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Frank H.M. Verbeeten Ramin Gamerschlag Klaus Möller

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Frank H.M. Verbeeten
EMFC/ARCA, VU University Amsterdam, Amsterdam, The Netherlands, and School of Economics, Utrecht University, Utrecht, The Netherlands
Ramin Gamerschlag
Faculty of Economic Sciences, Georg-August Universität Göttingen, Göttingen, Germany, and
Klaus Möller
Institute of Accounting, Control and Auditing, University of St Gallen, St Gallen, Switzerland

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Abstract
Purpose – The purpose of this paper is to examine whether narrative corporate social responsibility (CSR) disclosures (the provision of textual information on companies' environmental and social performance to external stakeholders) are associated with firm value in Germany.
Design/methodology/approach – Based on the global reporting initiative guidelines, the paper uses content analysis to assess the value relevance of CSR disclosures of 130 German companies over four years.
Findings – The results show that CSR information is value-relevant, but the value relevance of CSR information differs among CSR categories. Specifically, the disclosure of social information is positively associated with firm value yet environmental disclosures are not.
Practical implications – The results confirm that management should be aware of the potential capital market effects of voluntary CSR disclosures, even though such disclosures may be directed at other stakeholders.
Originality/value – Germany is an interesting setting as CSR disclosures are voluntarily, even though the institutional environment appears sensitive to CSR disclosures. Despite this, little research has focussed upon the value-relevance of CSR-disclosures in Germany. In addition, the results confirm that management should be aware of the potential capital market effects of voluntary CSR disclosures, even though they are not directed at shareholders as such.
Keywords Corporate social responsibility, Content analysis, Voluntary disclosure, Global reporting initiative, Value relevance
Paper type Research paper

1. Introduction
In the last three decades, corporate social responsibility (CSR) has become an issue of growing interest for society as well as for academics. Issues such as pollution, waste, resource depletion, product quality and safety, and the rights and status of workers have become the focus of increasing attention and concern (Garcia-Sanchez *et al.*, 2014; Reverte, 2009). Business organizations are increasingly viewed as being accountable for their social and environmental impacts (Kuo and Chen, 2013;

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Brammer and Pavelin, 2006). As a result, the reporting of CSR information is becoming more prevalent as investors, customers, employees, regulators, non-governmental organizations and other stakeholders demand greater transparency (Kim *et al.*, 2012). Despite the increase of CSR reporting in practice, there is little academic evidence regarding the value relevance of (specific) CSR disclosures (Reverte, 2016; Clarkson *et al.*, 2013).

In this paper, we analyze whether capital markets value the CSR information that is voluntarily disclosed by German companies and, if so, which *specific* CSR information is value-relevant. Understanding this relation is of increasing interest to academics and practitioners (Dhaliwal *et al.*, 2014) as CSR reporting is costly, yet has also been argued to improve financial performance (Arendt and Brettel, 2010), increase firm value (Reverte, 2016), reduce financial risk (Mishra and Modi, 2013), enhance access to finance (Cheng *et al.*, 2014), lower the cost of equity (Dhaliwal *et al.*, 2014; Reverte, 2012) and improve analyst forecast accuracy (Dhaliwal *et al.*, 2012). We test two competing predictions about the effect of voluntary CSR disclosures. Previous research (see Malik, 2015; Margolis *et al.*, 2009; Orlitzky *et al.*, 2003) suggests that better CSR performance is associated with increased financial performance. In such a situation, economic theory (Dye, 1985; Verrecchia, 1983) predicts a positive association between discretionary CSR disclosures and share price performance. The notion is that superior CSR performers will convey their performance which – due to legal and other obligations – is difficult to mimic by inferior firms. Inferior performers will choose to disclose less or to be silent on their CSR performance; investors will place these inferior firms in an "average type" pool. This partial disclosure equilibrium is sustained by the proprietary costs associated with CSR disclosure (Verrecchia, 1983) and uncertainty on whether the manager of the firm is informed regarding this type of information (Dye, 1985).

Alternatively, socio-political theories (including legitimacy theory and stakeholder theory; see Kuo and Chen, 2013; Cho *et al.*, 2012; Da Silva Monteiro and Aibar-Guzman, 2010) predict a negative association between CSR disclosure and share prices. These theories suggest that CSR disclosure is a function of social, political and other stakeholder's pressures facing the firm. To the extent that poor CSR performers face more political and social pressures and threatened legitimacy, they will attempt to increase discretionary CSR disclosures in order to change stakeholder perceptions about their CSR performance or their (costly) actions to repair or improve their CSR performance (Clarkson *et al.*, 2008). Both poor CSR performance (liabilities) as well as the improvement actions (higher operational costs) are likely to be associated with lower share prices. Therefore, we have competing directional predictions from alternative theories on the value relevance of CSR disclosures.

Based on the global reporting initiative (GRI) guidelines, we use content analysis to construct a number of CSR disclosure indices from the information provided in corporate reports. Scholars have increasingly employed content analysis as a research methodology (Conley and Tosti-Kharas, 2014; Da Silva Monteiro and Aibar-Guzman, 2010), and content analysis methods have been used before to establish the value relevance of voluntary disclosures (Vafaei *et al.*, 2011). We interpret CSR disclosure indices as "other information" that can be included in valuation models (see Ohlson, 1995; Feltham and Ohlson, 1995), and test whether these CSR disclosures are value-relevant.

We focus on the CSR disclosures in the annual reports over the years 2005 until 2008 of companies listed on the German DAX, MDAX and SDAX. These three indexes include the 130 largest listed German companies, and our tests are based upon at least 239 firm-year observations. Germany provides an interesting setting as CSR disclosure in Germany is generally voluntary. Other European countries (such as the UK, France, Denmark and the Netherlands) have specific requirements regarding CSR disclosures. Second, Germany's business culture and institutional environment is – similar to other Continental-European and Nordic countries – relatively stakeholder oriented (Dhaliwal *et al.*, 2012; Kinderman, 2008; Matten and Moon, 2008). This may affect the type, amount and financial impact of CSR-disclosures (Dhaliwal *et al.*, 2014). In addition to the annual report, we include a broader set of reports that German companies use to communicate with shareholders (including voluntary CSR reports and other CSR-specific disclosures in, for example environmental, social and human capital reports).

