MASTER THESIS

Corporate governance mechanisms, sustainability performance and sustainability disclosure quality

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Abstract

This study examines the relationship between corporate governance mechanisms, sustainability performance and sustainability disclosure quality. Firms are increasingly expected to disclose sustainability reports in which they report on their environmental and social impacts. We argue that higher levels of corporate governance pressure lead to better corporate sustainability performance and higher sustainability disclosure quality. Using structural equation modeling with a unique panel data set of 91 Dutch firms that have disclosed sustainability reports during the years 2012-2016, our results show that sustainability performance and the corporate governance mechanisms board strength, stakeholder engagement, media coverage, analyst coverage and external assurance play a significant role in explaining the variation in the quality of sustainability reports. The results support socio-political theories, which state that firms that are under high social and political pressures are more likely to produce high-quality sustainability reports. The anticipated effects of the explanatory variables on corporate sustainability performance are not consistently found, however. Our findings indicate that firms which are under high public pressure increase the quality of their sustainability reports, rather than directly improve the underlying sustainability performance. They suggest a need for stricter regulatory requirements to force companies to become more accountable for their sustainability performance.

Contents

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1. Introduction

This study examines the relationship between corporate governance mechanisms, sustainability performance and sustainability disclosure quality. Due to the increasing public awareness of the role that corporations play in climate change and their involvement with various environmental and social scandals, capital providers and other stakeholders are pressuring companies to accept greater responsibility for sustainable development (Amran and Ooi, 2014). The increased importance of corporate social responsibility has been associated with an increased demand for better information on companies' sustainability performance.

Companies account for their sustainability performance by voluntarily producing sustainability reports. In such reports, they should inform their stakeholders about the environmental and social impacts of their activities, which should diminish informational asymmetries between the firm and its stakeholders (Brammer and Pavelin, 2006). Although these reports do present firms' sustainability performances fairly and free of material misstatements, firms trying to protect their social legitimacy often publish misleading sustainability information (Luo and Tang, 2014). Since companies can produce sustainability reports voluntarily, they may have incentives to only disclose "good news" (Gray and Milner, 2002). The voluntary nature of sustainability reporting implies that there is room for managers to behave opportunistically by not reporting "bad" sustainability information. Consequently, stakeholders' access to information about environmental and social activities is often limited to the "good news" companies decide to disclose (Unerman et al., 2007). However, in order to produce sustainability reports of high quality, the "bad news" should be included as well. To decrease the possibility of opportunistic behavior and thereby increase the quality of the reports, corporate governance mechanisms can be used. Although sustainability reporting is (still) voluntary, internal and external corporate governance pressures may urge companies to become more responsible for their sustainability performance and to disclose high-quality sustainability information. Higher levels of corporate governance (CG) pressure are thus argued to be positively associated with sustainability disclosure quality (SDQ) and the underlying corporate sustainability performance (CSP).

On the basis of extant literature that offers various determinants of (the quality of) voluntary sustainability reporting, we hypothesize CSP and SDQ are associated with the following CG mechanisms: the board of directors, stakeholder engagement, media coverage, analyst coverage and external assurance (Brammer and Pavelin, 2006; Jo and Harjoto, 2011; Hahn and Kühnen, 2013). First, the most important internal governance mechanism is the board of directors, which is

responsible for determining and monitoring the firm's strategy (Fama and Jensen, 1983; Williamson, 1984). Board independence, sustainability expertise, diversity and size may indicate the firm's commitment to sustainability concerns and high-quality sustainability reporting (Prado-Lorenzo and García-Sánchez, 2010). Second, stakeholders, such as capital providers and environmental organizations as Greenpeace, hold the board of directors and top management accountable for the firm's environmental and social impacts (Brammer and Pavelin, 2006). The extent to which these stakeholders are engaged with the (reporting) activities of firms differs largely between firms and industries (Cowen et al., 1987; Deegan and Gordon, 1996). High levels of stakeholder engagement may urge companies to improve their CSP and SDQ in order to protect their legitimacy (Schaltegger et al., 2006; Wolf, 2014). Third, the media and analysts might pressure firms to become more accountable for sustainability concerns. These parties play an important role in CG as they reduce agency costs by monitoring corporate management and providing information about firms to the market (Gillan, 2006). As external pressure through media and analyst coverage increases, firms might feel that their legitimacy is threatened. Consequently, they may try to improve their sustainability performance. Furthermore, firms may engage in high-quality sustainability reporting in order to mitigate reputational risks (and exploit possible benefits) of press releases and analyst recommendations. In addition, voluntary third-party assurance on sustainability reports to enhance the credibility of the disclosed sustainability information may positively affect SDQ. It may create the credibility that the published information is reliable and fairly represents companies' sustainability performance (Simnett et al., 2009; Fonseca, 2010). This study contributes to the understanding of determinants of CSP and SDQ by examining whether the corporate governance mechanisms board of directors, stakeholder engagement, media coverage, analyst coverage and external assurance affect CSP and SDQ.

This study contributes to the literature regarding CG and voluntary sustainability reporting in several ways. First, there is a lot of literature available about either the topic of CG (e.g. Shleifer and Vishny, 1997; Gillan, 2006), the topic of CSP (e.g. Cho et al., 2013; Luo et al., 2014) or the topic of SDQ (e.g. Cormier et al., 2005; Chiu and Wang, 2014). Nevertheless, there is little empirical evidence describing the relationship between the three concepts. In addition, the considerable amount of literature on the relationship between CSP and sustainability reporting provides inconsistent results (e.g. Patten, 2002; Al-Tuwaijri, 2004; Clarkson et al., 2008; Braam et al., 2016). Furthermore, these studies only include a number of financial control variables. Our study is among the first to incorporate the effects of CG mechanisms on both CSP and SDQ in a comprehensive framework. Second, this study complements literature as its research method has not been used yet. Extant research that examines the effect of several CG mechanisms on sustainability reporting (e.g. Jo and Harjoto, 2011; Khan et al., 2013) is often focused on the probability and level of sustainability

reporting rather than on their quality. The studies that do examine the quality of sustainability disclosures (e.g. Manetti, 2011; Chiu and Wang, 2014) often use content analysis to quantify SDQ, which is subject to very specific indices that are difficult to apply in other studies. In this study SDQ is quantified by two comprehensive measures based on the indicators utilized by the Global Reporting Initiative (GRI), which is the most widely used set of reporting regulations for sustainability reporting (KPMG, 2013a). This method is related to the one used by Hummel and Schlick (2016), whose study is among the first to quantify SDQ using "hard" measures. However, they only examine the effect of CSP on SDQ and do not look into the influence of other CG mechanisms. Finally, our study contributes to the extant literature by examining the relationship between the aforementioned concepts, using panel data. This enables us to include multiple measurements of multiple variables at different moments in time. Extant empirical research about sustainability reporting is in most cases based on cross-sectional data, looking at one specific point in time (Patten, 2002; Clarkson, 2008; Hummel and Schlick, 2016). By analyzing our variables at multiple points in time, there is more power to detect causal relationships.

The next section provides a literature overview and develops hypotheses on the relationship between CG mechanisms, CSP and SDQ. This is followed by the research method and the results. Finally, we discuss the limitations of our study and draw conclusions.

2. Literature review and hypotheses

2.1 Theoretical background

2.1.1 Agency theory

Managers have the opportunity to decrease information asymmetry regarding sustainability concerns by voluntarily publishing sustainability reports (Cho et al., 2013). However, this voluntary setting also implies that there is room for opportunistic behavior for managers by not publishing bad sustainability information (Unerman et al., 2007). Hence, Friedman (2007) argues that engaging in corporate social responsibility is symptomatic of an agency problem. There is a conflict between the interests of managers (agent) and stakeholders (principal), because managers often use corporate social responsibility to further their own social, political, or career agendas, at the expense of stakeholders that want to obtain a reliable representation of a firm's sustainability performance. To restore the stakeholders' interests, CG mechanisms can be used. Higher levels of CG pressure may urge companies to become more responsible for sustainability issues and report on them accordingly (Jo and Harjoto, 2011).

2.1.2 Sustainability reporting

Two prominent theories about sustainability reporting are often distinguished in literature: voluntary disclosure theory, which suggests that superior sustainability performers use sustainability reporting to differentiate themselves from other, inferior performers, and socio-political theories, including legitimacy theory, that state that companies may produce sustainability reports to change public perceptions and expectations.

Voluntary disclosure theory predicts a positive relation between sustainability performance and the level of discretionary sustainability disclosure (Verrecchia, 1983; Dye, 1985). The notion is that superior sustainability performers will focus on objective performance indicators that are difficult to mimic by inferior firms, to enhance their reputation. Superior performers may have incentives to disclose sustainability reports of high quality to differentiate themselves from inferior sustainability performers in order to avoid the adverse selection problem (Verrecchia, 1983; Dye, 1985). Inferior performers will choose to disclose less about their sustainability performance, and might be not as attractive to investors as firms with a better sustainability performance.

