0.441	–0.084	–5.025
SMOOTH	3,191	0.193	0	0.394	680	0.159	0	0.366	0.034	2.074

Notes: This table shows the descriptive statistics (Panel A) and correlations (Panel B) of all variables used within the multivariate regression analysis. For the variables SIZE, GW, MTB, VOLA, LEV, REV, and SEG, we use untransformed values and further, we only use the arithmetic average ESG scores for interpretation purposes. Panel B italic numbers indicate significance at the 0.10 level. Variables are defined in the Appendix.

Table 2 Descriptive statistics and correlation matrix (continued)

Panel B: Correlation matrix

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*
1	avESGENV	**1**																				
2	avESGSOC	**0.6295**	**1**																			
3	avESGGOV	**0.3156**	**0.3605**	1																		
4	avESGSCORE	**0.8256**	**0.8554**	**0.577**	1																	
5	Size	**0.5419**	**0.5741**	**0.2926**	**0.6194**	1																
6	GW	**−0.088**	**−0.0478**	**−0.064**	**−0.0839**	**−0.0626**	1															
7	tGWIMP	**0.069**	**0.0461**	−0.0162	**0.0466**	**0.1093**	**0.0396**	1														
8	binGWIMP	**0.0766**	**0.0531**	−0.0122	**0.0537**	**0.1251**	**0.032**	**0.9942**	1													
9	ROA	**−0.0998**	**−0.0729**	**−0.0703**	**−0.0908**	**−0.2558**	**0.0881**	**−0.1736**	**−0.1605**	1												
10	MTB	**−0.0708**	**−0.055**	**−0.1036**	**−0.08**	**−0.2455**	**0.1491**	**−0.1388**	**−0.1406**	**0.5564**	1											
11	RET	**−0.0775**	**−0.0619**	−0.0228	**−0.0724**	**−0.0555**	**0.0478**	−0.005	−0.0054	**0.0471**	−0.0151	1										
12	OCF	**−0.0782**	**−0.043**	**−0.0584**	**−0.0572**	**−0.2037**	**0.0625**	**−0.0918**	**−0.0932**	**0.6173**	**0.4954**	0.0086	1									
13	REV	−0.0236	**−0.0983**	−0.0293	**−0.0928**	**−0.3139**	0.0225	**−0.0419**	**−0.0455**	**0.2272**	**0.2362**	**0.0319**	**0.1898**	1								
14	BIG4	0.0003	**0.0488**	0.0226	**0.0487**	−0.0002	**0.0503**	−0.0013	−0.0036	**0.0523**	**0.0557**	**0.0331**	**0.0802**	−0.0096	1							
15	SEG	**0.2349**	**0.1952**	**0.0788**	**0.2232**	**0.2616**	−0.0053	**0.0388**	**0.0425**	**−0.0594**	**−0.0769**	**−0.0304**	**−0.0685**	**0.0937**	0.0152	1						
16	ENF	**−0.1348**	**−0.1531**	0.0161	**−0.1266**	**−0.2437**	**−0.0825**	−0.0077	−0.0194	**0.0943**	**0.1266**	**0.0983**	**0.1033**	**0.0381**	**0.0408**	**−0.1704**	1					
17	LEV	**0.0558**	**0.0827**	**0.0546**	**0.1011**	**0.3011**	**0.0409**	**0.0416**	**0.0414**	**−0.296**	**−0.0759**	**−0.0342**	**−0.1763**	**−0.3615**	0.0126	**0.0386**	**−0.1087**	1				
18	VOLA	**−0.1611**	**−0.1518**	**−0.0538**	**−0.1763**	**−0.2679**	**−0.1084**	**0.0454**	**0.0327**	**−0.2469**	**−0.273**	**0.0468**	**−0.1816**	**0.0626**	−0.0114	**−0.0622**	**0.0708**	**−0.0661**	1			
19	NOSHFF	**0.051**	**0.0701**	**0.1575**	**0.122**	**−0.0122**	**0.1176**	−0.0095	−0.0168	**0.1117**	**0.0848**	**0.0442**	**0.0323**	**0.1236**	**0.0392**	**0.0295**	**0.2418**	**−0.0576**	**−0.0577**	1		
20	BATH	−0.0071	0.006	−0.0135	−0.0106	−0.0142	−0.0271	**0.0934**	**0.0738**	**−0.1724**	**−0.0368**	**0.0622**	**−0.0576**	−0.0218	0.0001	0.0075	0.0256	0.0103	**0.0955**	**0.0391**	1	
21	SMOOTH	**−0.0443**	−0.0108	0.0275	−0.0154	−0.074	**−0.0731**	**−0.0412**	**−0.0395**	**0.0725**	0.0051	**0.0464**	**0.0364**	**0.0578**	0.0134	**−0.0528**	0.0168	**−0.045**	**0.095**	−0.0131	**−0.2274**	**1**

Notes: This table shows the descriptive statistics (panel A) and correlations (panel B) of all variables used within the multivariate regression analysis. For the variables SIZE, GW, MTB, VOLA, LEV, REV, and SEG, we use untransformed values and further, we only use the arithmetic average ESG scores for interpretation purposes. Panel B bold numbers indicate significance at the 0.10 level. Variables are defined in the Appendix.