In brief, our results indicate that CSR information is value relevant; however, this relevance depends on the specific type of information provided. The provision of a CSR report is only marginally positively associated with firm value; in addition, our overall CSR disclosure variable is not associated with firm value. We find no (and, combined with social disclosures, a negative) association between our environmental disclosure proxies and share prices. Potential reasons for this lack of (negative) association may be that such (excessive) environmental disclosures relate to assets as well as liabilities, that they signal legitimacy strategies, or that they signal "overinvestments" in environmental activities. On the other hand, our proxy for social disclosure is positively associated with firm value. The social disclosures therefore appear to explain the association between CSR reports, overall CSR disclosure and firm value in Germany. The relevance of social disclosures may be due to the fact that such disclosure provides information on the capabilities of the companies' workforce (the human capital of the firms) or the good relations with the labor unions (an important stakeholder in Germany). Alternatively, social disclosures may signal an adequate risk management strategy; social activities lead to positive attributions from stakeholders (including unions) which provides "social capital" to the firm (Godfrey *et al.*, 2009). Finally, social CSR disclosures may signal investments that generate positive economic returns or are provided by firms that expect strong future performance (Lys *et al.*, 2015). Overall, our findings suggest that both economic as well as socio-political theories may be helpful in explaining the consequences of specific CSR disclosures.

Our study has a number of contributions to the literature. First, it provides evidence on the value relevance of CSR disclosures in a context different from the traditional USA, Canada and UK setting (see Giannarakis *et al.*, 2014; Reverte, 2016). The institutional context in Germany (with a civil-law jurisdiction, reliance on banks rather than shareholders for funding, relatively low disclosure requirements, and strong unions) provides the opportunity to investigate whether the value relevance of CSR disclosures extends beyond traditional Anglo-Saxon settings (with common law jurisdictions, more developed stock markets and security regulations, and less powerful unions). Second, this paper enriches the literature on the value relevance of narrative disclosures. Recent literature (e.g. Athanasakou and Hussainey, 2014; Campbell *et al.*, 2014; Muslu *et al.*, 2014) has started to investigate the information content of narrative disclosures in the annual report. We add to this stream of literature by providing evidence on the value relevance of narrative CSR disclosures in firm's (annual) reports. Our results suggest that investors consider the narrative CSR disclosures provided by the company relevant and reliable; it suggests that CSR disclosures provide information that is not directly reflected in financial statements yet provides insight in the future performance of the company. Third, previous studies (e.g. Mishra and Modi, 2013; Bird *et al.*, 2007; Hillman and Keim, 2001) suggest diverse effects for different types of CSR activities and CSR disclosures. Our finding that social disclosures are value relevant yet environmental disclosures are not may explain opposing results from previous studies that have used more general proxies for disclosure, such as CSR reports (as CSR reports may differ in the amount of social and environmental information that is provided by the company). Finally, previous studies (Cormier *et al.*, 2005; Gamerschlag *et al.*, 2011) have discussed the determinants of CSR disclosure in Germany; we extend this line of literature by focussing on the financial consequences of CSR disclosures in the German institutional setting.

The rest of the paper is organized as follows. Section 2 reviews the literature regarding the value relevance of CSR disclosure and provides our hypotheses. Section 3 presents the research methodology, data sources and empirical model. Section 4 provides the results, and the last section presents the discussion and conclusion of the study.

2. Background literature and hypotheses

2.1 CSR activities and CSR disclosures

CSR refers to a company's voluntary contribution to sustainable development which goes beyond legal requirements (Kuo and Chen, 2013; Arendt and Brettel, 2010). Business organizations are increasingly viewed as being accountable for their social and environmental impacts (Mishra and Modi, 2013; Brammer and Pavelin, 2006). The demand for enhanced CSR disclosures has been further fueled by the increasing popularity of the stakeholder approach that has resulted in a widespread realization that the interactions of a company are not limited to just shareholders. Companies usually inform stakeholders of their CSR activities in the annual report or in separate CSR reports (Dhaliwal *et al.*, 2011; Reverte, 2016, 2009); in addition, external rankings of companies' CSR activities and/or CSR disclosures are sometimes available[1]. However, there is no standardization or uniformity in terms of the items reported, or the way of reporting. Various NGO's have started to develop models or frameworks for reporting on CSR, including the Internationally Standards Organization (ISO 14001), the World Resources Institute and the GRI.

2.2 Theoretical perspectives on CSR disclosures

2.2.1 The value relevance of CSR disclosures. Despite previous research on CSR disclosures, a comprehensive theoretical framework for the impact of CSR disclosures is still elusive (De Klerk *et al.*, 2015; Reverte, 2009). Most studies in this area rely on economic theories or socio-political theories (e.g. De Villiers and Marques, 2016; Da Silva Monteiro and Aibar-Guzman, 2010). Empirical evidence (see Table I) does not consistently display a positive, neutral or negative relation between CSR disclosures and share prices. We examine the underlying theories as well as the associated hypotheses in the following sections.

Economic perspectives on CSR disclosures. Economic theories (specifically voluntary disclosure theory; Verrecchia, 1983; and agency theory, De Villiers and Marques, 2016) suggests a positive association between disclosures and stock market performance. The underlying notion is that voluntary disclosures provide incremental information beyond current financial performance that helps investors to assess competitiveness and expected future firm performance based upon the firm's (CSR) strategy (Reverte, 2016; Clarkson *et al.*, 2013). Over-compliance with CSR regulations has been argued to create "CSR goodwill"; this includes cost advantages due to process

