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Article

The Impact of Supervisory Board Composition on CSR Reporting. Evidence from the German Two-Tier System

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Abstract: Corporate social responsibility (CSR) reporting is becoming increasingly relevant in light of modern corporate governance. There is growing activity among empirical research in one-tier systems that considers the link between board composition and CSR reporting. This study is the first of its kind on the German two-tier system with special regard for the supervisory board. We analyze gender diversity, expertise, the presence of former managers, frequency of meetings, and the size of the supervisory board. Our multiple regressions indicate that gender diversity has a positive impact on CSR disclosure intensity, which is in line with prior studies on one-tier systems. Our findings have implications for both users and public policy and suggest that current European corporate governance regulations could help to increase the decision usefulness of CSR reporting.

Keywords: CSR reporting; corporate governance; gender diversity; supervisory board composition

1. Introduction

The European Commission (EC) has set forth several initiatives to modify the professional standards of corporate governance. These reforms are a reaction to the capital markets' reduced reliance on the quality of corporate governance (e.g., composition of the board of directors, auditor independence) after the financial crisis of 2008/2009. This is in line with a change in business reporting, which can no longer be aimed generally at shareholders as the primary receivers of information and must therefore address other stakeholders as well. Thus, sound sustainability management in general and corporate social responsibility (CSR) reporting in particular have come to be considered key elements of modern corporate governance. Links between corporate governance and CSR reporting have been established in prior empirical research. A growing number of studies on the one-tier system have been carried out over the last few years that have incorporated a statistical examination of the impact of specific board composition variables on CSR reporting [1–4]. The results of these studies are characterized by a high level of heterogeneity, and the studies themselves do not focus on the two-tier system and continental European corporate governance systems. The results delivered by prior studies of one-tier systems cannot simply be transferred to two-tier systems. Compared with two-tier systems, one-tier systems typically have an unrestricted information flow between executive and non-executive directors. At the same time, the risk of conflicts of interest is increased by self-assessment due to the lack of a clear separation of duties between management and supervisory functions. As we concentrate on board composition as a key aspect of internal corporate governance, we note that external corporate governance (e.g., shareholder concentration) can also be important in influencing the intensity of CSR reporting.

This paper addresses the research gap by analyzing the link between board composition and CSR reporting in Germany as a representative model of the European two-tier system. We used regression analysis to derive results on the relation between board composition variables (e.g., gender diversity, expertise, or former managers on the supervisory board) and CSR reporting. We state that gender diversity affects CSR reporting intensity positively. We also found firm size, profitability, as well as the age of the firm to be important determinants of CSR disclosure.

Our paper is structured as follows. First, we present a theoretical framework for the economic relevance of CSR reporting and the potential influences of corporate governance (Section 2). In this context, a state-of-the-art analysis of empirical studies on the impact of specific supervisory board characteristics on CSR reporting is provided (Section 3). This is followed by a description of the data and methodology of our empirical analysis with a sample selection and description of variables (Section 4). Subsequently, the research results of the descriptive statistics as well as correlation, regression, and sensitivity analyses are presented (Section 5). A summary and an academic outlook then complement the preceding analysis (Section 6).

2. Theoretical Framework

As stated above, most of the empirical corporate governance research focuses on the one-tier systems (board systems) especially in USA. In contrast to the typical Anglo-Saxon one-tier system, the German Stock Corporation Act (GSCA) has provided two administrative bodies—the management board (Vorstand) and the supervisory board (Aufsichtsrat). Two-tier systems have an organizational separation between management and supervision. Therefore, members of the supervisory board may not simultaneously belong to the management board. While the management board leads the firm under its own responsibility, the supervisory board appoints, monitors and advises the members of the management board concerning crucial decisions (paragraphs 84, 111 GSCA).

Although supervisory boards in two-tier systems are more independent compared to one-tier systems, they are less effective in supervising and advising the management board. The Anglo-Saxon systems are classified as outsider systems with a strong focus on the equity market, whereas the corporate governance systems in Continental Europe are considered as insider systems. Insider systems are characterized by a lower relevance of investor protection, while internal corporate governance mechanisms like the duties of supervisory boards play a key role in corporate governance. Since the implementation in 1937, Germany is a main representative of the Continental Europe insider model of corporate governance.

In view of these considerable differences between the US board system and the German two-tier model, we expect new insights about the impact of supervisory board composition on CSR reporting which was not under research considerations so far. It seems quite obvious that the impact of composition variables on CSR reporting might be different in one- and two-tier systems because the decision making process of supervisory board members could be different from the one of non-executive directors in the one-tier system. CSR reporting as well as the need for professionalization of supervisory board are two central aspects of modern corporate governance in Germany and are both addressed in this study.

The link between corporate governance and CSR reporting can be motivated by a variety of theories (e.g., stakeholder (agent), legitimacy, and resource-based theory). Stakeholder theory has regularly been applied to explain corporate sustainability practice and its reporting. In this view, such practice is to satisfy the interests of different coalition partners with which the company is involved through a corporate network. In general, stakeholders determine the sale of products and services [5]. In this perspective, isolated business practices that do not account for societal values and requirements are considered non-conducive in the long run. A company can therefore be considered a subset of society. Value generation is, however, measured by the fulfillment of specific societal expectations. Therefore, it is imperative that management succeeds in reconciling a multitude of interests that address (partly) conflicting demands [6]. Insufficient consideration or inclusion of stakeholders in the

operating activities of the company puts the going-concern principle at risk [7]. To constantly maintain this strategy and at the same time fulfill stakeholders' expectations, CSR reporting is necessary. This is illustrated by the fact that sustainable management activities represent an effective tool of stakeholder communication, and this suggests a positive correlation between stakeholder power, sustainable performance, and sustainability reporting [8].