Panel B of Table 2 presents a correlation analysis for our dataset. Other than expected, three of the four key variables positively correlate with the amount of goodwill impairment (tGWIMP) and the probability that goodwill impairment occurs (binGWIMP). The average social (avESGSOC) and average environmental score (avESGENV), along with the all-in-all average ESG-Score (avESGSCORE) are significantly positive correlated, while the governance score (avESGGOV) is insignificantly negative correlated with tGWIMP and binGWIMP. This indicates that just governance activities seem to pay off by fewer impairments. Again, the correlation support that the ESG scores, profitability, goodwill, and goodwill impairment are strongly driven by SIZE, which shows a significant positive correlation with all ESG measures. Furthermore, it correlates significantly negative with most of the performance measures (ROA, OCF, REV, RET). As expected and mentioned above, SIZE is highly positively correlated with a firms' goodwill (GW) and thus, with goodwill impairment (tGWIMP and binGWIMP). The number of Segements (SEG) also positively correlates with SIZE, tGWIMP and binGWIMP. However, OCF and ROA are negatively correlated with all ESG scores, which is possibly due to the correlation between both profitability and SIZE as well as SIZE and ESG scores. BATH and SMOOTH are positively, respectively, negatively correlated with goodwill impairments.

The descriptives and correlations of the control variables are mostly in line with prior literature. Yet, the correlations of the ESG scores rather support the shareholder view and therefore, the minority of studies suggested any negative effects of CSR activities on performance and goodwill impairment. However, goodwill impairments also seem driven by other factors, for which multivariate analyses will give better explanations.

As expected, some of the ESG scores are highly correlated with each other. Other variables, however, do not show such high correlations. Still, we tested for multicollinearity. The test results indicated that we do not face multicollinearity problems as the variance inflation factor (VIF) meets the tolerance (VIF < 10, tolerance > 0.1).

4.2 Regression results model 1 (binary)

In the following, I present the multivariate regression results concerning the association between the independent variables and the binary GWI or the magnitude of GWI.

Table 3 depicts the coefficients and p-values of the regression results for equation (1), primarily testing Hypothesis 1. Model 1(a) contains the arithmetic mean of each ESG category. Instead, model 1(b) considers the scores of each ESG category resulting from a principal component analysis (PCA). Models 1(c) and 1(d) are composed of the arithmetic all-in-all ESG score and an all-in-all ESG score resulting from a principal component analysis. To avoid common trends at the country level, between industries or over time, I use a logit regression and control for country, industry and year fixed effects. Furthermore, I used robust standard errors clustered at the firm level (Petersen, 2009).

The first column of Table 3 shows that the coefficients on social score (coefficient: –0.0056) and governance score (coefficient: –0.0077) are negative as expected, but the coefficient on the environmental score (coefficient: 0.0069) is positive. Still, the social and environmental scores are insignificant. The governance score is significant at the 5%-level (p-value: 0.0312) suggesting that governance activities are a key driver for immediate CSR-effects. The PCA-scores in model 1(b) confirm these results. Again, environmental and social scores are insignificant, while the governance score is significantly negative associated with the probability that GWI occurs. However, the

results of models 1(c) and 1(d) reveal that the all-in-all ESG scores are still insignificant, probably driven by the insignificance of environmental and social activities.

In line with prior literature, SIZE is significantly positive associated with binGWIMP (coefficient: 0.2603; p-value: 0.0006), indicating that the probability of GWI increases the larger a firm is. Furthermore, the association between goodwill and GWI loss is significantly positive (coefficient: 0.1286; p-value: 0.0025), as expected.

Table 3 Regression results for determinants of GWI

Variable	*Model A*	*Model B*	*Model C*	*Model D*
avESGENV	0.0069			
	(0.1262)			
avESGSC	–0.0056			
	(0.2354)			
avESGCG	–0.0077**			
	(0.0312)			
ESGENV		0.0899		
		(0.1755)		
ESGSOC		–0.0827		
		(0.2673)		
ESGGOV		–0.1544**		
		(0.0299)		
avESGSCORE			–0.0058	
			(0.2997)	
ESGSCORE1				–0.0333
				(0.4368)
ESGCON	–0.0034	–0.0034	–0.0027	–0.0026
	(0.1595)	(0.1625)	(0.2697)	(0.2908)
SIZE	0.2603***	0.2634***	0.2749***	0.2677***
	(0.0006)	(0.0005)	(0.0002)	(0.0004)
GW	0.1296***	0.1290***	0.1291***	0.1297***
	(0.0025)	(0.0027)	(0.0025)	(0.0024)
ROA	–6.1988***	–6.2057***	–6.2736***	–6.2776***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
MTB	–0.1798*	–0.1810*	–0.1631	–0.1622
	(0.0945)	(0.0927)	(0.1322)	(0.1350)
RET	4.6131	4.5876	4.4142	4.5158
	(0.8891)	(0.8896)	(0.8934)	(0.8911)