Table I. Summary of previous studies on value relevance of CSR disclosures

Study	CSR metric(s)	Voluntary disclosure?	Methodology	Country/ continent	Dependent variable	Findings
Hassel *et al.* (2005)	Disclosure index on environmental reporting	No	Value relevance study	Sweden	Market value	Disclosed environmental performance has a negative impact on the market value of firms
Murray *et al.* (2006)	Disclosure score based upon CSEAR database	Yes	Value relevance study	UK	Share price	No association between environmental disclosure, overall disclosure and share price
Cormier and Magnan (2007)	Disclosure index on environmental reporting	Yes	Value relevance study	Germany, France, Canada	Market to book value	Disclosure of environmental information has positive effect on investors appreciation of the relationship between reported earnings and value in German firms; French and Canadian firms are not affected
					Share price (sensitivity check)	Mixed results for Germany (no direct effect for environmental disclosure, positive interaction effect with earnings per share) and Canada, no results for France
Carnevale *et al.* (2012)	Publication of social report	Yes	Value relevance study	Europe	Share price	No association between publication of CSR report and share price
Berthelot *et al.* (2012)	Availability of CSR report	Yes	Value relevance study	Canada	Market value	Positive association between provision of CSR report and market value
Xu *et al.* (2012)	Environmental violation disclosed by media and Ministry of Environmental Protection and the media in China	No	Event study	China	(Cumulative) abnormal return	Limited/no effect of environmental violation on share price
Clarkson *et al.* (2013)	Voluntary environmental disclosure index based upon GRI	Yes	Value relevance study	USA	Share price (among others)	Voluntary environmental disclosures provide valuation relevant information

(*continued*)

Table I.

Study	CSR metric(s)	Voluntary disclosure?	Methodology	Country/ continent	Dependent variable	Findings
Carnevale and Mazzuca (2014)	Provision of sustainability report (including specific section in annual report)	Yes	Value relevance study	International	Share price	Provision of sustainability report is positively associated with stock prices; sustainability report does not (negatively) moderate relation of earnings per share (book value of equity) with share price; value relevance of sustainability report varies across European countries
De Klerk *et al.* (2015)	KPMG survey on CSR reporting practices	Yes	Value relevance study	UK	Share price	Generally positive association between CSR score and share price, with interaction effects for industry
Plumlee *et al.* (2015)	Standalone CSR report, respectively voluntary environmental disclosure index based on GRI guidelines	Yes	Cost of capital, predictive ability study	USA	Share price, cost of equity, future cash flows	CSR report is not (positively) associated with share price and cost of equity (future cash flows); voluntary environmental disclosure index is not associated with share prices, cost of equity or future cash flows; effects of voluntary environmental disclosure index moderated by type of information (positive/negative and hard/soft)
Cahan *et al.* (2016)	KPMG survey on CSR reporting practices	Yes	Value relevance study	International	Tobin's Q	Positive association between CSR score and share price, moderated by institutional (country) characteristics
Reverte (2016)	CSR score granted by Observatorio	No	Value relevance study	Spain	Share price	Generally positive, with interaction effects for profitability and book value of equity
Fernández-Gago *et al.* (2016)	CSR score granted by Observatorio	No	Value relevance study	Spain	Share price	Positive association between CSR score and share price
DeVilliers and Marques (2016)	Compliance with the GRI G3 guidelines (A-, B- and C-scores)	Yes	Value relevance study	International	Share price	Positive association between CSR score and share price, moderated by institutional (country) characteristics

(*continued*)

Study	CSR metric(s)	Voluntary disclosure?	Methodology	Country/ continent	Dependent variable	Findings
This paper	Availability of CSR report; CSR disclosure index distinguishing between content (social and environmental disclosure) and intensity (number of words)	Yes	Value relevance study	Germany	Share price	Marginally positive association of CSR report and share price; no association of total CSR disclosures and share price; positive (no) association between social (environmental) information provided by company and share price Focus on Germany, with specific stakeholder-oriented business culture and institutional environment (especially relative to Anglo-Saxon settings) Provides evidence on value relevance of narrative CSR disclosures Documents the impact of specific social and environmental CSR disclosures (rather than more general CSR report proxy) in value relevance study Focus on impact rather than the determinants of CSR disclosures

Table I.

innovation (Malik, 2015), the creation of insurance-like moral capital which can temper penalizing reactions in case of a negative event (Flammer, 2013; Godfrey *et al.*, 2009; Arendt and Brettel, 2010), the establishment of customer loyalty and market share in case of positive events (Godfrey *et al.*, 2009), attraction of better talent and the motivation of employees (Flammer, 2015; Malik, 2015) and the increase of rivals' costs (Clarkson *et al.*, 2013). On the other hand, poor CSR performers do not enjoy these benefits but instead face obligations to incur future CSR expenditures with no incremental returns to shareholders as demands from society or CSR standard setters get tougher (Clarkson *et al.*, 2013). Good CSR performers signal their performance through the market with voluntary CSR disclosures that cannot be easily mimicked by poor CSR performers; this line of reasoning suggests that voluntary CSR disclosures increase firm value (Reverte, 2016; Clarkson *et al.*, 2013). Empirical evidence seems at least partially consistent with economic theory predictions: several studies have documented that CSR disclosures are positively associated with share price (see Table I for a review). Therefore, our economics-based hypothesis is:

H1a. Voluntarily disclosed CSR information is positively associated with firm value.

Socio-political perspectives on CSR disclosures. Socio-political theories (including legitimacy theory and stakeholder theory), on the other hand, predict a negative association between CSR disclosures and share prices. Legitimacy theory recognizes that businesses are bound by the social contract with society in which the firm agrees to perform various socially desired actions in return for approval of their objectives and other rewards, and this ultimately guarantees their continued existence (Reverte, 2009). Prior studies in this domain have provided evidence that firms voluntarily disclose information in their annual reports as a strategy to manage their legitimacy (Kuo and Chen, 2013; Da Silva Monteiro and Aibar-Guzman, 2010; Deegan and Gordon, 1996). Stakeholder theory explicitly considers the expectations impact of the different stakeholder groups within society upon corporate disclosure policies (Reverte, 2009). Under the managerial branch of stakeholder theory, the central thesis that emerges is that corporate disclosure is a management tool for managing the informational needs of the various powerful stakeholder groups (employees, shareholders, public authorities, etc.). Managers use information to manage or manipulate the most powerful stakeholders in order to gain their support, which is required for survival (Gray *et al.*, 1995). As poor CSR performers face more political and social pressures and threatened legitimacy, they will attempt to increase discretionary CSR disclosures to change stakeholder perceptions (Clarkson *et al.*, 2008).