Socio-political theories (including legitimacy theory), on the other hand, predict a negative relation between sustainability performance and voluntary sustainability reporting (Gray et al., 1995; Patten, 2002). Poor sustainability performers might face more political and social pressures which may incentivize them to hide the fact that they are actually poor performers. Hence, they can use sustainability reporting as a legitimation device. Another reason for inferior sustainability performers to disclose high-quality sustainability reports might be to educate and inform relevant publics about changes in their performance. Furthermore, they could aim to change public perceptions and expectations about their performance (Clarkson et al., 2008).

2.2 Framework

Figure 1 shows our framework that distinguishes between CSP and SDQ. These variables are shown on the right-hand side of Figure 1. Determinants of CSP and SDQ are shown on the left-hand side. Consistent with Hahn and Kühnen (2013), two determinants that are consistently found to positively influence sustainability reporting are present: stakeholder pressure (stakeholder engagement) and media exposure (media coverage). Furthermore, consistent with prior literature (Prado-Lorenzo and García-Sánchez, 2010; Khan, 2011; Frias-Aceituno et al., 2013), the board of directors is included. In addition, the effects of analyst coverage (Dhaliwal et al., 2011; Jo and Harjoto, 2011, 2014) and external assurance (Simnett et al., 2009; Fonseca, 2010) are incorporated.

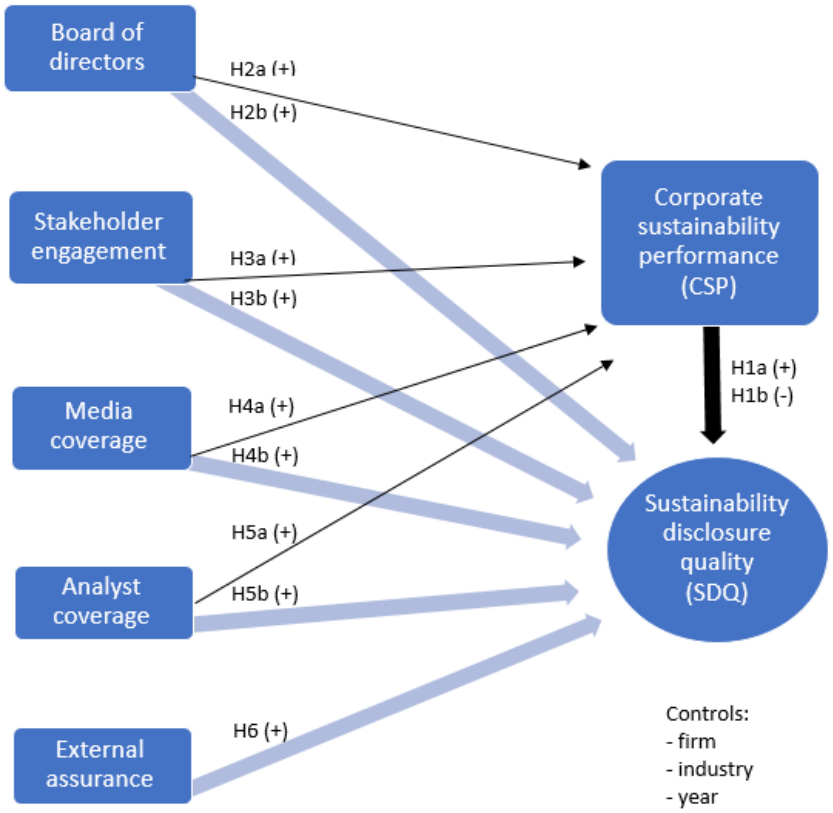

Figure 1. Determinants of CSP and SDQ.

2.3 Hypotheses

Voluntary disclosure theory states that superior sustainability performers choose high-quality sustainability disclosure to signal their superior performance to the market. They may focus on objective performance indicators that are difficult to mimic by inferior firms, to enhance their reputation (Verrecchia, 1983; Dye, 1985). Socio-political theories, however, argue that poor sustainability performers are more likely to engage in high-quality sustainability reporting. Since poor performers may be exposed to more social and political pressures, they may be urged to comprehensively and reliably disclose sustainability information (Patten, 2002; Clarkson et al., 2008). Thus, the two competing theories provide opposite predictions on how CSP may affect SDQ. The (contradicting) hypotheses are as follows:

H1a. CSP is positively related to SDQ.

H1b. CSP is negatively related to SDQ.

The board of directors is directly responsible for (monitoring) corporate sustainability reporting. Consistent with prior literature, we examine the effect of the board's independence, sustainability expertise, diversity and board size on CSP and SDQ (Dilling, 2010; Prado-Lorenzo and

García-Sánchez, 2010; Khan, 2011). First, Prado-Lorenzo and García-Sánchez (2010) argue that the more independent board members are, the more likely the company is to engage in corporate social responsibility: non-executive board members are assumed to be more sensitive to social demands, finding themselves in a better position than executive board members to protect the interests of the stakeholders. Second, the board's sustainability expertise is expected to affect CSP and SDQ. The presence of a sustainability committee might influence reporting quality as such a committee emphasizes the importance of corporate social responsibility (Dilling, 2010; Hahn and Kühnen, 2013). More sustainability expertise in the board of directors may also indicate that serious attention is paid to a firm's underlying sustainability performance. Third, the more diverse an organization's board of directors is, the more likely it is that sustainability concerns are taken into account. The presence of female members in the board may influence CSP and SDQ since women may have approaches which are less economically and self-interest oriented than those of men (Ibrahim and Angelidis, 1991; Prado-Lorenzo and García-Sánchez, 2010). Last, Frias-Aceituno et al. (2013) argue that the presence of a greater number of directors has a positive effect on the quality of sustainability information, because it increases the variety of expert viewpoints in the board. Consistent with prior literature (Dhaliwal et al., 2006; Hoitash et al., 2009; Hooghiemstra, 2012), we use a composite measure of board strength that is based on these four board characteristics. Board strength provides an overall indication of the extent to which the board is able to supervise management's actions effectively (Hooghiemstra, 2012). In conclusion, we expect the following:

H2a. Board strength is positively related to CSP.
H2b. Board strength is positively related to SDQ.

Furthermore, we expect stakeholder engagement to have positive associations with CSP and SDQ. Socio-political theories, including legitimacy theory, state that firms that are under public pressure by capital providers and other stakeholders (e.g. environmental organizations like Greenpeace) are more likely to have high sustainability performances and to disclose high-quality sustainability information (Hahn & Kühnen, 2013; Wolf, 2014). The increased stakeholder pressure forces companies to disclose the "bad news" in addition to the "good news", leading to sustainability reports of higher quality (Prado-Lorenzo et al., 2009). By disclosing sustainability reports of high quality, firms could try to change public perceptions and expectations of their sustainability performance which could lead to an enhanced reputation (Schaltegger et al., 2006). This could be appealing for companies, because those that are considered as high performers both in the market and for society face less problems in their (business) relationships with their stakeholders (Fombrun, 1996). Thus, we propose the following,

H3a. Stakeholder engagement is positively related to CSP.
H3b. Stakeholder engagement is positively related to SDQ.

We also account for the role of media coverage. The media can be effective in driving the community's concern about the sustainability performance of particular organizations, mobilizing social movements such as environmental groups. Where such concern is raised, organizations can respond by improving their sustainability performance and by increasing the extent of disclosure of environmental information (Brown and Deegan, 1998; Reverte, 2009). In addition, Hahn and Kühnen (2013) argue that companies may increase the depths of their disclosure in order to mitigate reputational risks of bad press and exploit possible benefits of good press. Thus, we expect not only the level of disclosures, but also the quality to increase when media coverage increases: if the media put more pressure on companies to disclose sustainability reports that truly and fairly represent their sustainability performance, the quality of the reports is expected to increase accordingly. Hence,

H4a. Media coverage is positively related to CSP.
H4b. Media coverage is positively related to SDQ.

Analysts can serve as an additional monitoring mechanism: analyst coverage imposes discipline on misbehaving managers and helps align managers with stakeholders, thus improving managerial incentives to undertake more optimal (corporate social responsibility) policies (Harjoto and Jo, 2011). Consequently, analyst coverage may lead to an increased focus on CSP. Furthermore, firms can use sustainability reporting as a mechanism to resolve conflicts between managers and non-investing stakeholders. Analysts can provide relevant information useful to mitigate these conflicts of interest (Jo and Harjeto, 2014). Dhaliwal et al. (2011) also find that firms initiating corporate social responsibility attract analyst coverage. However, we expect analyst coverage not only to be positively associated with the probability of engagement, but with SDQ as well: firms might feel pressured to disclose sustainability information of higher quality when their reports are closely followed by a number of analysts. Based on the above we propose,

H5a. Analyst coverage is positively related to CSP.
H5b. Analyst coverage is positively related to SDQ.