Notes: Table 3 shows the multivariate regression results for H1. We estimate equation (1) as stated below: $binGWIMP = \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 MTB_{i,t} + \beta_7 OCF_{i,t} + \beta_8 LEV_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} GW_{i,t} + \beta_{11} REW_{i,t} + \beta_{12} REV + \beta_{13} BATH + \beta_{14} SMOOTH + \beta_{15} BIG4 + \beta_{16} ENF + \beta_{17} SEG + \beta_{18} NOSHFF + \beta_{19} VOLA + Country$, *Industry* and *Year Indicators* $+ \varepsilon_{i,t}$. We ran a logit regression using country, industry, and year controls with firm clustered robust standard errors. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels. Variables are as defined in the Appendix.

Table 3 Regression results for determinants of GWI (continued)

Variable	*Model A*	*Model B*	*Model C*	*Model D*
OCF	1.4318	1.4290	1.3612	1.3899
	(0.2763)	(0.2779)	(0.3182)	(0.3095)
REV	0.1037	0.1074	0.1197	0.1143
	(0.4715)	(0.4559)	(0.4013)	(0.4215)
BIG4	0.0617	0.0570	0.0417	0.0455
	(0.8712)	(0.8807)	(0.9115)	(0.9039)
SEG	0.0516	0.0542	0.0696	0.0688
	(0.7030)	(0.6888)	(0.6023)	(0.6064)
ENF	0.0022	0.0023	0.0027	0.0029
	(0.6579)	(0.6487)	(0.5806)	(0.5508)
LEV	–0.0432	–0.0440	–0.0516	–0.050
	(0.550)	(0.5420)	(0.4691)	(0.4835)
VOLA	–0.1172	–0.1170	–0.1193	–0.1243
	(0.5207)	(0.5217)	(0.5150)	(0.4969)
NOSHFF	–0.2501	–0.2481	–0.2860	–0.2998
	(0.4174)	(0.4210)	(0.3565)	(0.3342)
BATH	0.3962***	0.3942***	0.3859***	0.3870***
	(0.0012)	(0.0012)	(0.0015)	(0.0014)
SMOOTH	0.0875	0.0850	0.0657	0.0667
	(0.5017)	(0.5135)	(0.6108)	(0.6053)
Country control	YES	YES	YES	YES
Industry control	YES	YES	YES	YES
Year control	YES	YES	YES	YES
Pseu. R-squared	0.0766	0.0764	0.0729	0.0726
N	3,686	3,686	3,686	3,686

Notes: Table 3 shows the multivariate regression results for H1. We estimate equation (1) as stated below: $binGWIMP = \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 MTB_{i,t} + \beta_7 OCF_{i,t} + \beta_8 LEV_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} GW_{i,t} + \beta_{11} REW_{i,t} + \beta_{12} REV + \beta_{13} BATH + \beta_{14} SMOOTH + \beta_{15} BIG4 + \beta_{16} ENF + \beta_{17} SEG + \beta_{18} NOSHFF + \beta_{19} VOLA + Country, Industry$ and *Year Indicators* $+ \varepsilon_{i,t}$. We ran a logit regression using country, industry, and year controls with firm clustered robust standard errors. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels. Variables are as defined in the Appendix.

The results also reveal that ROA is negative and significantly associated with the likelihood of GWI in t0 (coefficient: –6.1988; p-value: 0.0001). The yearly mean log stock return (RET) is insignificant (coefficient: 4.6131; p-value: 0.8891). OCF and REV are positive and insignificant (coefficients: 1.4318 and 0.1037; p-values: 0.2763 and 0.4715). VOLA exhibits insignificant results (coefficient: –0.1172; p-value: –0.5207), which is in line with Baugh and Mauldin (2018). MTB reveals a negative and significant association (coefficient: –0.1798; p-value: 0.0945). This is in line with Beatty and Weber (2006) and Bens et al. (2011) suggesting that GWIs are more likely for firm years with

MTB values lower than one. ROA and MTB seem to be the only firm performance indicator determining the short-term likelihood of GWI losses leading to fewer impairments.

The results for the earnings management incentive proxies vary. BATH is positive and significant at the 1%-level (coefficient: 0.3962; p-value: 0.0012), which suggests that managers use the discretion in GWI for big bath accounting. SMOOTH is positive insignificant (coefficient: 0.0875; p-value: 0.5017). LEV is negative and insignificant (coefficient: –0.0432; p-value: –0.550).

Further controls, such as NOSHFF (coefficient: –0.2501; p-value: 0.4174) and BIG4 (coefficient: 0.0617; p-value: 0.8712) are insignificant which is in line with prior studies (e.g., Glaum et al., 2015; Baugh and Mauldin, 2018). In contrast to prior studies, SEG (coefficient: 0.0516; p-value: 0.7030) and ENF (coefficient: 0.0022; p-value: 0.6579) are insignificant as well.