Unlike economic theories, socio-political theories make no assumptions of rational, wealth-maximizing individuals operating within the environment of efficient capital markets. Previous evidence (Deegan and Gordon, 1996) suggests that CSR disclosures are mostly self-laudatory, with companies promoting positive aspects of CSR performance yet failing to disclose negative aspects. According to the socio-political perspective, voluntary CSR disclosures may be regarded as irrelevant to investors (as the provided CSR information is salient only to other stakeholders) or unreliable (as companies whose social legitimacy is threatened will try to change perceptions yet not necessarily activities about CSR performance, deflect attention from the issue of concern by highlighting other accomplishments and seek to change public expectations of their CSR activities; Moneva *et al.*, 2006; Gray *et al.*, 1995). For shareholders, CSR disclosures may actually signal a shift of power toward other stakeholders (including employees, customers, government or society in general; Lys *et al.*, 2015). Therefore, our socio-political theory-based hypothesis is:

H1b. Voluntarily disclosed CSR information is negatively associated with firm value.

Note that *H1a* and *1b* predict different effects for the value-relevance of CSR disclosures; which of these effects dominates is an empirical question. We interpret a positive (negative) association between CSR disclosures and share price as empirical evidence that economic (socio-political) theory predictions hold.

2.2.2 The value relevance of specific CSR disclosures. One of the reasons that previous research has provided mixed results (see Table I) is that the value relevance of CSR information may differ across categories. For example, Hillman and Keim (2001) suggest that environmental performance has a negative (yet insignificant) association with market value, while employee relations have a positive (yet insignificant) association with market value. Bird *et al.* (2007) find that higher environmental ratings are negatively associated, yet higher diversity and employee ratings are positively associated on share price returns. Bird *et al.* (2007) argue that market participants recognize the need to satisfy regulatory requirements but punish companies that expend corporate resources on environmental activities beyond those necessary to meet the minimum requirements, yet that the market rewards a "good employer" as this helps to build human capital. Mishra and Modi (2013) document that positive (negative) aspects of CSR reduces (increases) the idiosyncratic risk of the firm.

As CSR is multidimensional, we argue that the value relevance of CSR disclosures may differ across environmental and social (employee) categories. First, CSR disclosures on environmental aspects may discuss assets as well as liabilities; even though the last category may be framed in a positive way, they are likely to be received somewhat differently than information on employees (see Flammer, 2015). As we lack a proxy for actual environmental performance in our sample (Clarkson *et al.*, 2013; Patten, 2002), our proxy for environmental disclosure is more likely to pick up the liability side of environmental disclosures. In addition, social disclosures are more likely to be considered as intangible assets (rather than liabilities) that provide information on human capital (Surroca *et al.*, 2010; Bird *et al.*, 2007). The last category of disclosures is especially likely to be important in Germany, where the labor unions have a substantial say in corporate practices; more social disclosures may signal good labor union relations to the market. Third, a number of studies (Cho and Patten, 2007; Patten, 2002) suggest that environmental disclosures may be used to gain legitimacy (greenwashing); this suggests that the credibility of these disclosures is limited, and that shareholders (and other stakeholders) would not react, or even react negatively, to such information. Due to the type of information and the involvement of strong unions and worker councils in corporate practices (Kinderman, 2008), such "greenwashing" is less likely to apply to social disclosures in Germany. The previous review results in our second set of hypotheses:

H2a. Voluntarily disclosed environmental CSR information is negatively associated with firm value.

H2b. Voluntarily disclosed social CSR information is positively associated with firm value.

3. Study design and methodology

3.1 Sample selection

We extend the previous studies on the value relevance of voluntary CSR disclosures in Anglo-Saxon countries (e.g. De Klerk *et al.*, 2015; Plumlee *et al.*, 2015; see Table I) to Germany, a country which is relatively more stakeholder oriented. Germany can be characterized as highly regulated, with strong unions and worker council involvement in corporate decision making (Kinderman, 2008). In addition, Germany has highly institutionalized collective bargaining systems, extensive provision of social welfare and employment protection. Furthermore, environmental lobby groups have been monitoring German companies since the 1980s and try to impose sanctions on firms with perceived high environmental impacts. The idea that business bears social responsibilities is a long-standing characteristic of German culture (Kinderman, 2008, p. 8). Germany as has no official regulations on reporting social and environmental activities; however, German companies' stakeholders might be specifically sensitive with regard to CSR matters given the institutional background.

We focus on companies listed on the German DAX, MDAX and SDAX for reasons of comparability (exclusion of institutional differences, and similar voluntary disclosure environment and institutional environment; Dhaliwal *et al.*, 2014). The three indexes include the 130 biggest listed German companies. Our sample focusses on the index composition at the end of 2008; we include four reporting periods (reporting years 2005 until 2008), and only reports provided in English have been included in the analysis (all companies in the sample provide their reports in English as well as in German). We lose 150 observations due to missing company reports or other missing information. Our final dataset consists of a total of 370 firm-year observations.

3.2 Content analysis

Similar to previous studies (Kuo and Chen, 2013; Clarkson *et al.*, 2013; Da Silva Monteiro and Aibar-Guzman, 2010), we use content analysis to quantify CSR disclosures. Content analysis is a method of codifying written text (Conley and Tosti-Kharas, 2014; Li, 2010) into various groups or categories on the basis of selected criteria. This analysis assumes that frequency is an indication of the subject matter's importance (Beattie and Thomson, 2007; Krippendorff, 2004). Its objective is to generate a numerically based summary of a chosen message set (Li, 2010; Neuendorf, 2002). The existing literature (Kuo and Chen, 2013; Cormier *et al.*, 2005) suggests that content analysis provides valid results for corporate social and environmental reporting research, allowing the researcher to evaluate the extent of various items' disclosure.