To ultimately achieve an increase in stakeholder value by implementing sustainable activities [9], it is essential for a company to increase the attraction of its sustainability reports as well. Maintaining corporate governance mechanisms (e.g., gender diversity, frequency of board meetings) contributes to this. After the financial market crisis, the stakeholders' trust in the quality of reporting has been declined. In contrast to the shareholders, other stakeholder groups are not only interested in the financial accounting and financial performance indicators, but focus on non-financial aspects (e.g., corporate governance and CSR). Thus, a successful stakeholder relationship needs a combined corporate governance and CSR reporting. Generally, several corporate governance elements could have a positive impact on the incentives and motivation of the company regarding the implementation of and the reporting on CSR. In this light, board composition seems to be a key factor whether it depends on one-tier system or the two-tier model. Therefore, it can be expected that a professional board will increase the intensity of sustainability reports. Higher intensity can be achieved, for instance, if board members have an appropriate degree of independence. With this in mind, having former managers on the supervisory board might entail conflicts of interest and reduced incentives for proper supervision. Likewise, the expectations of stakeholders regarding (sustainability) expertise on committees, for instance, could be fulfilled by ensuring gender diversity in the composition of the supervisory board. Furthermore, stakeholder goals should be regularly monitored by frequent supervisory board meetings to meet stakeholders' needs and to secure legitimacy.

Stakeholder-agent theory links the stakeholder and the principal agent theory [10]. Sustainability information is supposed to contribute to a reduction in information asymmetries and transaction costs in the agency relationships between stakeholders and companies [11]. It is not only the standard-setters like the Global Reporting Initiative (GRI) who create incentives for the publication of sustainability reports with witch information asymmetries between the mentioned parties could be reduced. Management also sees an increased necessity to deliver sustainability information to shareholder and stakeholder if there is an undervaluation of the capital markets. Proactive publications can lead to a lower systematic business risk [12]. Additional (sustainability) information has the potential to be routinely beneficial [13] in that a higher intensity in sustainability reporting might correlate with more informed stakeholder decisions and their ability to influence the company value in a positive way. In addition to information asymmetries, conflicts of interest between stakeholders and agents could be reduced. Management could also consider such reports, respectively, specific Key Performance Indicators (KPIs) as tools for enhancing employee loyalty and motivation, for instance, through the implementation of compensation systems that include sustainability performance measures. Those who have a supervisory function on the board or those who sit on the auditing or sustainability committees are at the same time agents of the stakeholders and principals of the management. As the intensity of data improves through sustainability reporting, management can be monitored more efficiently and this requirement can be met. Thus, the board composition could play a central role in regard to the adoption of new CSR measures.

3. Literature Review and Hypotheses

In the following literature review, board composition plays a crucial role in sustainability reporting. Because the influence of corporate governance on sustainability reporting was so far not in focus of German research, this analysis includes common and objective variables which were found in a previous systematic literature review by the authors [14]. The motivation to analyze the German two-tier system in particular is due to the fact that the quality of management supervision is expected as relatively low compared to that of the one-tier system. This arises from an honorary and therefore

outside engagement of the supervisory board members in Germany. The relating corporate governance factors that influence sustainability reporting will therefore concentrate on gender diversity, expertise, former managers on the supervisory board, as well as the frequency of board meetings and the size of the supervisory board.

After the recent financial market crisis, CSR reporting has been established as a central complement of modern business reporting. Traditional firm performance indicators (e.g., Return on Assets) which can be measured by financial accounting instruments (e.g., balance sheet, statement of income) are extended by environmental, social and corporate governance (ESG) performance information. In order to compare the ESG performance of corporations, a credible rating is necessary. Currently, there is a variety of different ESG indexes, e.g., the Dow Jones Sustainability Index, the FTSE4Good Index (which is co-owned by Financial Times (FT) and the London Stock Exchange (SE)) and the Morgan Stanley Capital International (MSCI) ESG Indices.

Professional analysts of (non-)financial data support ESG performance like Thomson Reuters Asset4. This database is commonly used in empirical corporate governance and CSR research. Insofar, the general link between corporate governance variables, as well as firm performance and disclosure can be transferred to the growing research activities in corporate governance and CSR management and disclosure by modifying the existing models.

By taking the gender diversity in board composition into account, several possible theories concerning CSR reporting can be supported. For instance, Hillman *et al.* [15] interpret the resource-dependent theory as an indication that gender diversity provides various resources that benefit the company. Thus, the greater efficiency of monitoring activities can be explained by better information processing and a willingness on the part of the supervisory committee to engage in dialogue [16]. This could result in a higher intensity in sustainability reporting. Empirical research has partly confirmed the positive influence of gender diversity on the independence of the plenum, which can suffer from an "old boys network" phenomenon [16]. This phenomenon suggests that conflicts of interest arise more often among male board members since memberships with multiple groups and cross-shareholding has been more frequent with men than women in the past.

In recent years gender diversity has been empirically examined in relation to company performance. The company's (sustainability) performance is always depicted in a (CSR) reporting. An influence of CSR performance regarding gender issues could affect the intensity of sustainability reporting. Thus, the influence of gender diversity on CSR must be considered. The predominance of this research can be attributed to its comparative simplicity of categorization as well as to the political debate that has been ongoing for many years about whether a quota of women on boards should be established by law. The German legislature has currently introduced a fixed quota of 30% female representatives on the supervisory board of stock corporations with full co-determination starting with the fiscal year 2016. The European legislature will also regulate gender diversity among the supervisory board by enforcing a female quota of 40% starting in 2020. Studies have shown a pronounced heterogeneity of results in this area, which means that a causality between gender diversity and firm performance remains uncertain. While some have found a positive relation (e.g., [17]), others have found a negative impact on company performance (e.g., [18]), or even no connection at all (e.g., [19]).

Gender diversity has been taken into account more frequently when analyzing its impact on CSR reporting. Liao *et al.* [3], Frias-Aceituno *et al.* [20], Fernandez-Feijoo *et al.* [21,22], Rao *et al.* [23], and Barako *et al.* [24] found increased female representation on the board to have a positive influence on the quality of CSR reporting. Furthermore, Zhang *et al.* [25] stated that female directors are linked to better CSR performance within the firm's industry. They interpret CSR performance as the extent of the firm's moral legitimacy. Thus, board composition can be classified as an effective approach to increase moral legitimacy of the society. Galia *et al.* [26] found a positive relationship between the probability and intensity of environmental benefits of innovation and gender diversity in a French setting. According to Nielsen/Huse [27], the ratio of women directors is positively associated with

board strategic control. The positive effects on board effectiveness are mediated through increased board development activities and decreased level of conflict. Finally, Hafsi/Turgut [28] state a positive relationship between gender diversity and social performance. Therefore, we expect that female supervisory board members will also have an impact on CSR reporting.