So far, the results in Table 3 reveal that in short-term the governance score is negatively associated with the likelihood that GWI occurs, which supports Hypothesis 1. Social and environmental scores are not significantly associated with the binary GWI in t0, which is why the all-in-all scores are insignificant. The significant controls reveal the expected associations.

Table 4 exhibits the results of equation (1) over a three-year period. I measure the associations with the dependent variables in $t + 1$, $t + 2$, and $t + 3$, to observe the long-term effects of the CSR categories. As mentioned in Section 2 prior studies revealed positive long-term effects of CSR on CFP. I test Hypothesis 2 and expected long-term effects of CSR activities on GWI.

The results reveal that in $t + 1$, the social activities (avESGSCOC and ESGSOC) are negatively associated with the likelihood that GWI occurs, which is significant at the 10%-level (coefficient: –0.0095 and –01411; p-value: 0.060 and 0.0773). The governance score is insignificant (coefficient: –0.0042; p-value: 0.2603) indicating that the governance activities are rather paying off in the short-term (t0). I also observe increasing amounts of the social score coefficients and successively higher significance. This suggests that social activities have a longer-term association with the likelihood of GWI. Therefore, Hypothesis 2 cannot be rejected.

Untabulated regression results of equation (2) do not differ considerably from the results of equation (1). The ESG scores show similar associations to tGWIMP over time. The governance scores are significantly negative associated with the magnitude of GWI. The social score reveals a significant negative association from $t + 1$ to $t + 3$ with an increasing significance. Generally, the results confirm hypotheses 1 and 2. Performance variables ROA and RET are associated with a lower amount of impairments until one year ahead ($t + 1$). As expected, GW is positively significant associated with tGWIMP for all periods. SIZE shows a significant positive association until two years ahead ($t + 2$). Other controls are insignificant for all future periods. These results show that mainly social activities reveal the long-term effects on GWI.

Summarising the results for our main model, I can observe short-term effects on GWI by governance activities. Furthermore, I notice the long-term effects of social activities until three years ahead. Both associations apply to the likelihood as well as the magnitude of GWI. Consequently, I can neither reject Hypothesis 1 or 2.

Table 4 Regression results for determinants of GWI $t+1$ to $t+3$

	$t+1$		$t+2$		$t+3$	
Variable	*Model A*	*Model B*	*Model A*	*Model B*	*Model A*	*Model B*
avESGENV	0.0054		0.0062		0.0115*	
	(0.2942)		(0.3004)		(0.0766)	
avESGSOC	–0.0095*		–0.0147***		–0.0199***	
	(0.060)		(0.0078)		(0.0018)	
avESGGOV	–0.0042		–0.0009		0.0020	
	(0.2603)		(0.8245)		(0.6793)	
ESGENV		0.0674		0.0862		0.1697*
		(0.3764)		(0.3323)		(0.0788)
ESGSOC		–0.1411*		–0.2251**		–0.3116***
		(0.0773)		(0.0102)		(0.0020)
ESGGOV		–0.0840		–0.0182		0.0381
		(0.2562)		(0.8282)		(0.6889)
ESGCON	–0.0036	–0.0036	–0.0018	–0.0018	–0.0028	–0.0027
	(0.2147)	(0.2185)	(0.5777)	(0.5846)	(0.4948)	(0.4965)
SIZE	0.2688***	0.2725***	0.2596***	0.2618***	0.2180**	0.2199**
	(0.0008)	(0.0007)	(0.0040)	(0.0037)	(0.0424)	(0.0404)
GW	0.1614***	0.1605***	0.1527***	0.1518***	0.1585***	0.1577***
	(0.0001)	(0.0001)	(0.0008)	(0.0009)	(0.0027)	(0.0028)
ROA	–1.2424	–1.2456	0.4965	0.4947	–2.10	–2.0969
	(0.1681)	(0.1670)	(0.6924)	(0.6934)	(0.2199)	(0.2216)
MTB	–0.2785**	–0.2798**	–0.2408	–0.2420	–0.2618	–0.2634
	(0.0288)	(0.0281)	(0.1113)	(0.1089)	(0.1037)	(0.1002)
RET	–137.3469***	–137.4312***	–42.2738	–42.4948	74.2927	74.0592
	(0.0009)	(0.0009)	(0.3337)	(0.3316)	(0.1506)	(0.1519)

Notes: Table 4 shows the multivariate regression results for H2. We estimate equation (1) as stated below: $binGWIMP = \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 MTB_{i,t} + \beta_7 OCF_{i,t} + \beta_8 LEV_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} GW_{i,t} + \beta_{11} REW_{i,t} + \beta_{12} REV + \beta_{13} BATH + \beta_{14} SMOOTH + \beta_{15} BIG4 + \beta_{16} ENF + \beta_{17} SEG + \beta_{18} NOSHFF + \beta_{19} VOLA +$ *Country*, *Industry* and *Year Indicators* $+ \varepsilon_{i,t}$, with *binGWIMP* in $t+1$, $t+2$ and $t+3$. We ran a logit regression using country, industry, and year controls with firm clustered robust standard errors. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels. Variables are as defined in the Appendix.