Disclosing credible sustainability performance information can be viewed as a central element in corporate social responsibility. More and more stakeholders are demanding that

sustainability reports truly and fairly represent what the companies have achieved and what they will achieve in the future (Park and Brorson, 2005). In an attempt to tackle such challenges, some organizations introduce third-party assurance of sustainability reports. Companies can purchase external assurance to enhance the credibility of their reports (Kolk, 2008; Simnett et al., 2009; Fonseca, 2010). The enhanced credibility is a consequence of the assurer being technically and ethically competent in their role, and their independence from the preparer of the information (Pflugrath et al., 2011). Park and Brorson (2005) find that, besides enhancing credibility, companies can seek external assurance to improve the internal reporting system. In conclusion, a positive relationship is anticipated.

H6. External assurance is positively related to the SDQ.

3. Methodology

3.1 Sample

To test the above hypotheses, we used panel data of 91 Dutch companies that voluntarily disclosed corporate sustainability reports in accordance with the GRI-guidelines, during the years 2012-2016. The Netherlands is a relevant country for this research as the GRI is located in Amsterdam, and Dutch companies as Unilever and Royal Dutch Shell have leading roles in corporate sustainability reporting. To assess CSP, we used companies' sustainability reports and the ASSET4 database of Thomson Reuters. Data on SDQ was taken from the GRI database, which scores sustainability reports dichotomously on several guidelines and standards. Due to the lack of available data on Dutch companies, we extracted data on board characteristics directly from the annual and sustainability reports. Data on stakeholder engagement was obtained from the "Transparantiebenchmark". This annual assessment by the Dutch Ministry of Economic Affairs evaluates the level of transparency by the top 500 Dutch companies in relation to sustainability reporting (Heineken, 2015). Among the indicators that measure this transparency are indicators that proxy for stakeholder engagement. The indicators that proxy for external assurance were also taken from the Transparantiebenchmark. Data on media coverage was obtained from the national leading financial and business newspaper. The number of analysts following was obtained from the I/B/E/S dataset of Thomson Reuters. The financial information was extracted from Orbis and ThomsonOne.

Of the observations initially in our sample, 276 were excluded because they had too many missing values on the CSP indicators (see section 3.2.1). An additional 19 observations were excluded due to missing data on SDQ. Missing data on company size, stakeholder engagement and board size led to the last 8 excluded observations. Table 1 presents the sample selection (panel A) and

descriptive statistics for the sample companies by industry, year and listing status (panel B). It shows that companies in all industries publish sustainability reports, whether they are listed or unlisted.

Table 1

Sample selection and distribution.

Panel A: Sample selection	
91 Dutch companies that published sustainability reports in the period 2012-2016	455
Less: observations with insufficient data on CSP (see section 3.2.1)	-276
Less: observations with insufficient data on SDQ	-19
Less: observations with insufficient data on other variables	-8
Final sample (company-year observations)	152

Panel B: Company characteristics

Industry	Number of company-year observations					
	Total	Year				
		2012	2013	2014	2015	2016
Financial services	20	5	5	4	6	0
Other services than financial services	66	15	21	19	9	2
Manufacturing companies	29	6	7	8	8	0
Trade companies	37	8	10	10	9	0
Total	152	34	43	41	32	2
Listing status						
Listed	90	19	24	25	20	2
Unlisted	62	15	19	16	12	0
Total	152	34	43	41	32	2

3.2 Variables

3.2.1 Dependent variables

The first dependent variable is CSP. Consistent with Hummel and Schlick (2016), a comprehensive measure of CSP including both environmental and social indicators is used. The indicators are presented in Table 2. Since the share of women in the highest corporate bodies was already part of the board characteristics, we replaced this social indicator by the average rate of absenteeism (Muller and Kolk, 2009). Firstly, observations with more than two missing values per dimension are excluded from the dataset. Next, all performance indicator values are divided by the natural logarithm of the firm's year-end total assets. Subsequently, the data is arranged by industry groups and winsorized within each industry group at the top and bottom tails at a 10% level to limit the influence of outliers (Tukey, 1962; Hummel and Schlick, 2016). Then, all indicators are converted into a continuous [0, 1] scale per industry group. The worst indicator value is assigned "0", the best "1",

and all other indicator values are rescaled proportionally (Hummel and Schlick, 2016). Next, missing values in each dimension are replaced by the mean of the other values in the respective dimension. Subsequently, the sum of all environmental indicator values is taken and used as a proxy for environmental performance (EP). The sum of all social indicator values proxies for social performance (SP). Lastly, the sum of EP and SP is taken and used as measure for CSP. All performance indicators in this comprehensive CSP measure are thus weighted equally.

Table 2

Environmental and social indicators of corporate sustainability performance (CSP).

CSP indicator	Measurement	Unit
Environmental dimension		
1. Total weight of waste (1)	Total amount of waste produced	Tonnes of kg
2. Greenhouse gas emissions (1)	Total greenhouse gas and greenhouse gas equivalents emission	Tonnes of kg
3. Energy consumption (1)	Total direct and indirect energy consumption	Gigajoules
4. Water withdrawal (1)	Total water withdrawal	Cubic meter
Social dimension		
1. Employee training (1)	Total training hours performed by all employees	Number (hours)
2. Lost time injury rate (1)	Total number of injuries that caused the employees and contractors to lose at least a working day relative to one million hours worked	Number (injuries)
3. Employee turnover (1)	Percentage of employee turnover	Percent
4. Absenteeism rate (2)	Percentage of absenteeism	Percent

(1) Consistent with Hummel and Schlick (2016).

(2) Consistent with Muller and Kolk (2009).

The second dependent variable proxies for SDQ. The quality of the reports is measured by using the GRI's information on the application of global standards. The GRI analyzes whether or not a company applies these standards. By including the reference to or use of these standards, the GRI aims to harmonize with other global sustainability tools. This makes it easier for organizations to understand how complementary guidance can be used quickly and efficiently (KPMG, 2013b). In Table 3, panel A presents definitions of the SDQ standards used (Global Reporting Initiative, 2016). Panel B depicts the summary statistics of these standards.

Table 3

Characteristics of the sustainability disclosure quality (SDQ) standards.

Panel A: Definitions of the SDQ standards

Standards	Definition
SDGs	Indicates explicit reference to the UN Sustainable Development Goals (SDGs) in the report. Tracks whether the reporting organization has indicated that the report addresses any of the UN Sustainable Development Goals (SDGs). These goals are classified in the following groups: (1) no poverty, (2) zero hunger, (3) good health and well-being, (4) quality education, (5) gender equality, (6) clean water and sanitation, (7) affordable and clean energy, (8) decent work and economic growth, (9) industry, innovation and infrastructure, (10) reduced inequalities, (11) sustainable cities and communities, (12) responsible consumption and production, (13) climate action, (14) life below water, (15) life on land, (16) peace, justice and strong institutions, (17) partnerships for the goals.
CDP	Indicates explicit reference to the organization responding to one of the annual Carbon Disclosure Project (CDP) questionnaires, or participating in an associated CDP project. The CDP is an organization that works with shareholders and corporations to disclose the greenhouse gas emissions of major corporations.
IFC	Indicates explicit reference to/ use of the International Finance Corporation (IFC) Performance Standards in the report. These performance standards are: (1) assessment and management of environmental and social risks and impacts, (2) labor and working conditions, (3) resource efficiency and pollution prevention, (4) community health, safety, and security, (5) land acquisition and involuntary resettlement, (6) biodiversity conservation and sustainable management of living natural resources, (7) indigenous peoples, (8) cultural heritage.
OECD	Indicates explicit reference to/ use of the OECD Guidelines for Multinational Enterprises in the report. These guidelines are classified in the following groups: (1) concepts and principles, (2) general policies, (3) disclosure, (4) human rights, (5) employment and industrial relations, (6) environment, (7) combating bribery, bribe solicitation and extortion, (8) consumer interests, (9) science and technology, (10) competition, (11) taxation.
UNGC	Indicates explicit reference to/ use of the United Nations Global Compact and its principles in the report. The four UNGC principles are: (1) human rights, (2) labor, (3) environment, (4) anti-corruption.
ISO 26000	Indicates explicit reference to/ use of the ISO 26000 clauses in the report. These clauses are about the implementation of corporate social responsibility. They are classified as follows: (1) general, (2) accountability, (3) transparency, (4) ethical behavior, (5) respect for stakeholder interests, (6) respect for the rule of law, (7) respect for international norms, (8) respect for human rights.