H_1: Gender diversity among the supervisory board (GENDER) increases CSR reporting intensity.

In addition to diversity, empirical corporate governance research stresses the importance of appointing financial experts to the supervisory board in order to guarantee an appropriate quality of corporate governance. Empirical research suggests that the independence of members is directly related to their financial expertise. For this reason, it is impossible for board members without sufficient financial expertise to give advice to other board members. The economic influence of financial experts has frequently been the subject of empirical studies. Wild [29,30] and DeFond *et al.* [31], for instance, have demonstrated a positive effect on firm value. Corresponding findings have also been found for combinations of independent financial experts (e.g., [32–35]).

Since the economic effects of financial expertise on CSR reporting have so far received comparatively less attention, a research gap clearly still exists. Jizi *et al.* [36] show, for instance, that the number of financial experts has no effect on sustainability reporting. This supports the assumption that financial expertise alone is not sufficient to have an effect on CSR reporting. Michelon *et al.* [37] instead place their focus on the existence of so-called "community influential members" on the board. These are renowned scientists, politicians, and high-ranking executives from the military and non-profit organizations who have a greater social impact. In the mentioned study, these board members are said to exert a positive influence on CSR reporting. These findings are confirmed by De Villiers *et al.* [9], who demonstrate a higher environmental performance when there are legal experts among the board members. Thus, the following Hypothesis 2 can be deduced.

H_2: Supervisory board members with financial, legal, or other expertise (EXPERTISE) increase CSR reporting intensity.

Agency theory, for instance, explains the importance of the independence of monitoring persons from company management. Independence represents a necessary condition for monitoring measures with the aim of achieving the best possible CSR reporting. The subject of empirical corporate governance research is, for instance, the influence of independent members on the board on earnings quality [38], the existence and prevention of management fraud [39], as well as the quality of the external audit [31] and the cost of capital of the company [40].

Therefore, the necessity for an internal division between executive and supervisory tasks on management boards can be justified by agency theory. This theory states that management is mainly guided by the intent to maximize its own profit and wealth on the one hand while shirking on the other [41]. In the so-called CEO model, where the chief executive officer (CEO) is also the chair of the board, major conflicts of interest can arise [42]. There is increased risk when companies carry out their own assessments as the chairperson of the board needs to evaluate situations that are associated with his or her own functions as CEO. However, appropriate management advice by the board necessitates a comprehensive knowledge of business strategy. There are many studies on the CEO model in which the impact on company performance on the US capital market has been analyzed. There is no solid evidence of any positive [43] or negative connection [44].

The CEO model has also been comparatively frequently included in existing studies on CSR reporting. A positive interconnection between the CEO model and reporting on greenhouse gas emissions was demonstrated by Prado-Lorenzo *et al.* [45]. Identical results were presented by Jizi *et al.* [32]. Li *et al.* [46] by contrast demonstrated a negative influence of the CEO model on the intensity of CSR communication for the overall model.

In two-tier systems, an appropriate surrogate for the CEO model is the existence of former management board members on the supervisory board. The following hypothesis states that there is

a negative impact according to the growing risk of conflicts of interest in two-tier systems, which can lead to a decrease in the intensity of CSR reporting.

H_3: *Former managers on the supervisory board (FORMER) have an impact on CSR reporting intensity.*

Both economic theory and empirical research are inconclusive in regard to the relationship between the frequency of the supervisory board meetings and the CSR reporting. There is evidence in support of a positive impact of frequency, but there is also evidence to the contrary. With regard to the economic principle of scarcity of time, arguments are taken from agency theory to suggest that a higher frequency of meetings is in the interest of stakeholders and that the additional time available would reduce agency costs [47]. Legitimacy theory provides the basis for a similar argument. The dynamic business environment requires an increased frequency of meetings to ensure legitimacy. In particular, phenomena related to sustainability (e.g., a sudden occurrence of environmental disasters) require a higher frequency of coordination to facilitate an adequate response to any negative impacts. However, the assumption that an increased frequency of meetings inevitably raises the quality standard of corporate governance is questionable. Firstly, additional meetings also result in higher coordination costs. Thus, a high number of meetings could lead to negative assessment effects [48]. Moreover, the members of the board could potentially decide to simply split the agenda between various meetings without expanding the agenda of corporate governance activities.

Despite being easy to measure empirically, the effect of an increased frequency of board meetings on firm performance has been studied very rarely. This might be due to the fact that little can be concluded from the frequency of meetings as a formal criterion for recruitment to the board. Vafeas [48], for instance, established a negative relationship between the number of meetings held each year and the company value for a sample of 307 listed US companies covering the financial years 1990–1994.

Surprisingly, there are in fact several empirical studies on this impact of board size on CSR reporting. Van Staden *et al.* [49] and Kent *et al.* [45] show a positive correlation between the frequency of board meetings and CSR reporting. Therefore, we will analyze the following hypothesis.

H_4: *The number of supervisory board meetings (FREQ) has an impact on CSR reporting intensity.*

From the perspective of agency theory, an increase in conflicts of interest and coordination issues is related to a high number of board members, which in turn compromises corporate governance efficiency [50]. Large boards can result in flawed incentives in terms of free rider behavior [51]. The flexibility and dynamism of the decision-making process is reduced as the number of board members increases [52]. Insufficient critical self-reflection and a lower level of process discussion can be observed, resulting in higher agency costs [47]. Moreover, management monitoring requirements within the board are increased, thereby necessitating more time and specialist resources on a committee level [53]. Resource-based theory, however, suggests that broad factor endowments and consequently a higher number of board members should be endorsed.