Table 4 Regression results for determinants of GWI $t+1$ to $t+3$ (continued)

	$t+1$		$t+2$		$t+3$	
Variable	*Model A*	*Model B*	*Model A*	*Model B*	*Model A*	*Model B*
OCF	–0.0402	–0.0386	–2.8678	–2.8571	0.0319	0.0495
	(0.9778)	(0.9787)	(0.1387)	(0.1401)	(0.9876)	(0.9806)
REV	–0.0517	–0.0472	–0.0934	–0.0893	–0.2363	–0.2310
	(0.7149)	(0.7383)	(0.5357)	(0.5529)	(0.1704)	(0.1787)
BIG4	0.0834	0.0780	0.2599	0.2538	0.4782	0.4706
	(0.8356)	(0.8459)	(0.5631)	(0.5726)	(0.3746)	(0.3825)
SEG	0.0319	0.0336	0.1073	0.1081	0.0898	0.0911
	(0.8161)	(0.8063)	(0.4911)	(0.4875)	(0.6224)	(0.6172)
ENF	0.0049	0.0050	0.0067	0.0069	0.0085	0.0087
	(0.3818)	(0.3677)	(0.3050)	(0.2888)	(0.3289)	(0.3137)
LEV	–0.1012	–0.1023	–0.0913	–0.0921	–0.1141	–0.1146
	(0.1199)	(0.1158)	(0.1882)	(0.1844)	(0.1442)	(0.1428)
VOLA	–0.1634	–0.1631	–0.2776	–0.2758	–0.1864	–0.1796
	(0.4101)	(0.4110)	(0.2334)	(0.2356)	(0.5222)	(0.5375)
NOSHFF	–0.1709	–0.1686	–0.0503	–0.0513	0.0878	0.0847
	(0.6134)	(0.6180)	(0.9000)	(0.8978)	(0.8490)	(0.8540)
BATH	0.0869	0.0845	0.2062	0.2027	–0.0563	–0.0621
	(0.5363)	(0.5475)	(0.1896)	(0.1968)	(0.7703)	(0.7469)
SMOOTH	0.0873	0.0842	0.0843	0.0807	0.1229	0.1187
	(0.5545)	(0.5687)	(0.6226)	(0.6372)	(0.5325)	(0.5465)
Country control	YES	YES	YES	YES	YES	YES
Industry control	YES	YES	YES	YES	YES	YES
Year control	YES	YES	YES	YES	YES	YES
Pseu. R–squared	0.0596	0.0594	0.0493	0.0492	0.0487	0.0488
N	3018	3018	2414	2414	1867	1867

Notes: Table 4 shows the multivariate regression results for H2. We estimate equation (1) as stated below: $binGWIMP = \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 MTB_{i,t} + \beta_7 OCF_{i,t} + \beta_8 LEV_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} GW_{i,t} + \beta_{11} REW_{i,t} + \beta_{12} REV + \beta_{13} BATH + \beta_{14} SMOOTH + \beta_{15} BIG4 + \beta_{16} ENF + \beta_{17} SEG + \beta_{18} NOSHFF + \beta_{19} VOLA$ + *Country*, *Industry* and *Year Indicators* + $\varepsilon_{i,t}$, with *binGWIMP* in $t+1$, $t+2$ and $t+3$. We ran a logit regression using country, industry, and year controls with firm clustered robust standard errors. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels. Variables are as defined in the Appendix.

4.3 Regression results model 3 (discretionary and non-discretionary GWI)

In the following, I present the regression results for equations (3) and (4). In the first step, I show how solely the economic determinants are associated with tGWIMP and how much they can explain occurring GWI s in t0, to estimate the non-discretionary (expected) GWI.

Table 5 Regression results for the economic determinants of GWI

Variable	*Model 3*
ESGENV	–0.0002
	(0.8721)
ESGSOC	0.0036**
	(0.0202)
ESGGOV	–0.0019*
	(0.0847)
ESGCON	0.0000
	(0.5170)
SIZE	–0.0049***
	(0.0003)
GW	0.0017
	(0.1502)
ROA	–0.2512***
	(0.0001)
MTB	0.0047
	(0.1565)
RET	–1.7985
	(0.2562)
OCF	0.0800*
	(0.0519)
REV	–0.0017
	(0.4416)
VOLA	0.0077
	(0.1890)
SEG	0.0007
	(0.8099)
Country control	YES
Industry control	YES
Year control	YES
R-squared	0.4378
N	680

Notes: Table 5 shows the multivariate regression results running equation (3) as stated below: $tGWIMP = \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} + \beta_4 ESGCON_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 MTB_{i,t} + \beta_6 OCF_{i,t} + \beta_7 ROA_{i,t} + \beta_8 GW_{i,t} + \beta_9 RET_{i,t} + \beta_{10} REV + \beta_{11} VOLA + \beta_{12} SEG + Country$, *Industry* and *Year Indicators* $+ \varepsilon_{i,t}$. We ran an OLS regression using country, industry, and year controls with firm clustered robust standard errors. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels. Variables are defined in the Appendix.