Panel B: Summary statistics for the SDQ standards

Standards	n	Mean	Std. Dev.	Min	Max
SDGs	34	0.15	0.36	0.00	1.00
CDP	152	0.36	0.48	0.00	1.00
IFC	152	0.06	0.24	0.00	1.00
OECD	152	0.31	0.46	0.00	1.00
UNGC	152	0.46	0.50	0.00	1.00
ISO 26000	152	0.17	0.38	0.00	1.00

We included two proxies for SDQ. Firstly, consistent with Prado-Lorenzo et al. (2009), principal component analysis (PCA) was used to create a comprehensive measure of SDQ. This makes it

possible to simplify the GRI standards into components that reflect the underlying common dimensions (Prado-Lorenzo et al., 2009). Since the GRI included reference to the SDGs standard only since 2016, the PCA was run without this standard. A Kaiser-Meyer-Olkin test was run to see whether there was an adequate basis for a PCA. The results of the sufficiency measurement of the general sampling falls within the range of acceptance (> 0.5) as can be found in panel A of Table 4, together with the PCA results. By analyzing the loadings, it can be seen that the interrelationships are stronger for the first component than for the second one. This indicates that the first component represents the quality of sustainability reporting best. Hence, component 1 is used as first measure for SDQ. The only indicator that does not fit with the others perfectly is the ISO 26000 standard. This standard is about the implementation of corporate social responsibility in general, rather than about reference to specific sustainability goals or performance standards (International Organization for Standardization, 2010). Nevertheless, since the loadings are still relatively close to each other and we rather use a comprehensive SDQ measure, the ISO 26000 standard is not removed from the analysis. The second proxy of SDQ is calculated by taking the sum of the six GRI standards. Every standard in this SDQ measure is thus weighted equally. Panel B of Table 4 presents the summary statistics of both SDQ measures.

Table 4

Principal component analysis for SDQ1 and summary statistics.

Panel A: SDQ1 (principal component analysis)

	Indicators	Component 1	Component 2
General standards	CDP	0.548	– 0.139
	IFC	0.392	0.296
	OECD	0.550	0.081
	UNGC	0.474	– 0.426
	ISO 26000	0.140	0.840
	Total variance explained	0.401	0.219
	Kaiser-Meyer-Olkin test	0.679	

Panel B: Summary statistics for SDQ1 (PCA) and SDQ2 (sum of GRI standards)

Variable	n	Mean	Std. Dev.	Min	Max
SDQ1	152	0.02	1.43	– 1.35	3.91
SDQ2	152	1.39	1.34	0.00	5.00

3.2.2 Independent variables

Consistent with prior literature, the characteristics of the board of directors (Board) that are examined are independence, sustainability expertise, diversity and size (Dilling, 2010; Prado-Lorenzo

and García-Sánchez, 2010; Khan, 2011; Frias-Aceituno et al., 2013). Board independence is measured by the ratio of non-executive directors to total board size. The proxy for sustainability expertise is a dummy variable which is equal to 1 if there is a corporate social responsibility expert or committee, and 0 otherwise. Board diversity is measured by the ratio of female board members to total board size. Board size is measured by the number of directors on the board. Subsequently, consistent with Hooghiemstra (2012), a composite score for board strength is used. Dummy variables for board independence, diversity and size are created, equal to 1 if the respective original variables are greater than the median and 0 otherwise. A comprehensive measure of board strength is created by taking the sum of these dummy variables and sustainability expertise. Table 5 presents the definitions and summary statistics of the board characteristics.

Table 5

Characteristics of the board of directors.

Panel A: Definitions of the board characteristics	
Indicator	Definition
Independence	Board independence is measured by the ratio of non-executive directors to total board size.
Sustainability expertise	Board sustainability expertise is a dummy variable that is equal to 1 if there is a corporate social responsibility expert, committee, or council on the firm, and 0 otherwise.
Diversity	Board diversity is measured by the ratio of female directors to total board size.
Size	Board size is measured by the number of directors on the board.
Board strength	Board strength is a composite score based on dummy variables of board independence, sustainability expertise, diversity and size. A comprehensive measure is created by taking the sum of these four variables.

Panel B: Summary statistics for the board characteristics					
Indicator	n	Mean	Std. Dev.	Min	Max
Independence	152	0.66	0.12	0.00	0.91
Sustainability expertise	152	0.43	0.50	0.00	1.00
Diversity	152	0.17	0.11	0.00	0.50
Size	152	9.91	3.06	2.00	19.00
Board strength	152	2.12	1.10	0.00	4.00

To measure stakeholder engagement (Sten), we used the sum of the standardized scores of two indicators in the aforementioned Transparantiebenchmark. The first indicator is about the involvement of stakeholders in policies, the second looks into stakeholders' information needs (Ministerie van Economische Zaken, 2017). Characteristics of the indicators are presented in Table 6.

Table 6

Characteristics of the stakeholder engagement indicators.

Panel A: Definitions of the stakeholder engagement indicators	
Indicator	Definition
Sten 1	The company reports on the involvement of stakeholders in policies and activities and on how it takes stakeholders' interests and expectations into account.
Sten 2	The company used stakeholders' information needs when producing the report.
Sten	Sten (Stakeholder engagement) is measured by using the sum of the standardized scores of Sten 1 and Sten 2.

Panel B: Summary statistics for the stakeholder engagement indicators					
Indicator	n	Mean	Std. Dev.	Min	Max
Sten 1	152	7.07	3.27	0.00	10.00
Sten 2	152	1.84	1.37	0.00	3.00
Sten	152	3.44	1.69	0.00	5.17

Consistent with prior literature (Brown and Deegan, 1998; Reverte, 2009), we used the number of articles in the leading Dutch national, financial and business newspaper that refer to the specific company, as a proxy for media coverage (Media).

Consistent with Jo and Harjeto (2014), analyst coverage (Analyst) is measured by the 12-month total number of analysts following the company as estimated by Thomson Reuters I/B/E/S. A dummy variable is created which is equal to 1 if there are analysts following the company, and 0 otherwise.

To measure external assurance (Assurance), we used two indicators in the Transparantiebenchmark. The first is about external assurance and the second looks into the use of external expert opinions (Ministerie van Economische Zaken, 2017). Firstly, the sum of the standardized scores of these indicators is taken. Subsequently, a dummy variable is created which is equal to 1 if this sum is higher than the median, and 0 otherwise. Hence, we differentiate between "high" and "low" assurance. Characteristics of the indicators are presented in Table 7.

Table 7

Characteristics of the external assurance indicators.

Panel A: Definitions of the external assurance indicators

Indicator	Definition
Assurance 1	The report is externally assured by an independent organization which has verified the contents of the information and has assured the reliability of the information.
Assurance 2	External expert opinions about the results of the sustainable aspects of business are included in the report.
Assurance	Assurance is a dummy variable that is equal to 1 if the sum of the standardized scores of Assurance 1 and Assurance 2 is higher than the median, and 0 otherwise.

Panel B: Summary statistics for the external assurance indicators

Indicator	n	Mean	Std. Dev.	Min	Max
Assurance 1	152	5.95	4.47	0.00	14.00
Assurance 2	152	1.64	1.46	0.00	3.00
Assurance	152	0.51	0.50	0.00	1.00

3.2.3 Control variables

Consistent with prior literature (Clarkson et al., 2011; Hahn and Kühnen, 2013), we controlled for company size, leverage, industry, listing status, and return on equity (ROE). Our proxy for size is the natural logarithm of the firm's year-end total assets. Leverage is measured as the firm's total non-current debt divided by the firm's year-end total assets. To control for sector-specific effects, we used a dummy variable that looks into the different industries (Industry) that firms are in. Listing is a dummy variable that is equal to 1 if a firm is listed on the Euronext Amsterdam Stock Exchange and 0 if the firm is not listed. Lastly, ROE is measured by dividing net income by shareholder's equity. This variable is included because companies with a better financial performance may have more freedom and flexibility to disclose extensive sustainability reports (Clarkson et al., 2008).