In line with the increased concentration of research on the impact of board size on performance, the economic impact on CSR reporting has frequently been examined. Empirical studies that establish positive relationships refer initially to the board level [3,20,23,54]. We therefore analyze the following hypothesis.

H_5: *The size of the supervisory board (BSIZE) has an impact on CSR reporting intensity.*

4. Research Methodology

4.1. Sample Selection and Data Sources

Voluntary disclosure research primarily analyzes the sustainability information contained in annual reports because financial analysts and investors regard them as the most important source of CSR information [55]. By contrast, the aim of this study is to examine sustainability reports because standards such as the guidelines issued by GRI have become more important. Thus, we analyzed the

relationship between board composition and CSR reporting intensity. We selected German CSR reports for our sample because of the lack of such an examination of the two-tier system in general. Our aim was to close this gap by undertaking the study for German corporations as the main representatives of the two-tier system in continental Europe. As for German research in the field of sustainability reporting, the Institute for Ecological Economy Research (IÖW/future) regularly delivers a ranking of CSR reports [56] for large companies [57] as well as for small- and medium-sized enterprises [58]. We used the latest version of the former ranking of the largest 150 German industrial and service. The use of previous versions in order to ensure longer sampling periods was not able due to divergent measurements. To use the ranking results as a dependent variable in our regression analysis (see Section 4.3), we needed a quantifiable score for each company; IÖW/future provided respective scores for a sample of 50 companies [59]. Their ranking procedure follows defined principles such as independence [60]. For our analysis of supervisory board composition, we could only take 39 listed companies into account due to the absence of a supervisory board in the others. We excluded a further five companies because of missing data in our commonly used databases. Thus, we analyzed a final sample of 34 German companies listed on HDAX in Frankfurt in 2011, which is reported in the appendix. The sample description as well as the respective sectors are listed in Table 1.

Table 1. Sample description.

Panel A: Sample Size	
Number of companies within IÖW/future ranking	150
Less	
Companies without respective score	100
Companies without stock listing	11
Companies without necessary information	5
Total	34
Panel B: Distribution by Industry	
Industry sector	No. of firms
Automobile	4
Banks	2
Basic commodities *	4
Chemicals and pharma *	8
Civil engineering	1
Commerce	3
Electronics	1
Insurance	2
Media	3
Transportation and logistics	4
Utilities *	2
Total	34

* CSR industry.

The data comes from multiple sources. As mentioned above, the CSR disclosure score was assigned by IÖW/future. We collected the financial and corporate governance data from annual reports as well as from databases such as Datastream or Osiris. Some additional information (e.g., control variables) was collected by hand from annual, sustainability, or corporate governance disclosures.

4.2. Description of Dependent Variable

As previously mentioned, we used a CSR disclosure score supplied by IÖW/future [59], which represents the dependent variable (*CSRDS*) in this study. To assess the intensity of standalone CSR reports, *CSRDS* includes five categories, namely, social requirements, ecological requirements, society, management, and general requirements. These categories consist of twelve disparate, weighted criteria (see Appendix) that can be distinguished in material requirements to disclosure (A1–A8) as well as general disclosure intensity (B1–B4) and themselves consist of 48 subcriteria. For the assessment of

each subcriterion, a four-level approach was chosen (0; 1; 3; 5 points). In addition to general criteria, the *CSRDS* consists of sector-specific criteria that particularly affect ecological and social requirements concerning production, product, and supply chain. The total points earned by a given company is computed by the following formula:

$$CSRDS_j = \sum_{i=1}^{5} SCORE_{i\,j}$$

Adding the total number of points awarded to company *j* for category *i* across all categories *i* = 1–5 results in an ordinal measure of disclosure level for each company with a possible score of 700 points. To prove the validity of this score and the respective ranking, we followed a threefold approach. First, we compared it with other rankings of sustainability reporting within the respective German research field (e.g., [61]). Second, rankings of national CSR performance (e.g., [62]) that arrived at similar ranking results with regard to certain companies were considered. The latter procedure could be assumed to be broadly applicable because sustainability disclosure is the illustration of CSR performance [63]. Third, similarly to prior voluntary disclosure score [12] or other CSRDS studies [64], we used Cronbach's coefficient alpha [65] to evaluate the internal consistency of our dependent variable. Internal consistency uses repeated measurements (e.g., the five categories of our *CSRDS*) "to assess the degree to which correlation among the measurements is attenuated due to random error" [12]. The maximum achievable alpha of 1 is given when the correlation between each pair of variables is 1. The coefficient alpha for the five subsections of the IÖW/future ranking is 0.744. Botosan [12], for instance, computed a coefficient alpha of 0.64. By comparison, Gul *et al.* [66] and Khan *et al.* [64] obtained a coefficient alpha of 0.51 and 0.7. Although there is no standard test of significance for this statistic, according to Nunnally [67] a score of 0.7 is acceptable. As the underlying Cronbach's alpha is 0.7, this offers good evidence that the respective categories in the disclosure index record the same underlying construct.

4.3. Model Specification

We considered the ordinary least squares (OLS) technique to be the most suitable for testing our null hypotheses regarding a possible influence of corporate governance composition on CSR reporting intensity. We used several models for each corporate governance issue (models 1–5) as well as an overall approach (model 6). To avoid multicollinearity, the assumptions underlying the regression model were tested on the basis of the correlation matrix (see Section 5.2) as well as the variance inflation factor (VIF; see Section 5.4). Thus, firm size (*FSIZE*) yielded the highest VIF of 4.363 (not tabulated) in model 6, well below the cutoff threshold of 10 stated by Neter *et al.* [68]. These statistics reduce multicollinearity concerns for the following regression analysis (see also Section 5.4). The regression equation for the overall model (model 6) is as follows:

$$\begin{aligned} CSRDS = \ & \alpha + \beta_1 GENDER + \beta_2 EXPERTISE + \beta_3 FORMER + \beta_4 FREQ + \beta_5 BSIZE \\ & + \beta_6 FSIZE + \beta_7 PROF + \beta_8 LEV + \beta_9 FAGE + \beta_{10} INDUSTRY + \varepsilon \end{aligned}$$

in which *CSRDS* is the corporate social responsibility disclosure score, *GENDER* is the percentage of women on the supervisory board, *EXPERTISE* is a dummy variable equal to 1 if the supervisory board contains financial, legal, or other experts, *FORMER* is a dummy variable equal to 1 if there is a former manager on the supervisory board (similar to the CEO model), *FREQ* is the total number of supervisory board meetings during the fiscal year, *BSIZE* is the total number of members on the supervisory board at the end of the fiscal year, *FSIZE* is the firm size measured by a natural logarithm of total assets, *PROF* is the profitability measured by the natural log of earnings before interest and taxes (EBIT), *LEV* is the leverage measured by the ratio of book value of total debt and total assets, *FAGE* is the firm age measured by the natural log of the number of years since the firm's inception, and *INDUSTRY* is a dummy variable equal to 1 if the company depends on a sustainable sector.