A key issue in content analysis is the unit of analysis (Li, 2010; Beattie and Thomson, 2007)[2]. We use words as the unit of analysis to reduce complexity in coding and to obtain an objective measure (Beattie and Thomson, 2007). We use the PDF reader's word count function after checking its validity manually. We apply a coding framework based on the GRI's framework. The GRI is regarded the most relevant institution in the CSR disclosure context (De Villiers and Marques, 2016; Moneva *et al.*, 2006), ranks among the most widely recognized CSR instruments among large European companies (European Commission, 2013), and is often referred to as a global standard. Owing to the guidelines' voluntary nature, organizations have the flexibility to decide which information to disclose. The GRI guidelines cover all aspects of CSR, as they consider an economic, environmental and a social perspective. Since companies are obliged to disclose economic information, we only incorporate the environmental and social perspectives in our coding framework. We derive the final 32 keywords for our analysis from the core indicators in the GRI framework (GRI, 2010) by defining one or more keywords for every indicator. Table II provides the keywords[3].

3.3 Valuation model

In line with previous studies (De Villiers and Marques, 2016; De Klerk *et al.*, 2015; Reverte, 2016; Lourenço *et al.*, 2014), we estimate the following Ohlson (1995) valuation model:

$$SP_{i,t} = \beta_0 + \beta_1 BVE_{i,t} + \beta_2 NI_{i,t} + \beta_3 CSRDISC_{i,t} + \sum \beta_n CONTROLS_{i,t} \quad (1)$$

where SP is the share price (of common shares) at the end of the quarter when all relevant reports have been published[4]; BVE is the book value per share at the end of the fiscal year; NI is the net income per share at the end of the fiscal year; CSRDISC is a CSR disclosure score over the fiscal year (the CSR disclosures provided in either the annual report or the CSR report); and CONTROLS include industry and year dummies.

An alternative approach to assessing value relevance is the return-based approach (Barth *et al.*, 2001):

$$RET_{i,t} = \beta_0 + \beta_1 DNI_{i,t} + \beta_2 NI_{i,t} + \beta_3 DCSRDISC_{i,t} + \sum \beta_n CONTROLS_{i,t} \quad (2)$$

where RET is the return per share over the year ending at the end of the quarter when all relevant reports have been published; DNI is the change in the net income per share

Environmental	Social
Recycled	Employment
Energy consumption	Employee turnover
Biodiversity	Collective bargaining
Emissions	Collective agreements
Effluents	Occupational health
Waste	Occupational safety
Spills	Training
Environmental impacts	Diversity
	Equal opportunities
	Human rights
	Discrimination
	Freedom of association
	Child labor
	Forced labor
	Compulsory labor
	Community
	Corruption
	Public policy
	Compliance
	Fines
	Sanctions
	Product responsibility
	Customer health
	Customer safety

Table II. Keywords for the content analysis derived from the GRI framework over the fiscal year; and DCSRDISC is the change in the CSR disclosure index over the fiscal year. NI and CONTROLS are as previously defined (see also Table III for data sources of our variables).

We use a number of proxies for the CSR information provided by firms. Our first variable of interest is whether companies provide a separate CSR report (denoted CSRR), as previous literature (Carnevale and Mazzuca, 2014; Dhaliwal *et al.*, 2011) indicates that companies that issue a CSR report are more likely to provide incrementally useful information for investors to evaluate a firm's long-term sustainability. In addition, we compute three other key disclosure variables[5] that focus on the amount of CSR information provided by companies: CSRTOT is the total quantity of CSR disclosures (i.e. the total number of words on CSR topics based on the list in Table I in the annual report and the CSR report), CSRENV is the amount of environmental disclosures, and CSRSOC is the amount of social disclosures. To prevent that CSR proxies for more disclosures in other areas (other financial or non-financial disclosures), we divide the number of observed words by the number of pages in both the annual report and the CSR report. Thus, we obtain a relative index indicating the number of "CSR hits per page" in the corresponding category. For the return model, we use the change in disclosure for consecutive years in each of the CSR categories (e.g. $\text{DCSRTOT} = \text{CSRTOT}_t - \text{CSRTOT}_{t\text{-}1}$). We use industry dummies to capture industry effects. We employ year dummies to capture time-effects, and estimate all models using firm-clustered standard errors (see Petersen, 2009; Thompson, 2011).

4. Empirical results

4.1 Descriptive statistics

Table III offers a summary of the variable definitions, the data sources, the descriptive statistics and the correlation matrix for the variables under consideration.

Table III, panel A, indicates that there is considerable variation in the variables under consideration. Approximately 17 percent of the companies in our sample provides a separate CSR report; the number of separate CSR reports has increased from 14 over 2005 (13 percent) to 26 over 2008 (21 percent). The absolute number of CSR-related words has increased from 10,050 hits in the reports over 2005 to more than 21,650 hits in the reports over 2008. The average number of words on CSR per page in the annual report and the CSR report (CSRTOT) is 0.63 for the whole sample. Despite an increase in the average number of pages in the analyzed reports[6], the scores for the variables CSRTOT (CSRENV, CSRSOC) have increased from 0.50 (0.25, 0.23) in 2005 to 0.71 (0.33, 0.37) in 2008. The previous result suggests that disclosures on CSR-related topics have increased in importance relative to other topics in the annual report[7]. Consistent with previous research (Reverte, 2016; Brammer and Pavelin, 2006; Kuo and Chen, 2013) is that companies in industries with environmental sensitivities – utilities, automobile manufacturing, chemicals and construction – disclose more CSR information[8].

Table III, panel B, shows the Pearson correlations. In addition to BVE and NI, the share price (SP) is positively associated with all CSR disclosures. In addition, the returns (RET) are positively associated with changes in some (DCSRTOT, DCSRSOC) yet not all CSR disclosures. Finally, (changes in) the disclosure indexes are highly correlated, suggesting that companies increase CSR disclosures in a number of areas rather than only in one area.