3.3 Econometric model

To test our hypotheses, we used the following structural equation model:

$$SDQ_{it} = \beta_0 + \beta_1 CSP_{it} + \beta_2 BOARD_{it} + \beta_3 STEN_{it} + \beta_4 MEDIA_{it} + \beta_5 ANALYST_i + \beta_6 ASSURANCE_{it} + \beta_7 FIRM_{CONTROL,\ it} + \beta_8 INDUSTRY_{CONTROL,\ i} + \beta_9 YEAR_{CONTROL,\ i} + \alpha_i + \varepsilon_{it}$$

Where the explanatory variables also affect SDQ via CSP:

$$CSP_{it} = \beta_0 + \beta_1 BOARD_{it} + \beta_2 STEN_{it} + \beta_3 MEDIA_{it} + \beta_4 ANALYST_i + \beta_5 FIRM_{CONTROL,\ it} + \beta_6 INDUSTRY_{CONTROL,\ i} + \beta_7 YEAR_{CONTROL,\ i} + \alpha_i + \varepsilon_{it}$$

The first dependent variable is CSP, measured by the indicators presented in Table 2. The second dependent variable is a proxy for SDQ. The independent variables board strength, stakeholder engagement, media coverage, analyst coverage and external assurance are the explanatory factors in this research. Firm-specific variables (e.g. ROE and leverage) and industry were added as control variables. Furthermore, year dummies were included to control for variables that are constant between firms but vary over time. In Table 8 the definitions of the variables used in our study are presented.

Table 8

Definitions of the variables employed in the analyses.

Variable	Definition
SDQ1	SDQ1 (sustainability disclosure quality) is measured by the standards which the GRI uses in its database. Principal component analysis is used to create a comprehensive measure.
SDQ2	SDQ2 (sustainability disclosure quality) is measured by using the sum of the standards which the GRI uses in its database.
CSP	CSP (corporate sustainability performance) is measured by 4 environmental and 4 social indicators that proxy for sustainability performance. Section 3.2.1 describes how a comprehensive measure is created.
EP	EP (environmental performance) is measured by 4 environmental indicators. Section 3.2.1 describes how a comprehensive measure is created.
SP	SP (social performance) is measured by 4 social indicators. Section 3.2.1 describes how a comprehensive measure is created.
Board strength	Board strength is a composite score based on board independence, sustainability expertise, diversity and size. Section 3.2.2 describes how a comprehensive measure is created.
Independence	Board independence is measured by the ratio of non-executive directors to total board size.
Expertise	Board sustainability expertise is a dummy variable that is equal to 1 if there is a corporate social responsibility expert, committee, or council on the firm, and 0 otherwise.
Diversity	Board diversity is measured by the ratio of female directors to total board size.
Board size	Board size is measured by the number of directors on the board.
Sten	Sten (stakeholder engagement) is measured by using the sum of the standardized scores of two indicators in the Transparantiebenchmark.
Media coverage	Media coverage is measured by counting the number of articles in the national leading financial and business newspaper that refer to a specific company.
Analyst coverage	Analyst coverage is a dummy variable that is equal to 1 if there are analysts following the company, and 0 otherwise.
Number of analysts	Number of analysts for listed firms is measured by the 12-month total number of analysts following the company.
Assurance	Assurance is a dummy variable that is equal to 1 if the sum of the standardized scores of two indicators in the Transparantiebenchmark is higher than the median, and 0 otherwise.
Size	Size is the natural logarithm of the firm's year-end total assets.
ROE	ROE (return on equity) is measured by the firm's year-end net income divided by year-end total equity.
Leverage	Leverage is measured as total non-current debt divided by year-end total assets.
Industry	Industry is a dummy variable that ranges from 1 to 4, dependent on the industry the firm is in.
Listing	Listing is a dummy variable that is equal to one if a firm is listed on the Euronext Amsterdam Stock Exchange, and 0 otherwise.

Table 9 presents the summary statistics for the dependent, independent and control variables employed in our analyses.

Table 9

Summary statistics of the variables employed in the analyses.

	Variable	n	Mean	Std. Dev.	Min	Max
(1)	SDQ1	152	0.02	1.43	– 1.35	3.91
(2)	SDQ2	152	1.39	1.34	0.00	5.00
(3)	CSP	152	5.16	1.27	1.18	8.00
(4)	EP	152	3.05	1.15	0.00	4.00
(5)	SP	152	2.10	1.01	0.00	4.00
(6)	Board strength	152	2.12	1.10	0.00	4.00
(7)	Independence	152	0.66	0.12	0.00	0.91
(8)	Expertise	152	0.43	0.50	0.00	1.00
(9)	Diversity	152	0.17	0.11	0.00	0.50
(10)	Board size	152	9.91	3.06	2.00	19.00
(11)	Sten	152	3.44	1.69	0.00	5.17
(12)	Media coverage	152	321.06	439.15	0.00	2532.00
(13)	Analyst coverage	152	0.57	0.50	0.00	1.00
(14)	Number of analysts	87	19.70	10.42	3.00	37.00
(15)	Assurance	152	0.51	0.50	0.00	1.00
(16)	Size	152	22.31	2.20	17.94	27.81
(17)	ROE	152	0.04	0.57	– 3.67	5.13
(18)	Leverage	152	0.21	0.19	0.00	1.32
(19)	Industry	152	2.79	0.96	1.00	4.00
(20)	Listing	152	0.59	0.49	0.00	1.00

Pearson correlations were run to control for multicollinearity. The Pearson correlations coefficients are presented in Table 10. As anticipated, SDQ1 and SDQ2 show very high correlations. Both variables measure the quality of sustainability reports. In addition, CSP shows high correlations with EP and SP. This was expected as CSP is calculated by taking the sum of EP and SP. Likewise, since Board strength consists of the variables Independency, Expertise, Diversity and Board size, these variables are highly correlated. In addition, the high correlations between Analyst coverage and Listing can be explained by the fact that Analyst coverage can only be equal to 1 for firms that are listed. Hence, Listing is excluded in models where Analyst coverage is used. Furthermore, the high correlations of Size with Media coverage and Number of analysts indicate that the company size variable can be considered a proxy for corporate visibility. Moreover, we already used Size to create

the comprehensive CSP measure. For these reasons, we excluded the Size variable from the main analysis.

Table 10

Pearson correlations.

		1	2	3	4	5	6	7	8	9	10
1	SDQ1	1.000									
2	SDQ2	0.972***	1.000								
3	CSP	− 0.241***	− 0.247***	1.000							
4	EP	− 0.487***	− 0.442***	0.652***	1.000						
5	SP	0.250***	0.191**	0.513***	− 0.316***	1.000					
6	Board strength	0.436***	0.431***	− 0.039	− 0.213***	0.192**	1.000				
7	Independence	0.291***	0.268***	− 0.038	− 0.171**	0.146*	0.410***	1.000			
8	Expertise	0.142*	0.167**	0.016	0.003	0.017	0.657***	0.094	1.000		
9	Diversity	0.216***	0.212***	− 0.038	− 0.103	0.069	0.571***	0.107	0.269***	1.000	
10	Board size	0.304***	0.310***	0.056	− 0.269***	0.374***	0.482***	0.001	0.249***	0.149*	1.000
11	Sten	0.243***	0.270***	0.011	− 0.083	0.107	0.078	− 0.110	0.085	0.085	0.118
12	Media coverage	0.641***	0.617***	− 0.121	− 0.408***	0.310***	0.425***	0.282***	0.132	0.169**	0.360***
13	Analyst coverage	0.475***	0.461***	− 0.135*	− 0.249***	0.113	0.480***	0.315***	0.344***	0.235***	0.362***
14	Number of analysts	0.309***	0.262**	0.371***	− 0.061	0.544***	0.409***	0.144	0.137	0.205*	0.646***
15	Assurance	0.213***	0.218***	− 0.091	− 0.178**	0.087	0.070	− 0.104	0.029	0.230***	0.044
16	Size	0.579***	0.544***	0.028	− 0.469***	0.567***	0.549***	0.317***	0.275***	0.243***	0.558***
17	ROE	− 0.074	− 0.113	0.068	− 0.057	0.150*	− 0.026	− 0.054	− 0.124	− 0.077	0.067
18	Leverage	− 0.079	− 0.035	− 0.010	− 0.013	0.002	0.249***	0.005	0.185**	0.203**	0.305***
19	Industry	− 0.304***	− 0.302***	0.149*	0.084	0.092	− 0.164**	− 0.029	0.051	− 0.105	− 0.253***
20	Listing	0.572***	0.543***	− 0.081	− 0.236***	0.166**	0.442***	0.322***	0.312**	0.281***	0.278***

		11	12	13	14	15	16	17	18	19	20
11	Sten	1.000									
12	Media coverage	0.221***	1.000								
13	Analyst coverage	0.071	0.265***	1.000							
14	Number of analysts	0.230**	0.500***		1.000						
15	Assurance	0.367***	0.172**	0.025	0.305***	1.000					
16	Size	0.302***	0.685***	0.399***	0.698***	0.143*	1.000				
17	ROE	− 0.049	− 0.019	− 0.014	0.084	− 0.061	0.060	1.000			
18	Leverage	0.040	0.110	0.024	0.105	0.101	0.141*	− 0.032	1.000		
19	Industry	− 0.106	− 0.378***	− 0.204**	− 0.180*	0.058	− 0.255***	0.047	− 0.069	1.000	
20	Listing	0.173**	0.332***	0.852***	0.343***	0.091	0.453***	− 0.010	− 0.049	− 0.169**	1.000

***, ** and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels respectively.

See Table 8 for the definitions of the variables.