Although the expected results for the corporate governance variables have already been mentioned (see Section 3), we have to discuss assumed results for the control variables. For instance, larger firms (*FSIZE*) are likely to disclose better CSR reports. Costs of reporting are expected to be lower for large companies since the expenses of preparing a sustainability report tend to decrease as firm size increases [69]. Therefore, our *CSRDS* should be higher in the case of larger companies. Owing to a higher portion of financial flexibility—for instance, concerning the establishment of CSR activities—profitable companies (*PROF*) are expected to obtain higher *CSRDS* values [70]. Furthermore, older firms (*FAGE*) are also expected to obtain higher *CSRDS* values [8]. For more mature companies, reputation and, as a result, CSR engagement becomes necessary. Generally, with regard to firm leverage (*LEV*) a negative influence is expected. In fact, a higher proportion of leverage indicates stronger relationships between companies and creditors. Therefore, a more informative CSR disclosure is unlikely where high leverage exists because creditors have a range of alternatives for gaining more detailed (sustainability) information. Prior empirical findings indicate that there is a significant difference between sustainability reporting for different sectors (*INDUSTRY*) [69], which is considered to be a divergent stakeholder view of sustainability for each sector [71]. Commonly "high-profile" industries (e.g., energy, pharmaceutical, utility, and mining corporations) are involved in CSR-sensitive activities [71,72]. For this reason, all corporations that belong to basic commodities, chemicals and pharma, as well as utilities sectors were considered to be CSR industries in our study [73,74].

5. Results

5.1. Descriptive statistics

Table 2 presents the descriptive statistics. On average, *CSRDS* is 377.794 (median = 373). The highest total score is 528; the highest possible score is 700. Interestingly, both of the best-ranked companies do not belong to our CSR industry classification.

Table 2. Descriptive statistics.

Variable	N	Min	Max	Mean	Median	Std. dev.
CSRDS	34	251.000	528.000	377.794	373.000	77.912
GENDER	34	0.000	40.000	13.515	13.965	9.039
EXPERTISE	34	0.000	1.000	0.680	1.000	0.475
FORMER	34	0.000	1.000	0.210	0.000	0.410
FREQ	34	4.000	10.000	6.059	6.000	1.890
BSIZE	34	9.000	21.000	17.235	19.000	3.908
FSIZE	34	14.721	21.491	17.392	17.158	1.600
PROF	34	12.863	17.208	14.854	14.681	1.154
LEV	34	2.160	90.050	41.738	38.005	19.430
FAGE	34	1.790	5.230	4.179	4.584	0.979
INDUSTRY	34	0.000	1.000	0.412	0.000	0.500

CSRDS: corporate social responsibility disclosure score, *GENDER*: percentage of women on the supervisory board, *EXPERTISE*: dummy variable equal to 1 if the supervisory board contains financial, legal, or other experts, *FORMER*: dummy variable equal to 1 if there is a former manager on the supervisory board, *FREQ*: total number of supervisory board meetings during the fiscal year, *BSIZE*: total number of members on the supervisory board at the end of the fiscal year, *FSIZE*: firm size measured by natural logarithm of total assets, *PROF*: profitability measured by natural log of earnings before interest and taxes, *LEV*: leverage measured by ratio of book value of total debt and total assets, *FAGE*: firm age measured by natural log of number of years since the firm's inception, *INDUSTRY*: dummy variable equal to 1 if the company belongs to a sustainable sector.

As for the independent variables, the average of *GENDER* (H_1) among the supervisory board is low (13.515%). The mean of *EXPERTISE* (supervisory board with at least one financial expert); (H_2) is 68%, whereas it is 21% for a former management board member on the supervisory board (H_3); The mean for *FREQ* (annual meetings); (H_4) is six meetings per year, whereas *BSIZE* (supervisory board members; (H_5) is 17 members per supervisory board.

5.2. Correlation Results

Table 3 presents the Pearson correlation matrix for the dependent, independent, as well as control variables. All corporate governance variables, excluding the number of meetings of the supervisory board (*FREQ*), correlate positively but non-significantly with *CSRDS*. Thus, we did not find a correlation between the independent variables and *CSRDS* that could support our study's hypotheses. Consistent with prior research, *CSRDS* correlates positively with profitability (correlation coefficient = 0.552) at the 1% significance level. In addition to this, profitability correlates positively and significantly with board (*BSIZE*) and firm size (*FSIZE*) at the 5% and 1% level, respectively. Furthermore, firm leverage (*LEV*) correlates positively and significantly with gender diversity (*GENDER*), board size (*BSIZE*), firm size (*FSIZE*), as well as profitability (*PROF*) at the 1% level and with the existence of financial, legal, or other experts on the supervisory board (*EXPERTISE*) and the frequency of meetings (*FREQ*) at the 5% level. Finally, it is worth noting that firm age (*FAGE*) and membership in a CSR sector (*INDUSTRY*) do not correlate at significant levels with any governance-related variables. The largest correlation coefficient observed across all variables is between firm size and profitability (correlation coefficient = 0.752).