In the second step, I show the association between discretionary (unexpected) GWI and ESG components and earnings management incentives. It sheds light on the question of whether ESG components affect GWI because of a performance aspect or rather because of more ethical management behaviour.

Table 5 depicts the regression results about the association between economic determinants and the magnitude of GWI running equation (3).

Table 6 Regression results for determinants of discretionary GWI

Variable	*Model A neg.*	*Model A pos.*	*Model B neg.*	*Model B pos.*
avESGENV	–0.0000**	0.0002		
	(0.0254)	(0.1410)		
avESGSOC	0.0002***	0.0002		
	(0.0000)	(0.1073)		
avESGGOV	–0.0001***	–0.0001		
	(0.0000)	(0.4132)		
ESGENV			–0.0006**	0.0018
			(0.0174)	(0.2317)
ESGSOC			0.0026***	0.0032*
			(0.0000)	(0.0966)
ESGGOV			–0.0014***	–0.0013
			(0.0000)	(0.4068)
ESGCON	–0.0000***	0.0000	–0.0000***	0.0000
	(0.0000)	(0.4378)	(0.0000)	(0.4583)
SIZE	–0.0039***	–0.0060***	–0.0039***	–0.0058***
	(0.0000)	(0.0002)	(0.0000)	(0.0002)
GW	0.0005***	0.0014	0.0005***	0.0014
	(0.0035)	(0.2345)	(0.0038)	(0.2344)
BIG4	0.0013	–0.0026	0.0014	–0.0026
	(0.3412)	(0.6777)	(0.3245)	(0.6706)
ENF	0.0000	–0.0001	0.0000	–0.0001
	(0.7585)	(0.4426)	(0.6670)	(0.4247)
LEV	0.0017***	0.0024*	0.0017***	0.0024*
	(0.0000)	(0.0648)	(0.0000)	(0.0640)
NOSHFF	–0.0042***	0.0023	–0.0042***	0.0026
	(0.0007)	(0.6109)	(0.0008)	(0.5538)

Notes: Table 6 shows the multivariate regression results for H3 running equation (4) as stated below: $tGWIMP = \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 GW_{i,t} + \beta_7 LEV_{i,t} + \beta_8 BATH + \beta_9 SMOOTH + \beta_{10} BIG4 \beta_{11} ENF + \beta_{12} NOSHFF + Country$, *Industry* and *Year Indicators* $+ \varepsilon_{i,t}$. We differ between positive (overstatements) and negative (understatement) discretionary goodwill impairments. Negative discretion is transformed to absolute values. We ran an OLS regression using country, industry, and year controls with firm clustered robust standard errors. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels. Variables are defined in the Appendix.

Table 6 Regression results for determinants of discretionary GWI (continued)

Variable	*Model A neg.*	*Model A pos.*	*Model B neg.*	*Model B pos.*
BATH	0.0053***	0.0088***	0.0053***	0.0087***
	(0.0000)	(0.0029)	(0.0000)	(0.0034)
Smooth	–0.0009**	–0.0039**	–0.0009**	–0.0040**
	(0.0205)	(0.0454)	(0.0217)	(0.0437)
Country control	YES	YES	YES	YES
Industry control	YES	YES	YES	YES
Year control	YES	YES	YES	YES
R-squared	0.3454	0.3361	0.3453	0.3373
N	2,897	261	2,897	261

Notes: Table 6 shows the multivariate regression results for H3 running equation (4) as stated below: $tGWIMP = \beta_0 + \beta_1 ESGENV_{i,t} + \beta_2 ESGSOC_{i,t} + \beta_3 ESGGOV_{i,t} + \beta_4 ESGCON_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 GW_{i,t} + \beta_7 LEV_{i,t} + \beta_8 BATH + \beta_9 SMOOTH + \beta_{10} BIG4$ $\beta_{11} ENF + \beta_{12} NOSHFF +$ *Country*, *Industry* and *Year Indicators* $+ \varepsilon_{i,t}$. We differ between positive (overstatements) and negative (understatement) discretionary goodwill impairments. Negative discretion is transformed to absolute values. We ran an OLS regression using country, industry, and year controls with firm clustered robust standard errors. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels. Variables are defined in the Appendix.

I ran an OLS regression including country, industry and year controls and standard errors clustered at the firm level. Here, tGWIMP is composed of all values greater than zero. Overall, most of the significant variables show reasonable associations. However, ESGSOC reveals a significant positive association with tGWIMP in t0 (coefficient: 0.0036; p-value: 0.0202). As prior results have shown, social activities are rather pay off in the long-term perspective. Supporting prior results, ESGGOV is significantly negative associated with tGWIMP in t0 (coefficient: –0.0019; p-value: –0.0847). Also confirming the main model, ROA shows a highly significant negative association with tGWIMP (coefficient: –0.2512; p-value: –0.0001). In contrast to the results of equation (2), but in line with Hamberg et al. (2009), SIZE is significantly negative associated with tGWIMP (coefficient: –0.0010; p-value: 0.0025).