4. Results

4.1 Regression results

Table 11 presents the regression results of the structural equation model illustrated by Figure 1. The first model uses SDQ1 (PCA) as dependent variable, the second model uses SDQ2 (sum of GRI standards). Both models show that CSP has a significantly negative relationship with SDQ, disputing H1a and providing support for H1b. Socio-political theories thus explain this result. Focusing on the effects of the predictor variables on CSP, the results are not significant. Therefore, we examined different CSP measures in the sensitivity analysis of section 4.2.

The predictor variables Board strength, Media coverage and Analyst coverage are consistently found to have significantly positive effects on SDQ. This provides strong support for H2b,

H4b and H5b, respectively. Furthermore, Leverage has a significantly negative association with SDQ. This indicates that a better financial position leads to sustainability information of higher quality. In addition, Model 1 shows that Assurance has a significantly positive association with SDQ (supporting H6). There is also support for H3b, as Sten positively affects SDQ in Model 2. In the next section, we provide some robustness checks to test whether the results are sensitive to our variable measurements.

Table 11

Main structural equation model results.

	Model 1				Model 2			
	CSP		SDQ1		CSP		SDQ2	
CSP			− 0.150**	(− 2.50)			− 0.148**	(− 2.50)
Board strength	0.096	(0.83)	0.199**	(2.33)	0.096	(0.83)	0.172**	(2.06)
Sten	0.042	(0.66)	0.064	(1.31)	0.042	(0.66)	0.086*	(1.77)
Media coverage	− 0.000	(− 1.02)	0.001***	(7.02)	− 0.000	(− 1.02)	0.001***	(6.34)
Analyst coverage	− 0.327	(− 1.39)	0.753***	(4.34)	− 0.327	(− 1.39)	0.673***	(3.93)
Assurance			0.292*	(1.76)			0.240	(1.47)
ROE	0.132	(0.68)	− 0.175	(− 1.24)	0.132	(0.68)	− 0.231*	(− 1.66)
Leverage	− 0.021	(− 0.04)	− 1.412***	(− 3.42)	− 0.021	(− 0.04)	− 1.010**	(− 2.48)
Industry	0.131	(1.14)	− 0.067	(− 0.78)	0.131	(1.14)	− 0.062	(− 0.74)
Year dummy 2013	− 0.044	(− 0.15)	0.241	(1.14)	− 0.044	(− 0.15)	0.152	(0.73)
Year dummy 2014	0.019	(0.06)	− 0.001	(− 0.00)	0.019	(0.06)	0.039	(0.18)
Year dummy 2015	− 0.177	(− 0.55)	− 0.124	(− 0.53)	− 0.177	(− 0.55)	0.002	(− 0.01)
Year dummy 2016	− 0.388	(− 0.40)	− 1.015	(− 1.43)	− 0.388	(− 0.40)	− 0.529	(− 0.75)
Intercept	4.772***	(9.74)	− 0.448	(− 0.98)	4.772***	(9.74)	0.908**	(2.01)
N	152		152		152		152	

***, ** and * indicate statistical significance (two-tailed) at the 1 percent, 5 percent, and 10 percent levels, respectively (t-values next to regression coefficients in parentheses).

See Table 8 for the definitions of the variables.

4.2 Sensitivity analysis

Table 12 presents the regression results differentiating between environmental performance (EP) and social performance (SP). The results for EP can be found in Model 1, the results for SP in Model 2. Only for EP, there is a significantly negative association with SDQ. SP does not show significant results. This indicates that the effect of CSP on SDQ depends on the type of performance (environmental or social). Moreover, there are inconsistent results regarding Media coverage. Model 1 shows a significantly negative association with EP, Model 2 a positive one with SP. Furthermore, Model 1 shows that Analyst coverage significantly negatively affects EP, contradicting hypothesis

H5a. Lastly, Model 2 indicates that the control variables ROE and Industry have significantly positive relationships with SP.

The variables Board strength, Media coverage and Analyst coverage consistently confirm the significantly positive relationships with SDQ found in the main analysis, providing support for H2b, H4b and H5b. Assurance only has a significantly positive association with SDQ in Model 2, where SP is used as first dependent variable. Lastly, the effect of Leverage on SDQ consistently confirms our findings in the main analysis.

Table 12

Structural equation model results for environmental and social performance.

	Model 1				Model 2			
	EP		SDQ1		SP		SDQ1	
EP			– 0.277***	(– 3.95)				
SP							0.071	(0.88)
Board strength	0.028	(0.29)	0.191**	(2.32)	0.068	(0.79)	0.180**	(2.08)
Sten	0.009	(0.17)	0.064	(1.35)	0.033	(0.70)	0.051	(1.02)
Media coverage	– 0.001***	(– 4.76)	0.001***	(5.61)	0.001***	(3.94)	0.001***	(6.47)
Analyst coverage	– 0.394**	(– 2.02)	0.693***	(4.08)	0.067	(0.38)	0.798***	(4.54)
Assurance			0.257	(1.59)			0.343**	(2.05)
ROE	– 0.115	(– 0.72)	– 0.228*	(– 1.66)	0.247*	(1.73)	– 0.210	(– 1.45)
Leverage	0.171	(0.37)	– 1.353***	(– 3.37)	– 0.192	(– 0.46)	– 1.408***	(– 3.35)
Industry	– 0.124	(– 1.30)	– 0.118	(– 1.42)	0.255***	(3.00)	– 0.109	(– 1.22)
Year dummy 2013	– 0.014	(– 0.06)	0.241	(1.18)	– 0.030	(– 0.14)	0.254	(1.18)
Year dummy 2014	– 0.046	(– 0.19)	– 0.010	(– 0.05)	0.065	(0.30)	– 0.017	(– 0.08)
Year dummy 2015	– 0.143	(– 0.54)	– 0.137	(– 0.60)	– 0.034	(– 0.14)	– 0.094	(– 0.39)
Year dummy 2016	– 0.098	(– 0.12)	– 0.983	(– 1.42)	– 0.290	(– 0.40)	– 0.936	(– 1.29)
Intercept	3.907***	(9.63)	– 0.084	(– 0.19)	0.865**	(2.38)	– 1.216***	(– 3.26)
N	152		152		152		152	

***, ** and * indicate statistical significance (two-tailed) at the 1 percent, 5 percent, and 10 percent levels, respectively (t-values next to regression coefficients in parentheses).

See Table 8 for the definitions of the variables.

Table 13 presents the regression results of two models which use alternative measures for Board strength and Analyst coverage, respectively. The first model (Model 3) uses the four board characteristics Board strength is based on (Independence, Expertise, Diversity and Board size). It shows that Board size is the only board characteristic to significantly positively affect CSP, confirming our expectation that a larger board size increases the variety of expert viewpoints in the board. However, none of the board characteristics has a significant relationship with SDQ. This result is surprising as Board strength had a significantly positive effect on SDQ in our main analysis.

The second model (Model 4) uses the actual number of analysts following listed companies as a measure for Analyst coverage, rather than a dummy variable equal to 1 if there are analysts following the company and 0 otherwise. Since our sample also includes unlisted firms and I/B/E/S only has data available for listed firms, the number of observations in Model 4 decreased from 152 to 87. The number of analysts has a significantly positive relationship with CSP. There is no significant association with SDQ, however. This indicates that the more analysts follow a specific company, the more the company feels pressured to improve its sustainability performance, rather than to improve the quality of the information it provides.

Table 13

Structural equation model results for board strength indicators and number of analysts.