5.3. Regression Results

Table 4 shows the results of the regression analysis of *CSRDS*. Depending on the respective model, the results reveal a significant relationship between the dependent and independent variables. In model 1 we tested the relationship between gender diversity and CSR disclosure. We found a positive and significant coefficient of *GENDER*, which implies that a higher proportion of women on the supervisory board increases *CSRDS*, thus supporting H_1. This implies that women are likely to influence decisions among the supervisory board concerning CSR reporting issues. From a theoretical viewpoint, women have different knowledge and values when it comes to contextual issues and they are able to increase the intensity of strategic decisions on sustainable activities and their reporting. This is consistent with prior findings for the one-tier system (e.g., [3,20–24]).

In model 2 we examined the impact of the existence of expertise on *CSRDS*. We found a strong negative but non-significant coefficient of the financial expertise (*EXPERTISE*) variable. Thus, H_2 is rejected. Our result implies that expertise has no influence on CSR disclosure. This finding is in line with prior research (e.g., [32]).

We analyzed the effect of the presence of former management board members on the supervisory board in model 3. The regression results show a strong positive but non-significant effect of *FORMER* on *CSRDS*. Former managers on the supervisory board should not have any influence on *CSRDS* with respect to German companies, which is in line with prior research (e.g., [3,36,37,49,63,74–77]) but does not support H_3. The positive direction is also in accord with previous research [36,45]. One possible explanation might be that members of the executive board, which initiates CSR activities or disclosure, are likely to supervise their own initiatives when joining the supervisory board. Although this would correspond with the long-term thinking required for sustainability, the intensity of sustainability reporting would not increase because those responsible for past decisions are probably less inclined to revise them later on.

In model 4 we examined the relationship between the frequency (*FREQ*) of supervisory board meetings and CSR disclosure. H_4 is not supported due to a negative non-significant coefficient of frequency.

In model 5 we investigated the impact of the size of the board (*BSIZE*) on *CSRDS*. We found a positive but non-significant coefficient. Thus, H_5 is not supported.

Finally, we regressed *CSRDS* on all corporate governance variables in model 6 to test the impact of all hypothesized variables within one model. Our results for the coefficients of the hypothesized variables are consistent with the main findings reported in models 1–5 except for *FREQ*. When all governance variables are considered, the negative relationship of *FREQ* with *CSRDS* in model 4 becomes a positive one, although both were not significant.

Table 3. Pearson correlation matrix.

Variables	CSRDS	GENDER	EXPERTISE	FORMER	FREQ	BSIZE	FSIZE	PROF	LEV	FAGE	INDUSTRY
CSRDS	1										
GENDER	0.204	1									
EXPERTISE	0.010	0.208	1								
FORMER	0.030	−0.059	−0.114	1							
FREQ	−0.123	−0.042	−0.012	−0.172	1						
BSIZE	0.241	0.298	−0.088	0.139	0.285	1					
FSIZE	0.231	0.453 **	0.194	0.196	0.239	0.482 **	1				
PROF	0.552 **	0.233	0.302	−0.054	0.119	0.425 *	0.752 **	1			
LEV	0.093	0.457 **	0.344 *	−0.079	0.421 *	0.494 **	0.642 **	0.542 **	1		
FAGE	0.137	−0.071	−0.190	0.314	−0.290	−0.138	0.005	−0.119	−0.136	1	
INDUSTRY	−0.113	−0.336	−0.188	0.017	−0.251	−0.175	−0.300	−0.171	−0.292	0.012	1

CSRDS: corporate social responsibility disclosure score, *GENDER*: percentage of women on the supervisory board, *EXPERTISE*: dummy variable equal to 1 if the supervisory board contains financial, legal, or other experts, *FORMER*: dummy variable equal to 1 if there is a former manager on the supervisory board, *FREQ*: total number of supervisory board meetings during the fiscal year, *BSIZE*: total number of members on the supervisory board at the end of the fiscal year, *FSIZE*: firm size measured by natural logarithm of total assets, *PROF*: profitability measured by natural log of earnings before interest and taxes, *LEV*: leverage measured by ratio of book value of total debt and total assets, *FAGE*: firm age measured by natural log of number of years since the firm's inception, *INDUSTRY*: dummy variable equal to 1 if the company belongs to a sustainable sector. * correlation is significant at the 0.05 level (2-tailed); ** correlation is significant at the 0.01 level (2-tailed).

Table 4. Multiple regression results using *CSRDS* as the dependent variable.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
	GENDER	EXPERTISE	FORMER	FREQ	BSIZE	OVERALL
Constant	−275.246 (−1.716) *	−267.809 (−1.580)	−251.052 (−1.447)	−253.652 (−1.366)	−279.266 (−1.653)	−263.485 (−1.468)
GENDER	2.806 (2.059) **					3.273 (2.174) **
EXPERTISE		−24.970 (−0.996)				−25.802 (−0.965)
FORMER			21.031 (0.694)			31.244 (1.009)
FREQ				−1.734 (−0.255)		1.810 (0.256)
BSIZE					3.620 (1.105)	1.242 (0.350)
FSIZE	−28.383 (−2.456) **	−23.309 (−1.971) *	−24.908 (−1.941) *	−21.095 (−1.770) *	−23.484 (−1.994) *	−37.814 (−2:792) ***
PROF	71.939 (5.121) ***	68.910 (4.645) ***	68.577 (4.518) ***	65.065 (4.334) ***	64.793 (4.478) ***	80.759 (4:921) ***
LEV	−0.981 (−1.355)	−0.455 (−0.595)	−0.526 (−0.687)	−0.568 (−0.710)	−0.840 (−1.101)	−0.832 (−0.951)
FAGE	20.497 (1.906) *	17.400 (1.526)	16.694 (1.414)	17.853 (1.484)	20.062 (1.769) *	17.742 (1.463)
INDUSTRY	−11.064 (−0.501)	−22.845 (−0.990)	−21.149 (−0.913)	−20.716 (−0.881)	−19.655 (−0.863)	−13.693 (−0.587)
R-sq.	0.540	0.487	0.478	0.470	0.491	0.592
Adj. R-sq.	0.438	0.373	0.362	0.352	0.378	0.415
F-Stat.	5.293 ***	4.274 ***	4.115 ***	3.984 ***	4.346 ***	3.342 ***
Observations	34	34	34	34	34	34