Table 6 shows the regression results for the association between ESG components and GWI discretion for equation (4). As before, I ran an OLS regression including country, industry, and year controls and standard errors clustered at the firm level. Columns 1 and 3 comprise negative (understatement) discretionary GWI losses, and columns 2 and 4 positive (overstatement) discretionary GWI losses.

As expected, the results show that firms that engage in governance activities (avESGGOV; ESGGOV) are less likely to understate GWI losses. The environmental scores also reveal a significant negative association with negative discretionary GWI losses. Therefore, managers who emphasise governance and environmental issues seem to act more ethically. This is in line with prior research, suggesting that managers who engage in CSR activities behave more responsibly regarding earnings management (e.g., Choi and Pae, 2011; Bozzolan et al., 2015). In contrast the significant positive association between social scores and negative as well as positive discretionary GWI indicates that managers use social activities as an image instrument and that CSR is positively

associated with earnings management (e.g., Petrovits, 2006; Prior et al., 2008; Cho et al., 2012; Grougiou et al., 2014).

Furthermore, I found that larger firms revealed significantly lower negative and positive discretionary GWI (coefficient: –0.0039; –0.0060; p-value: 0.0000; 0.0000). However, firms with higher incentives for BATH, as with outstanding bad firm performance, tend to use more positive and negative GWI discretion. Additionally, incentives for SMOOTH show that firms with an outstanding positive firm performance show less under-and overstatement of GWI. Moreover, the regression results show that firms with higher LEV are more likely to understate the impairment loss, which is expected, as these firms are more likely to avoid debt covenant violations.

To summarise, ESG components seem to have different and independent effects on earnings management behaviour. While managers who engage in governance and environmental activities are less likely to use discretion, engaging in social activities seem to have the opposite association. Considering the regression results from equations (1) and (2), governance activities might have a positive effect on a firm's performance, which leads to a lower likelihood of GWI, supported by the fact that managers of high governance firms even use less understatement of impairment losses. Environmental scores have not shown a significant association with binGWIMP or tGWIMP in t0 but show a significant negative association with negative impairment discretion. This indicates that governance and environmental activities might pay off ethically and environmentally and that the economic effects by environmental activities might suffer from less opportunistic discretion (less opportunistic understatement leads to more impairment and therefore less profit). After observing negative long-term associations between social activities and binGWIMP and tGWIMP, I can say that these activities do not lead to a decline in earnings management and that the resulting economic effects are instead U-shaped (i.e., neutral or negative in the short-term and positive in the long-term).

4.4 Additional analyses

To provide additional robustness, I ran a regression of equation (1), this time isolating each ESG category. I wanted to check for the sensitivity of environmental, social and governance on a stand-alone basis, preventing a biasing of interacting effects. Untabulated results support the aforementioned effects regarding each CSR component. Isolated, governance activities still reveal short-term effects on the likelihood of GWI. Moreover, the results from including only the social score, confirm the effects on a longer-term perspective for three years ahead.

In line with prior literature, using an OLS regression, I also tested the association between all independent variables used in equation (2) and $tGWIMP > 0$ (Abu Ghazaleh et al., 2011). The results support the long-term effects of social activities, but do not reveal significant effects from governance activities.

Finally, I constrained the regression of equation (1) to the four largest countries according to GDP.[4] Generally, I expected a more accurate data-base for larger countries. Again, the results confirmed Hypotheses 1 and 2. Governance activities are significantly negatively associated in the short-term, while in the long-term social activities are significantly negative associated with the likelihood of a GWI loss. The explanatory power of the model significantly increases.

5 Summary, conclusions and possible limitations

In this study, I examined the association between disaggregated CSR components ESG and GWI. Furthermore, I distinguished between non-discretionary and discretionary GWI. I found that governance activities have immediate positive short-term effects. Higher governance activities are associated with a lower likelihood that GWI occurs in t0. Furthermore, social activities show positive long-term effects. The single social scores are significantly negative associated with the likelihood of an impairment loss beginning from $t + 1$ until $t + 3$. This association gets even stronger over time.

Examining discretionary and non-discretionary GWI separately, the regression results reveal that managers who are more engaged in governance and environmental activities are less likely to understate GWI losses. This indicates a positive association between governance or environmental activities and ethical behaviour regarding earnings management. However, the lack of significance between environmental scores and the likelihood that GWI occurs could result from less discretion. Despite less understatement, the governance activities revealed a negative short-term association with the likelihood of an impairment loss, as stated above. It points to the fact that firms that engage in governance activities reveal considerably better firm performance leading to less impairment.