Table III. Descriptive and correlation statistics

Panel A: variable definitions and descriptive statistics

Measure	Explanation	Source	*n*	Mean	SD	Minimum	Maximum
SP	Share price three months after the end of the fiscal year	Thomson One Banker	478	35.76	33.97	1.69	183.90
RET	Return per share (incl. dividend payments) three months after the end of the fiscal year	Thomson One Banker	463	0.01	0.52	−0.87	1.80
BE	Book value of equity per share at the end of the fiscal year	Thomson One Banker	470	19.10	17.57	1.21	87.49
NI	Net income per share over the fiscal year	Thomson One Banker	371	3.51	4.89	−4.54	25.30
DNI	Net income per share over the fiscal year minus net income per share over the previous fiscal year	Thomson One Banker	252	−0.17	3.16	−13.00	7.74
CSRR	Dummy for provision of separate CSR report (1 if CSR report is provided, 0 otherwise)	Downloaded from the company's website	484	0.17	0.38	0.00	1.00
CSRTOT	Total number of CSR words mentioned in the reports, divided by the number of pages of the CSR report and the annual report	Provided reports	484	0.62	0.55	0.05	2.78
CSRENV	Total number of CSR words related to environmental aspects mentioned in the reports, divided by the number of pages of the CSR report and the annual report	Provided reports	484	0.30	0.31	0.00	1.51
CSRSOC	Total number of CSR words related to social (empoloyee-related) aspects mentioned in the reports, divided by the number of pages of the CSR report and the annual report	Provided reports	484	0.32	0.31	0.03	1.77

(*continued*)

Table III.

DCSRTOT	CSRTOT−$CSRTOT_{t-1}$	Provided reports	356	0.08	0.45	−1.21	1.73
DCSRENV	$CSRENV_t$−$CSRENV_{t-1}$	Provided reports	356	0.04	0.25	−0.68	1.10
DCSRSOC	$CSRSOC_t$−$CSRSOC_{t\text{-}1}$	Provided reports	356	0.05	0.24	−0.66	1.09
Industry dummies	Industry classification based upon German stock exchange (Deutsche Boerse; dummies for 18 different industries)	Deutsche Boerse				0	1

Panel B: correlation matrix

	1	2	3	4	5	6	7	8	9	10	11
1. SP	1.000										
2. RET	0.344**	1.000									
3. CSRR	0.250**	0.008	1.000								
4. CSRTOT	0.171**	0.003	0.658**	1.000							
5. CSRENV	0.098*	0.013	0.442**	0.865**	1.000						
6. CSRSOC	0.213**	−0.014	0.700**	0.860**	0.510**	1.000					
7. DCSRTOT	0.148**	0.123*	0.379**	0.545**	0.530**	0.431**	1.000				
8. DCSRENV	0.110*	0.099	0.317**	0.531**	0.567**	0.362**	0.940**	1.000			
9. DCSRSOC	0.180**	0.120*	0.388**	0.488**	0.412**	0.492**	0.900**	0.724**	1.000		
10. NI	0.586**	0.139**	0.088	0.109*	0.088	0.106*	0.056	0.064	0.047	1.000	
11. DNI	0.157*	0.264**	−0.050	−0.033	−0.023	−0.017	−0.060	−0.048	−0.053	0.319**	1.000
12. BVE	0.683**	0.029	0.268**	0.165**	0.115*	0.179**	0.094	0.090	0.093	0.777**	0.003

Note: *,**Correlation is significant at 5 and 1 percent levels, respectively

4.2 Regression model results

Results for our primary analyses are presented in Table IV. Panel A presents the results for the share price model (Equation (1)), and Panel B presents the results for the return model (Equation (2)). The results are based on the pooled sample of 370 (239) firm-year observations for which both share price (returns) and the disclosure index (change in disclosure index) are available.

Our results for the share price model show that, consistent with our *H1a* (the economic theory hypothesis), the provision of a separate CSR report is positively yet marginally significantly associated with share price (CSRR, $p < 0.15$). The provision of more CSR information relative to other information in the annual report is not associated with share price (CSRTOT, $p > 0.10$). The provision of more environmental information relative to other information in the annual report is, by itself, negatively yet not significantly associated with share price (CSRENV, $p > 0.10$); this is inconsistent with *H2a*. Consistent with *H2b* is our finding that the provision of more social information is positively associated with share price (CSRSOC, $p < 0.10$). When included jointly in the regression, the effect of CSRENV is negative and

Model	Hyp.	Hyp. effect	(1)	(2)	(3)	(4)	(5)
Panel A: share price model (Equation (1))							
Dependent variable: SP							
C			8.96*	6.15	8.61*	7.44*	12.22***
NI			1.37	1.35	1.26	1.43	1.40
BVE			1.12***	1.14***	1.17***	1.09***	1.08***
CSRR	*H1a*/*H1b*	+/−	6.43****				
CSRTOT	*H1a*/*H1b*	+/−		3.79			
CSRENV	*H2a*	−			−0.39		−10.12*
CSRSOC	*H2b*	+				11.65*	16.05**
Industry dummies			Included	Included	Included	Included	Included
Year dummies			Included	Included	Included	Included	Included
n			370	370	370	370	370
R^2			0.55	0.55	0.55	0.56	0.56
Panel B: return model (Equation (2))							
Dependent variable: RET							
C			−0.26***	−0.26**	−0.26**	−0.26**	
NI			0.01**	0.01**	0.01**	0.01**	
DNI			0.01*	0.01*	0.01*	0.01**	
DCSRTOT	*H1a*/*H1b*	+/−	0.06				
DCSRENV	*H2a*	−		0.04		−0.10	
DCSRSOC	*H2b*	+			0.14*	0.22**	
Industry dummies			Included	Included	Included	Included	
Year dummies			Included	Included	Included	Included	
n			239	239	239	239	
R^2			0.43	0.43	0.44	0.44	

Notes: See Table III, Panel A for variable definitions. The share price model is described by Equation (1) in the text, the returns model is described by Equation (2). All analyses are based on the pooled sample of 370 (239) firm-year observations for which both share price (returns) and the disclosure index (change in disclosure index) are available. All regression models include year dummies to control for year-fixed effects, industry dummies to control for industry-fixed effects and firm-clustered standard errors. *,**,***,****Significant at 10, 5, 1 and 15 percent levels (two-tailed), respectively

Table IV.
Regression results

significant ($p < 0.10$) while the effect of CSRSOC is positive and significant ($p < 0.05$), which confirms our second set of hypotheses.