CSRDS: corporate social responsibility disclosure score, *GENDER*: percentage of women on the supervisory board, *EXPERTISE*: dummy variable equal to 1 if the supervisory board contains financial, legal, or other experts, *FORMER*: dummy variable equal to 1 if there is a former manager on the supervisory board, *FREQ*: total number of supervisory board meetings during the fiscal year, *BSIZE*: total number of members on the supervisory board at the end of the fiscal year, *FSIZE*: firm size measured by natural logarithm of total assets, *PROF*: profitability measured by natural log of earnings before interest and taxes, *LEV*: leverage measured by ratio of book value of total debt and total assets, *FAGE*: firm age measured by natural log of number of years since the firm's inception, *INDUSTRY*: dummy variable equal to 1 if the company belongs to a sustainable sector. *, **, and *** = statistically significant at less than 0.10, 0.05, and 0.01 level, respectively.

With regard to control variables, our overall findings (models 1–6) suggest that larger firm size (*FSIZE*) as well as profitability (*PROF*) are significantly related to higher *CSRDS* scores. Although profitability shows the predicted positive direction [69,78,79], firm size has a negative effect on CSR reporting in all models, contrary to what was predicted. Firm size is regularly expected to have a positive effect on CSR disclosure [45], but we could not confirm a positive relationship [80,81]. This finding is in line with the theoretically contested effect that firm size has a negative impact on CSR disclosure [82]. The reason for that divergence from prior analysis is threefold. Firstly, it could depend on the German two-tier corporate governance system as well as on specific German CSR reporting behaviors. Because the German corporate governance system is characterized as being broadly stable—for instance, in terms of many regulations—large firms are expected to supervise their CSR activities and are likely to produce high-quality CSR reports. Therefore, *CSRDS* could decrease as firm size increases. Secondly, it is stated that companies engage in CSR reporting in consideration of costs and benefits. In the case of large-sized firms, the costs could exceed the benefits, and therefore the publication of a high-quality CSR report would not be desirable from their perspective. Thirdly, a possible assertion from a more resource-based standpoint could be the fact that larger firms already have access to multiple resources (environmental, natural, human, or social) and therefore do not need high-quality CSR reports to gain exclusive access to these resources [82]. Hence, as company size in Germany increases, the importance of high-quality CSR reports decreases. In addition, some older firms (*FAGE*) also show significant correlation at the 10% level (model 1 and model 5). The results of our study with respect to the control variables are consistent with previous studies.

5.4. Robustness Tests

A series of tests were conducted to examine the models' robustness. First, we replaced the natural logarithm of total assets (*FSIZE*) with total assets as well as the natural log of earnings before interest and tax (EBIT), with EBIT (*PROF*). Generally, in the unreported results we found no difference to those reported in Table 4. The same results could be derived by using the natural log of total sales for company size (*FSIZE*). With regard to significance levels concerning *FSIZE*, only a devaluation from the 0.1 level to the 0.05 level (model 1 and model 5) and the 0.01 level to the 0.05 level (Model 6) could be found. Our results showed the same results if we used return on assets (ROA) instead of EBIT for profitability (*PROF*). After dropping *LEV* from all models, there were no changes in our results. The industry classification assigned by IÖW/future (*INDUSTRY*) could be changed to a different German classification per the German stock exchange. This slightly changed the number of different industries as well as the number of CSR-related sectors. However, there were no changes across any of the models. In our results, even when the natural log of firm age (*FAGE*) was replaced with firm age, no changes appeared.

In addition to the use of other variables, we examined collinearity problems through the correlation matrix (see Section 5.2). According to Studenmund [83] and Farrar *et al.* [84], the correlation coefficient is thought to be problematic if it exceeds 0.8. The correlation coefficients found in our study are below the stated value. A more indicative and accurate technique that is commonly used is the variance inflation factor (VIF) for each of the independent variables. If the VIF exceeds 10, collinearity is considered to be a problem [67]. The VIF (not tabulated) for this study for each model varied from 1.071 (model 1) to 4.363 (model 6). Thus, according to the correlation matrix and VIF of the variables of the study, it is unlikely that multicollinearity manipulates the regression results, since the maximum VIF of 4.363 is less than the threshold of 10.

6. Conclusions

6.1. Summary

Our analysis examined the impact of supervisory board composition on the intensity of CSR reporting. This paper represents the first empirical study for Germany as a primary representative

of the continental European two-tier system. Gender diversity, supervisory board expertise, former managers on the supervisory board, as well as the frequency of meetings and size of the board have been evaluated as composition variables. Thus, our set of variables is one of the most comprehensive to have been used in this type of study to date. Furthermore, we have minimized the threat of a correlated omitted variables problem that is risked by the narrow sets used in prior studies. We performed an OLS regression with five models per board variable (*GENDER*, *EXPERTISE*, *FORMER*, *FREQ*, *BSIZE*) as well as an overall model. We used a CSR disclosure score (*CSRDS*) as the dependent variable.

Our results show that gender diversity has a significant positive impact on *CSRDS* separately (model 1) and for the overall model (model 6). In this cases, it rejects the null hypothesis and strongly supports the H_1, *i.e.*, companies with a higher proportion of women on supervisory board have a higher CSR reporting intensity. Additionally, our results on gender diversity are consistent with prior findings on the one-tier system (e.g., [3,20–24]). From a resource-based perspective, women on the supervisory board play a crucial role in achieving holistic (CSR) resources. Contrary to boards with predominant male directors, women can deliver new input in improving CSR activities as well as respective performance [24]. Because the company's sustainability performance is always depicted in a CSR reporting, a higher proportion of women on the supervisory board could contribute to enhance its intensity. In regard to a stakeholder-agent relation, CSR reports with a high intensity are, for instance, more appropriate to achieve more efficient monitoring activities.