Overall, our results reveal that it can be biased to examine the effects of CSR as a whole. It is more significant to disaggregate CSR into its components and activities, as each has its own characteristics and thus has a different impact. Prior literature has shown that CSR is associated with determinants of GWIs. I can observe that some ESG components are directly associated with GWI. Therefore, ESG components can be further helpful predictors for impairment losses. From this study, I can support the argument that sustainability and socially responsible behaviour do not only serve social and environmental issues. It also has an impact on a variety of economic processes and is associated with the firm performance, earnings management behaviour, and meaningful firm characteristics. It supports the development of non-financial reporting as a pre-indicator of firm performance.

Nevertheless, our results have limitations. Requiring continuously available ESG scores, our comparison between the basic and the final samples reveals some self-selection. The final sample consists of rather larger firms that have, on average, a significantly higher firm performance. Furthermore, larger firms show, on average, higher ESG scores. Therefore, the selection process leads to a smaller deviation of the ESG scores. Additionally, our impairment data is based on firm-level data and does not consider the data from the CGU, where goodwill belongs to. Moreover, predicting the expected impairment loss using the actual impairment data, might already be driven by opportunistic behaviour. Although prior literature do not necessarily find evidence for a reverse causality between ESG factors and performance indicators (Qiu et al., 2016), I control for firm size and firm performance factors to mitigate possible reverse causality problems. However, the presence of a reverse causality may still be a possible limitation. Finally, some of the ESG information is based on voluntary disclosure that could be biased. CSR disclosure has been mandated in the EU only since 2017. Hence, future research will have more reliable ESG information and thus, more comparable ESG datasets for further research projects in this field.

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Notes

1 According to Statista, M&A deal values increased about 30% between 2012 and 2017.

2 An M&A deal failure is commonly defined as the negative change of shareholder returns after the M&A deal announcement.

3 Bundesministerium für Arbeit und Soziales (BMAS) indicates, "CSR describes the responsibility for a company regarding the society for the purpose of sustainable economic activity". They argue that CSR leads to a better long-term performance for companies engaging in CSR activities.

4 According to Statista: Germany, UK, France, Italy.

Appendix

Variable description		
Dependent variables	*Group of variable*	*Description*
binGWIMP	Dependent variable	Dummy variable: equals 1 if goodwill impairment occurred for firm *i* in year *t*, 0 otherwise.
tGWIMP	Dependent variable	Total amount of goodwill impairment scaled by total assets for firm *i* in year *t*.
Variables of interest		
avESGENV	ESG score	Mean environmental score containing the resource use score, the emissions score and the environmental innovation score available at Thomson Reuters Datastream.
avESGSOC	ESG score	Mean social score containing the workforce, the human rights score and the community score available at Thomson Reuters Datastream.
avESGGOV	ESG score	Mean governance score containing the shareholder score and the CSR strategy Score available at Thomson Reuters Datastream.
ESGENV	ESG score	Principal component analysis score based on positive actions towards environmental protection.
ESGSOC	ESG score	Principal component analysis score considering the engagement for social welfare improvements, human rights and business ethics.
ESGGOV	ESG score	Principal component analysis score measuring the effectiveness of corporate governance systems.
avESGSCORE	ESG score	Mean ESG score of positive activities containing the three ESG categories.
ESGCON	ESG Score	Mean score containing negative ESG activities.
Control variables		
SIZE	Firm characteristics	Natural logarithm of total assets for firm *i* in year *t*.
MTB	Firm performance	Natural logarithm of MTB for firm *i* in year *t*.
OCF	Firm performance	Operating cashflow for firm *i* in year *t* scaled by total assets.

Appendix (continued)

Variable description		
Dependent variables	*Group of variable*	*Description*
Control variables		
LEV	Earnings management incentive	Natural logarithm of total debt divided by total assets for firm *i* in year *t*.
ROA	Firm performance	Return on assets for firm *i* in year *t*.
GW	Firm characteristics	Natural logarithm of firm *i*'s goodwill relative to its total assets in year *t*.
RET	Firm performance	Natural logarithm of one-year mean of daily stock returns for firm *i* in year *t*.
REV	Firm performance	Natural logarithm of revenue for firm *i* in year *t* scaled by total assets.
BATH	Earnings management incentive	Dummy variable: equals 1 if a firm experiences a negative change in scaled EBIT, which is below the industry median among all firms with negative changes, 0 otherwise.
SMOOTH	Earnings management incentive	Dummy variable: equals 1 if a firm experiences a positive change in scaled EBIT, which is above the industry median among all firms with positive changes, 0 otherwise.
BIG4	Corporate governance	Dummy variable: equals 1 if firm *i* is audited by a Big 4 auditing firm, 0 otherwise.
ENF	Corporate governance	Weighted country-specific enforcement score based on Brown et al. (2014).
SEG	Firm characteristics	Natural logarithm of number of segements for firm *i* in year *t*.
NOSHFF	Firm characteristics	Number of shares available for public trading relative to the total number of shares for firm *i* in year *t*.
VOLA	Firm performance	Natural logarithm of one-year mean of the daily standard deviation of stock returns for firm *i* in year *t*.
COUNTRY		Country of origin
INDUSTRY		Primary industry
YEAR		Year