The results for the returns model are mostly consistent with the findings from the share price model (see Table IV, panel B). A change in total disclosure (DCSRTOT) and environmental disclosure (DCSRENV) by itself does not have any impact on the returns; this result is inconsistent with *H1* and *H2a*. In addition, a change in social disclosure (DCSRSOC) has a positive impact on the returns ($\beta = 0.14$, $p < 0.10$). The joint effect of a change in environmental and social disclosure is negatively yet not significant, respectively positively and significant associated with the returns (DCSRENV: $\beta = -0.10$, $p > 0.10$; DCSRSOC: $\beta = 0.22$, $p < 0.05$); this again is consistent with our second set of hypotheses. The combined results of the share price and the returns model suggest that disclosing more information on social (employee) related issues can enhance share price, while disclosing more information on environmental issues may not affect – or even decrease – share price. As environmental and social disclosures are correlated (see Table III, panel B), this result suggests that "excessive" environmental disclosures (relative to social disclosures) are negatively associated with share price.

4.3 Robustness checks

We perform a number of stability checks to evaluate the robustness of our findings. First, we consider the effect of the time period (untabulated); overall, the year-by-year results are qualitatively similar (yet with lower significance levels due to smaller sample sizes) compared to the results based on the pooled sample, although the results for 2005 are somewhat weaker and the results for 2008 are stronger. This last finding suggests that the disclosure of CSR information may be part of an effective risk management strategy[9] (Godfrey *et al.*, 2009; Husted, 2005): firms with more (social) CSR disclosures may be less vulnerable to share price declines and economic downturns, and appear to have better foresights when the economy picks up. In a second set of tests, we evaluate whether our results are affected by the construction of our disclosure measure. We construct two alternative disclosure measures[10] and repeat the previous analyses (non-tabulated); the results for these alternative measures are similar to the results presented previously. Finally, the two CSR dimensions are highly correlated, which makes it difficult to interpret the regression coefficients. We therefore first regress the two variables (CSRENV and CSRSOC) on each other and save the residuals from each regression. Subsequently, we rerun our regression using the residuals from the regression; the results (non-tabulated) provide qualitatively similar results as those presented previously (i.e. "excessive" environmental disclosure relative to social disclosure is negatively associated with the share price).

5. Summary and conclusions

Establishing the value relevance of voluntary CSR disclosures is of importance to both practitioners as well as to academics. Previous studies (e.g. De Klerk *et al.*, 2015; Clarkson *et al.*, 2013; Berthelot *et al.*, 2012; Murray *et al.*, 2006), mostly from a shareholder-oriented setting (USA, UK, Canada), provide mixed results on the relation between CSR disclosures and share price performance. We revisit this relation and seek to advance the literature in this area by testing the value relevance of CSR disclosures in Germany, a context with a stakeholder-oriented setting. We distinguish between different aspects of CSR disclosures (environmental vs social disclosures) as specific stakeholder groups may have dissimilar influences on firms' operations and financial performance (Flammer, 2015; Dhaliwal *et al.*, 2012); in addition, investors may be interested in specific CSR activities (Harjoto and Jo, 2015; Mishra and Modi, 2013; Bird *et al.*, 2007).

We find that the provision of a separate CSR report is positively, yet only marginally associated with share prices; in addition, the provision of CSR information is not associated with share price. Further tests reveal that the provision of environmental disclosures has either no impact, or potentially even a negative impact on share prices; this is consistent with socio-political theories. These results suggest that the provision of more CSR disclosures to tailor-specific stakeholder needs (environmental NGO's) may come at the expense of another stakeholder group (shareholders), and firms should be aware of such trade-offs when designing their CSR disclosure policy. In addition, we find a positive association between social CSR disclosures and share price (consistent with economic theory predictions); the positive effects for social CSR disclosures and share price are stronger in specific years (when the economy contracts yet share prices increase in anticipation of economic recovery). One potential explanation is that social CSR disclosures provide an indication of the human capital of the firm, which subsequently drives future financial performance (Flammer, 2015; Surroca *et al.*, 2010). Alternatively, social CSR disclosures may be part of a risk management strategy that tempers economic downside risk (Mishra and Modi, 2013; Godfrey *et al.*, 2009). A third explanation is that companies provide social CSR disclosures because these will provide positive economic returns or because such disclosures are provided by firms that expect strong future financial performance (Lys *et al.*, 2015). Our results suggest that future research should consider specific CSR indices rather than relatively crude proxies (such as CSR reports).

Our study has several limitations. First, our results do not control for actual environmental or social performance as such measures are not available for our sample. Although the exclusion of actual environmental and social performance is consistent with other studies in this area (e.g. Reverte, 2016; De Klerk *et al.*, 2015), other studies find that environmental performance has an impact upon share price (e.g. Clarkson *et al.*, 2013). Our finding that environmental CSR disclosures are not associated with share prices may be explained by the fact that environmental disclosures capture both assets as well as liabilities (while the last one may be captured by actual environmental performance in other studies), that they signal legitimacy strategies (which may be more adequately explained by social theories), or that they signal "overinvestments" in environmental activities. Second, our study focusses on firms listed on the German stock exchange. In addition to the institutional setting, our analysis is based on the industry classification that is provided by Deutsche Boerse (the German stock exchange). This industry classification is more detailed and deviates from industry classifications in previous Anglo-Saxon studies, which may affect both the results as well as comparability with Anglo-Saxon studies. In addition, some measures were not available for all industries, which reduced our sample size; the exclusion of companies from some industries may have also biased our results.

Another limitation is that our inferences are based on a disclosure measure that relies on keywords as a unit of analysis; this methodology may be criticized as words are detached from their textual background (Li, 2010). Subsequent studies may evaluate whether the CSR disclosures are presented as assets or liabilities, or may evaluate the tone of the CSR disclosures (positive or negative). In addition, deriving the keywords for the content analysis from the GRI guidelines is not free of risk as the guidelines might not capture all of the relevant CSR aspects. Even though we account for unusual disclosure scores in some reports, control for other information in the report and perform additional checks to evaluate the robustness of our disclosure index, we are aware that our methodology may affect our results. Also, our methodology only captures textual disclosures in annual reports; it does not capture information from alternative communication channels (such as websites; Tagesson *et al.*, 2009), alternative communication formats (such as visual images; Davison, 2008) nor differences in font size, boldness, or color and alternative locations in the annual report that could be used to stress the importance of the item being disclosed (Beattie and Thomson, 2007). Finally, cultural aspects may also affect our results since our results are from one country, which affects the generalizability of our findings. Additional research along these lines may provide interesting insights.