All remaining corporate governance variables (*EXPERTISE*, *FORMER*, *FREQ*, and *BSIZE*) have no influence on *CSRDS*. Thus, we have to accept the respective null hypothesis. These non-significant results are not uncommon, as is confirmed by prior studies (e.g., [85]). Beyond delivering corporate governance results, we have identified firm size (*FSIZE*) and profitability (*PROF*) as well as firm age (*FAGE*) to some degree as control variables that have a significant impact on *CSRDS*. Our approach and findings therefore have important implications for further research.

In terms of practical implications, our study suggests that companies interested in pursuing a strategy of achieving a high *CSRDS* value through their boards should have a supervisory board composed of observant members and with appropriate diversity. In line with prior research, our findings suggest that the supervisory board should not be appointed haphazardly but with a view to improving elements of board design that will provide the necessary monitoring skills and resources to ensure sustainability. From a resource-based perspective, our results on gender diversity strongly suggest that women on the supervisory board represent a necessary resource for achieving sustainability as well as high *CSRDS*.

Finally, our research results might be of interest to policy makers. We have therefore identified elements of supervisory board governance that deserve further regulatory focus in order to achieve the public policy objectives of sustainability innovation. With a view to the usefulness of future decisions on sustainability reporting and the quality of corporate governance, recent regulatory reform initiatives should be noted. The European Union and other bodies have published a range of statements in response to the most recent financial crisis—for example, "green papers" on corporate governance, action plans, guidelines on the introduction of legal quotas for women on the board of directors and the supervisory board, an amendment directive on the extension of the management report to accommodate sustainability and diversity—that will have a material impact on corporate governance arrangements (especially reporting) in the future. Furthermore, the International Integrated Reporting Council (IIRC) specifications for an integrated reporting framework concept demonstrate a new impetus for the further development of company disclosure. Although integrated reporting could positively influence sustainability reporting, the establishment of this reporting constraint will require several years of adjustment.

6.2. Limitations

In the coming years, an increase in empirical research activity in this field can be expected. The need for research on the two-tier system in Europe is not the only apparent research gap. A need

has also been shown for multiperiod observations and transnational examinations. In this context, we should point out the limitations of our study. Because of the lack of availability of data for our dependent variable, we were unable to implement time-series tests to examine how changes in board characteristics might lead to changes in company sustainability. Thus, our analysis only covers one reporting period and therefore offers only limited insight into changes in the manner of reporting over time because legislative reforms tend to become visible only in longitudinal studies [86]. Although this approach is understandable given the limited availability of data or the mandatory yearly publication of CSR reports, future studies could consider using longer sampling periods to analyze these extensions. Further, the study is restricted to the analysis of a relatively small sample owing to limited secondary data for our dependent variable. The use of secondary data was necessary because of the time-consuming process of data analysis. It should be noted that the selection of the content criteria and the number of points assigned by IÖW/future are not free of subjective influences, which again reduces the validity of the results. The weighting of the individual content criteria can remedy the aforementioned objectivity deficiencies only in part, as the selection of the survey group(s) is likewise not free of subjective influences. Thus, an analysis of corporate disclosures in future studies could deliver meaningful insights. Future research could also investigate how other board characteristics not examined in this research (e.g., foreign diversity, community influential members) can directly or indirectly influence CSR reporting in Germany as well as in other two-tier systems. Finally, all board composition and corporate governance can be limited with regard to endogeneity problems. In this way, CSR reporting quality itself could influence board composition.

Author Contributions: Dominik Dienes and Patrick Velte conceived the literature review; Dominik Dienes performed the empirical analysis; The authors analyzed the results and wrote the paper.

Appendix

Table A1. Sample [54].

Rank	Company	Industry	Management	Social Requirements	Ecological Requirements	Social Environment	General Requirements	Total
1	BMW AG	Automobile	198	99	107	30	94	528
2	Siemens AG	Electronics	185	104	120	35	75	519
3	BASF SE	Chemicals and pharma *	155	118	111	40	70	494
4	Daimler AG	Automobile	192	104	82	28	81	487
5	Bayer AG	Chemicals and pharma *	172	100	87	40	72	471
6	Deutsche Telekom AG	Media	162	94	94	30	85	465
7	Volkswagen AG	Automobile	125	100	126	25	79	455
8	Axel Springer AG	Media	155	84	87	25	86	437
9	Henkel AG & Co. KGaA	Chemicals and pharma *	118	93	125	35	66	437
10	RWE AG	Utilities *	168	62	85	30	86	431
11	Wacker Chemie AG	Chemicals and pharma *	182	74	66	40	69	431
12	K+S AG	Basic commodities *	122	109	90	25	70	416
13	Fraport AG	Transportation and logistics	145	76	83	30	80	414
14	Deutsche Post DHL	Transportation and logistics	132	80	83	35	81	411
15	Adidas AG	Commerce	142	78	68	25	77	390
16	Commerzbank AG	Banks	108	87	108	23	60	386
17	SAP AG	Media	125	67	78	20	85	375
18	E.ON AG	Utilities *	95	87	78	30	82	372
19	Puma SE	Commerce	132	48	71	25	82	358
20	Allianz SE	Insurance	112	56	91	33	58	350
21	Evonik Industries AG	Chemicals and pharma *	108	69	77	25	67	346
22	Merck KGaA	Chemicals and pharma *	125	63	60	30	64	342
23	Münchner Rück AG	Insurance	85	62	72	40	63	322
24	Hochtief AG	Civil engineering	108	61	60	35	56	320
25	HeidelbergCement AG	Basic commodities *	95	62	73	25	62	317
26	Deutsche Bank AG	Banks	63	72	108	18	52	313
27	TUI AG	Transportation and logistics	82	62	78	10	77	309
28	MAN SE	Automobile	112	47	56	30	62	307
29	Deutsche Lufthansa AG	Transportation and logistics	125	41	56	15	68	305
30	Salzgitter AG	Basic commodities *	82	61	73	30	59	305
31	Linde AG	Chemicals and pharma *	82	74	59	13	50	278
32	METRO AG	Commerce	102	41	48	18	50	259
33	Aurubis AG	Basic commodities *	68	59	56	25	49	257
34	Lanxess AG	Chemicals and pharma *	115	33	41	20	43	252

* Company within a CSR industry.

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