	Model 3				Model 4			
	CSP		SDQ1		CSP		SDQ1	
CSP			− 0.159***	(− 2.62)			− 0.133	(− 1.37)
Board strength					− 0.034	(− 0.26)	0.204*	(1.72)
Independency	0.679	(0.72)	1.112	(1.56)				
Expertise	0.129	(0.57)	− 0.072	(− 0.43)				
Diversity	0.136	(0.13)	1.099	(1.41)				
Board size	0.081**	(2.02)	0.045	(1.49)				
Sten	0.037	(0.59)	0.073	(1.48)	− 0.113	(− 1.48)	0.102	(1.33)
Media coverage	− 0.000	(− 1.37)	0.001***	(6.85)	− 0.001***	(− 3.28)	0.001***	(4.76)
Analyst coverage	− 0.475*	(− 1.95)	0.757***	(4.13)				
Number of analysts					0.074***	(5.07)	− 0.002	(− 0.13)
Assurance			0.267	(1.55)			0.437*	(1.74)
ROE	0.096	(0.49)	− 0.188	(− 1.31)	− 0.120	(− 0.70)	− 0.115	(− 0.73)
Leverage	− 0.338	(− 0.59)	− 1.426***	(− 3.32)	− 0.687	(− 0.77)	− 2.265***	(− 2.70)
Industry	0.142	(1.22)	− 0.047	(− 0.53)	0.212	(1.49)	− 0.042	(− 0.32)
Listed					1.054	(1.60)	0.312	(0.52)
Year dummy 2013	0.010	(0.03)	0.242	(1.13)	0.133	(0.39)	0.260	(0.84)
Year dummy 2014	0.091	(0.30)	0.029	(0.13)	0.362	(1.04)	− 0.062	(− 0.19)
Year dummy 2015	− 0.103	(− 0.32)	− 0.125	(− 0.52)	0.306	(0.78)	− 0.325	(− 0.91)
Year dummy 2016	− 0.503	(− 0.51)	− 1.109	(− 1.53)	− 0.803	(− 0.95)	− 0.977	(− 1.27)
Intercept	3.763***	(4.33)	− 1.398**	(− 2.04)	2.849***	(4.28)	− 0.040	(− 0.06)
N	152		152		87		87	

***, ** and * indicate statistical significance (two-tailed) at the 1 percent, 5 percent, and 10 percent levels, respectively (t-values next to regression coefficients in parentheses).

See Table 8 for the definitions of the variables.

5. Discussion

5.1 Interpretation

Our findings consistently support socio-political theories including legitimacy theory, indicating that poor sustainability performers publish sustainability reports of higher quality than superior sustainability performers. By disclosing sustainability information of high quality, inferior performers may try to influence public perceptions and expectations regarding their sustainability performance (Lindblom, 1994; Patten, 2002; Hummel and Schlick, 2016). They might account for their poor sustainability performance by improving the quality of their sustainability reports. Hence, they may be using sustainability reporting as a legitimation tactic. Providing high-quality sustainability information may deflect the attention of their poor sustainability performance. Furthermore, by providing high-quality sustainability information, poor sustainability performers could enhance their reputation and attract more stakeholders such as capital investors (Schaltegger et al., 2006).

Focusing on the explanatory variables, the results show that higher levels of CG pressure are associated with higher SDQ, as anticipated. Increased board strength, stakeholder engagement, media coverage, analyst coverage and external assurance all lead to an enhanced quality of the reports. The increasing pressure these parties put on companies to publish sustainability reports of high quality, urges companies to increase their SDQ. However, fewer variables are associated with the underlying CSP. Only media coverage and analyst coverage influence CSP, but the results are inconsistent. This suggests that companies under public pressure increase the quality of their sustainability disclosures, rather than directly improve the underlying sustainability performance.

Descriptive statistics show that SDQ is still relatively low. Most GRI standards are not met by the companies analyzed in this study (see Table 3, panel B). The indicator with the highest mean is the UNGC standard, with a mean of only 0.46. The other standards are often not explicitly referred to in companies' sustainability reports, as indicated by the low means. This implies that the application of global standards is still relatively low. These findings signal a need to complement voluntary sustainability reporting with mandatory requirements to urge companies to become more accountable for their sustainability performance (Braam et al., 2016).

5.2 Limitations

Our study has some limitations. Firstly, disclosing sustainability reports is voluntary and it is not (yet) mandatory to obtain external verification before the reports are published. Companies that do not produce sustainability reports were not included in this study. Moreover, our study only focused on companies in one country that have voluntarily disclosed sustainability reports. Further research could examine more companies and countries to increase the external validity of our findings. Another limitation is that the measures for stakeholder engagement and external assurance are

based on indicators used in the Transparantiebenchmark. This benchmark assesses the content and quality of sustainability reports. Hence, the indicators used for stakeholder engagement and external assurance could also be seen as indicators for SDQ. However, these two variables had the lowest correlations with SDQ (see Table 10). This suggests that these indicators do not have a large impact on the total score of the Transparantiebenchmark. Further research could investigate whether the SDQ measure based on the six GRI standards resembles the total Transparantiebenchmark score. Furthermore, it could be interesting to research the difference in quality between reports that are integrated with the companies' annual reports and reports that are published separately. Lastly, there may be inverse relationships that could be investigated. First, there may be an effect of SDQ on CSP, as providing higher information quality may make firms become more aware of their sustainability performance. This may make them attempt to improve it accordingly, resulting in a positive effect of CSP on SDQ. Second, CSP may negatively affect stakeholder engagement, media coverage and analyst coverage, as companies with poor sustainability performances may face more stakeholder, media and analyst pressure. These relationships could be examined in future research.

6. Conclusion

This study examined the relationship between CG mechanisms, CSP and SDQ. Structural equation modeling was used to test the significance of our framework. The first dependent variable, CSP, was measured by a comprehensive measure based on four environmental and four social indicators. To measure the second dependent construct, SDQ, we used six standards and guidelines that the GRI utilizes in their database to score sustainability reports on. Our results show that CSP plays a significant role in explaining the variation of SDQ. This can be explained by socio-political theories which state that firms that are under public pressure (because of their poor sustainability performance) are more likely to publish high-quality sustainability reports than firms that are not pressured. Furthermore, the positive associations between SDQ and the explanatory variables board of directors, stakeholder engagement, media coverage, analyst coverage and external assurance suggest that higher levels of CG pressure urge companies to disclose more reliable and complete sustainability information. The anticipated positive effects of the explanatory variables on CSP were not consistently found, however. This could indicate that firms which are under political and social pressure increase the quality of their sustainability reports, rather than directly improve their underlying sustainability performance. This implies that increasing pressure on firms to become more accountable for sustainability concerns, does not increase their actual sustainability performance. Instead, firms feel urged to increase the quality of the sustainability information they provide. Hence, they may be using sustainability reports as a legitimation device. The findings suggest that rather than focusing on the quality of their sustainability reports, firms should be held accountable for their

actual sustainability performance. This may be accomplished by complementing voluntary sustainability reporting with mandatory requirements for CSP. Furthermore, since the quality of sustainability reports is still relatively low, disclosure regulation could be implemented. This might positively affect the development of sustainable value creation.

7. References

Al-Tuwaijri, S. A., Christensen, T. E. and Hughes, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: A simultaneous equations approach. *Accounting, Organizations and Society*, 29, pp. 447-471.

Amran, A. and Ooi, S. K. (2014). Sustainability reporting: meeting stakeholder demands. *Strategic Direction*, 30:7, pp. 38-41.

Braam, G. J. M., Uit de Weerd, L., Hauck, M. and Huijbregts, M. A. J. (2016). Determinants of corporate environmental reporting: the importance of environmental performance and assurance. *Journal of Cleaner Production*, 129, pp. 724-734.

Brammer, S. and Pavelin, S. (2006). Voluntary environmental disclosures by large UK companies. *Journal of Business Finance & Accounting*, 33, pp. 1168-1188.

Brown, N. and Deegan, C. (1998). The public disclosure of environmental performance information – a dual test of media agenda setting theory and legitimacy theory. *Accounting and business research*, 29:1, pp. 21-41.

Chiu, T. K. and Wang, Y. H. (2014). Determinants of social disclosure quality in Taiwan: an application of stakeholder theory. *Journal of Business Ethics*, 129:2, pp. 379-398.

Cho, S. Y., Lee, C. and Pfeiffer Jr., R. J. (2013). Corporate social responsibility performance and information asymmetry. *Journal of Accounting and Public Policy*, 32, pp. 71-83.

Clarkson, P. M., Li, Y., Richardson, G. D. and Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society*, 33, pp. 303-327.

Clarkson, P. M., Overell, M. and Law Chapple, L. (2011). Environmental reporting and its relation to corporate environmental performance. *Abacus*, 47:1, pp. 27-60.

Cormier, D., Magnan, M. and van Velthoven, B. (2005). Environmental Disclosure Quality in Large German Companies: Economic Incentives, Public Pressures or Institutional Conditions? *European Accounting Review*, 14:1, pp. 3-39.

Cowen, S., Ferreri, L. and Parker, L. D. (1987). The Impact of Corporate Characteristics on Social Responsibility Disclosure: A Typology and Frequency-Based Analysis. *Accounting, Organizations and Society*, 12:2, pp. 111-122.

Deegan, C. and Gordon, B. (1996). A Study of the Environmental Disclosure Practices of Australian Corporations. *Accounting and Business Research*, 26:3, pp. 187-199.