In addition to the above noted limitations, our results provide interesting avenues for future research. Our results suggest that the availability of a CSR report is a rather rough proxy for CSR disclosures, and subsequent studies could evaluate how specific CSR activities provide (or destroy) value for the company. For example, CSR disclosures in different categories could serve different roles for future performance improvements and risk management purposes; additional research may try to disentangle these relationships. Further research may also address the question whether there is an optimum regarding CSR information disclosure; more information may not always be better. Finally, future research could investigate the impact of CSR disclosures on different stakeholder attitudes (such as employee motivation or customer satisfaction). Considering only the share price implications might not be sufficient to understand the mechanisms through which CSR disclosures could affect future financial performance.

Notes

1. External rankings of companies' CSR activities include the CaringCompany Research database (Hassel *et al.*, 2005), the Dow Jones Sustainability Index (Lourenço *et al.*, 2014), the KLD database (Mishra and Modi, 2013; Bird *et al.*, 2007), Thomson Reuters ASSET4 (Cheng *et al.*, 2014) and the Observatorio on CSR reports (Reverte, 2016, 2012).

2. Beattie and Thomson (2007, p. 135-145) and Li (2010, p. 145-148) discuss specific issues which are relevant in using content analysis to investigate narrative disclosures in annual reports. These include boundary definitions and coding reliability, manual vs electronic searching, annual report material analyzed, volume of disclosures, location and type of disclosure, and unit of analysis. Each of these issues is discussed in this section.

3. Some examples of quotes from annual reports:
   Example environmental keywords from Daimler Annual Report 2008, p. 62:
   Extensive activities for environmental protection in production. With the help of environmentally friendly production methods, we have succeeded in recent years in continually reducing our plants' CO2 *emissions*, production-related solvent *emissions* and noise pollution. With a comparable production volume, *energy consumption* fell compared with 2005 by 3.1 percent to 10.4 million megawatt hours. During the same period, CO2 *emissions* decreased by 3.5 percent to approximately 3.6 million tons as a result of the slightly lower share of electricity in our total *energy consumption*. Utilization of techniques that conserve resources, including closed-cycle systems, enabled us to reduce water consumption by 2.2 percent between 2005 and 2008. In the area of *waste* management, our

guiding principle is that avoiding and recycling is better than disposal. Innovative techniques and environmentally compatible production planning allow us to steadily reduce our volumes of *waste* materials. Between 2005 and 2008, the annual total of production-related *waste* material fell by 4.1 percent to 1.1 million tons. The figures stated are based on an extrapolation of the environmental figures currently available for 2008. The exact figures will be released with the publication of our new sustainability report in April 2009. We apply comprehensive environmental management systems in our efforts to make further progress in the field of environmental protection. More than 95 percent of our employees worldwide work in plants whose environmental management systems have been certified.

Example social keywords from BMW Annual Report 2008, p. 30:
As a premium provider, the BMW Group attaches great importance to both the basic and the further *training* of its workforce. Further *training* is always tailored to suit requirements and carried out with specific objectives in mind. The BMW Group continued to invest at a high level during the financial year 2008. In response to difficult business conditions, the BMW Group's further *training* activities were focused on selected target groups and specific priority topics in 2008. As a consequence, total expenditure of euro 154 million was 14.9 percent lower than in 2007.

4. The end of the quarter when all relevant reports have been published may be three months after the end of the fiscal year, yet may also be later as CSR reports tend to be published later in the year.
5. We evaluate the stability of our results by using other disclosure variables and methodologies in a number of robustness checks. Subsequent sections will discuss these robustness checks as well as the construction of the alternative variables.
6. On average, the total number of pages in the annual report and – if available – the CSR report have increased from 160 pages over 2005 to 204 pages over 2008.
7. An additional manual analysis of the disclosures indicates that nearly all disclosures have a positive tone. Companies hardly provide information on negative environmental impacts (for example, oil spills) or on poor human rights performance. If anything, this goes against finding a result if investors are skeptical to such "greenwashing."
8. In addition, the telecommunications industry has a high amount of CSR disclosure; this industry is presented by just one company, and most of the disclosures relate to social CSR disclosures.
9. The DAX index, the index for the main German stock exchange, increased during 2006 and 2007, declined during 2008, and increased again during 2009. On the other hand, the economy had a growth averaging 2.3 percent during 2006-2008, yet Germany's economy contracted by 5 percent in 2009 (see Ahearn and Belkin, 2010).
10. As alternative disclosure measures, we use a dichotomous measure that is equal to one if one of the words in Table I is mentioned in either of the reports, and zero otherwise, and summate the score (similar to Botosan, 1997). In addition, we replicate our tests using the absolute number of words on each of the CSR topics; this indicates the subject matter's importance (Davison, 2008) as it provides emphasis and memorability.

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About the authors

Frank H.M. Verbeeten is a Professor of Accounting at the School of Economics, Utrecht University, and is also associated with the EMFC/ARCA programs at the VU University Amsterdam. His research focusses on measuring, managing and reporting intangible assets, as well as on management control practices in intangible-intensive firms and public sector organizations. He tackles these issues from both economic as well as behavioral angles. His publications have appeared in several accounting and management journals. Frank H.M. Verbeeten is the corresponding author and can be contacted at: f.h.m.verbeeten@vu.nl

Ramin Gamerschlag is a Research Associate at the Chair of Controlling/Performance Management at the University of St Gallen and serves as a local CFO at an international automotive company. He graduated with a Master and a PhD from the University of Goettingen.

Klaus Moeller is a Professor of Controlling/Performance Management and Director of the Institute of Accounting, Control and Auditing at the University of St Gallen. His research focusses on performance management system design at the intersection with behavioral aspects. He established several industry and research networks to get access to insights from cases and empirical studies. Since 2016 he serves as the IMA Honorary Professor in Management Accounting.