Dhaliwal, D. S., Naiker, V. and Navissi, F. (2006). *Audit Committee Financial Expertise, Corporate Governance, and Accruals Quality: An Empirical Analysis* (Working Paper, University of Arizona).

Dhaliwal, D. S., Li, O. Z., Tsang, A. and Yang, Y. G. (2011). Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. *The Accounting Review*, 86:1, pp. 59-100.

Dilling, P. (2010). Sustainability Reporting In A Global Context: What Are The Characteristics Of Corporations That Provide High Quality Sustainability Reports – An Empirical Analysis. *International Business and Economic Research Journal*, 9:1, pp. 19-30.

Dye, R. A. (1985). Disclosure of nonproprietary information. *Journal of Accounting Research*, 23:1, pp. 123-145.

Fama, E. F. and Jensen, M. C. (1983). Separation of Ownership and Control. *Journal of Law & Economics*, 27, pp. 301–325.

Frias-Aceituno, J. V., Rodriguez-Ariza, L. and García-Sánchez, I. M. (2013). The Role of the Board in the Dissemination of Integrated Corporate Social Reporting. *Corporate Social Responsibility and Environmental Management*, 20, pp. 219-233.

Friedman, M. (2007). The Social Responsibility of Business is to Increase its Profits. New York: Springer.

Fombrun, C. (1996). *Reputation. Realizing value from the corporate image*. Boston: Harvard University Press.

Fonseca, A. (2010). How credible are mining corporations' sustainability reports? A critical analysis of external assurance under the requirements of the international council on mining and metals. *Corporate Social Responsibility and Environmental Management*, 17:6, pp. 355-370.

Gillan, S. L. (2006). Recent Developments in Corporate Governance: An Overview. *Journal of Corporate Finance*, 12, pp. 381-402.

Global Reporting Initiative (2016). *Sustainability Disclosure Database – Data Legend*. Retrieved from http://database.globalreporting.org/about-this-site.

Gray, R., Kouhy, R. and Lavers, S. (1995). Corporate social and environmental reporting: a review of the literature and a longitudinal study of UK disclosure. *Accounting, Auditing & Accountability Journal*, 8:2, pp. 47-77.

Gray, R. and Milner, M. (2002). Sustainability Reporting: Who's Kidding Whom? *Chartered Accountants Journal of New Zealand*, 81:6, pp. 66-70.

Hahn, R. and Kühnen, M. (2013). Determinants of sustainability reporting: a review of results, trends, theory, and opportunities in an expanding field of research. *Journal of Cleaner Production*, 59, pp. 5-21.

Harjoto, M. A. and Jo, H. (2011). Corporate Governance and CSR Nexus. *Journal of Business Ethics*, 100, pp. 45-67.

Heineken (2015, September 24). *Sustainability Report 2014 – Brewing a Better World*. Retrieved from http://database.globalreporting.org/reports/31061/.

Hoitash, U., Hoitash, R. and Bedard, J. C. (2009). Corporate governance and internal control over financial reporting: a comparison of regulatory regimes. *Accounting Review*, 84:3, pp. 839-867.

Hooghiemstra, R. (2012). What determines the informativeness of firms' explanations for deviations from the Dutch corporate governance code? *Accounting and Business Research*, 42:1, pp. 1-27.

Hummel, K. and Schlick, C. (2016). The relationship between sustainability performance and sustainability disclosure – Reconciling voluntary disclosure theory and legitimacy theory. *Journal of Accounting and Public Policy*, 35, pp. 455-476.

Ibrahim, N. A. and Angelidis, J. P. (1991). Effects of Board Members' Gender on Level of Investment in Strategic Management and Corporate Social Responsiveness Orientation. *Proceedings of the Northeast Decision Sciences Institutes*, pp. 208–210.

International Organization for Standardization (2010). *ISO26000: 2010 – Guidance on social responsibility*. Retrieved from https://www.iso.org/obp/ui/#iso:std:iso:26000:ed-1:v1:en.

Jo, H. and Harjoto, M. A. (2011). Corporate governance and firm value: The impact of corporate social responsibility. *Journal of Business Ethics*, 103:3, pp. 351-383.

Jo, H. and Harjoto, M. A. (2014). Analyst coverage, corporate social responsibility, and firm risk. *Business Ethics: A European Review*, 23:3, pp. 272-292.

Khan, H. Z. (2011). The effect of corporate governance elements on corporate social responsibility (CSR) reporting: Empirical evidence from private commercial banks of Bangladesh. *International Journal of Law and Management*, 52:2, pp. 82-109.

Khan, A., Muttakin, M. B. and Siddiqui, J. (2013). Corporate Governance and Corporate Social Responsibility Disclosures: Evidence from an Emerging Economy. *Journal of Business Ethics*, 114, pp. 207-223.

Kolk, A. (2008). Sustainability, accountability and corporate governance: Exploring multinationals' reporting practices. *Business Strategy and the Environment*, 17:1, pp. 1-15.

KPMG (2013a). KPMG International survey of corporate responsibility reporting 2013.

KPMG (2013b). Carrots and sticks. Sustainability reporting policies worldwide – today's best practice, tomorrow's trends.

Lindblom, C. (1994). *The implications of organizational legitimacy for corporate social performance and disclosure*. Paper presented at the Critical Perspectives on Accounting Conference, New York.

Luo, X. and Tang, Q. (2014). Does voluntary carbon disclosure reflect underlying carbon performance? *Journal of Contemporary Accounting & Economics*, 10:3, pp. 191-205.

Luo, X., Wang, H., Raithel, S. and Zheng, Q. (2014). Corporate Social Performance, Analyst Stock Recommendations, and Firm Future Returns. *Strategic Management Journal*.

Manetti, G. (2011). The quality of stakeholder engagement in sustainability reporting: empirical evidence and critical points. *Corporate Social Responsibility and Environmental Management*, 18, pp. 110-122.

Ministerie van Economische Zaken (2017). *Criteria Transparency Benchmark 2017*. Retrieved from https://www.transparantiebenchmark.nl/sites/transparantiebenchmark.nl/files/afbeeldingen/transparency_benchmark-_criteria_2017_english.pdf.

Muller, A. and Kolk, A. (2009). CSR Performance in Emerging Markets Evidence from Mexico. *Journal of Business Ethics*, 85:2, pp. 325-337.

Park, J. and Brorson, T. (2005). Experiences of and views on third-party assurance of corporate environmental and sustainability reports. *Journal of Cleaner Production*, 13, pp. 1095-1106.

Patten, D. M. (2002). The relation between environmental performance and environmental disclosure: a research note. *Accounting, Organizations and Society*, 27, pp. 763-773.

Pflugrath, G., Roebuck, P. and Simnett, R. (2011). Impact of Assurance and Assurer's Professional Affiliation on Financial Analysts' Assessment of Credibility of Corporate Social Responsibility Information. *Auditing: A Journal of Practice and Theory*, 30:3, pp. 239-254.

Prado-Lorenzo J. M., Gallego-Alvarez, I. and García-Sánchez, I. M. (2009). Stakeholder engagement and corporate social responsibility reporting: the ownership structure effect. *Corporate Social Responsibility and Environmental Management*, 16, pp. 94-107.

Prado-Lorenzo J. M. and García-Sánchez, I. M. (2010). The Role of the Board of Directors in Disseminating Relevant Information on Greenhouse Gases. *Journal of Business Ethics*, 97:3, pp. 391-424.

Reverte, C. (2009). Determinants of corporate social responsibility disclosure rating by Spanish listed firms. *Journal of Business Ethics*, 88, pp. 351-366.

Schaltegger, S., Bennett, M. and Burritt R. (2006). *Sustainability accounting and reporting*. Dordrecht: Springer.

Shleifer, A. and Vishny, R. W. (1997). A Survey of Corporate Governance. *The Journal of Finance*, 52:2, pp. 737-783.

Simnett, R., Vanstraelen, A. and Chua, W. F. (2009). Assurance on Sustainability Reports: An International Comparison. *The Accounting Review*, 84:3, pp. 937-967.

Tukey, J. W. (1962). The future of data analysis*. Ann. Math. Statlist*, 33:1, pp. 1-67.

Unerman, J., Bebbington, J. and O'Dwyer, B. (2007). *Sustainability, Accounting and Accountability*. London: Routledge.

Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, 5, pp. 179-194.

Williamson, O. E. (1984). Corporate Governance. *Yale Law Journal*, 93, p. 1197.

Wolf, J. (2014). The Relationship Between Sustainable Supply Chain Management, Stakeholder Pressure and Corporate Sustainability Performance. *Journal of Business Ethics*, 119:3, pp. 317–328.